Executive Department
Jon P. Jennings, City Manager

January 31st, 2019

Mr. Alex Rosenberg
Office of Environmental Stewardship
U.S. Environmental Protection Agency – Region 1
5 Post Office Square – Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

Re: CMOM Program Implementation Annual Report
City of Portland Reporting Period: 1/1/2018 – 12/31/2018
Administrative Order Docket No CWA-R1-AO-12-009

Dear Mr. Rosenberg:

Please find the City of Portland's CMOM Program Implementation Annual Report enclosed. The report reflects the period between January 1st, 2018, to December 31st, 2018; according to the requirements of the Administrative Order Implementation Schedule. The attached report was organized in collaboration with members of my staff and prepared by Benjamin Pearson, P.E., Water Resources Division Compliance Section Coordinator. I am pleased to report that we have completed significant efforts to resolve deficiencies identified in the CMOM Corrective Action Plan; we are in the process of executing additional contracts for other corrective action plan work as described in the attached report.

The report complies with the CMOM Corrective Action Plan and provides information required for the annual report and checklist. Topics include; corrective action plan related work, reports on sanitary sewer overflows (SSO's), activities to measure efforts to comply with the EPA Order, collections system mapping, sewer budgets, measures to reduce Inflow and Infiltration, easement maintenance program, status of work related to the Administrative Order schedule, and projected measures going forward. Associated documentation including invoices, pay requisitions, contracts, SSO reports, and budget documents are included in the appendices.

The City of Portland is committed to promote, implement and maintain our infrastructure to meet Clean Water Act regulations and requirements. The City has taken on other initiatives to support this effort to include continued funding for Sewer CMOM corrective actions, organizational and staff development work, and assessments of the City's water resources infrastructure. The City has also awarded a contract to Kleinfelder to complete an integrated plan for the City of Portland.

Should you have any questions or need further information, do not hesitate to contact Nancy Gallinaro, Water Resources Manager, at 207-874-8801.

Sincerely,

Jon. P. Jennings
City Manager

CC: Christopher Branch, City of Portland, Director of Public Works
Nancy Gallinaro, City of Portland, Water Resources Manager
Danielle West Chuhta, City of Portland, Corporation Counsel
Benjamin Pearson, City of Portland, Compliance Section Coordinator
Stuart Rose, MaineDEP WQM-Southern Region
Michael Wagner, Senior Enforcement Counsel, USEPA

Via Electronic Mail

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Mr. Alex Rosenberg
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U.S. Environmental Protection Agency – Region 1
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Boston, MA 02109-3912

Re: CMOM Program Implementation 2018 Annual Report, City of Portland Maine
Reporting Period: 01/01/2018 – 12/31/2018
Administrative Order Docket No CWA-R1-AO-12-009

Dear Ms. Rosenberg,

As required in the Administrative Order Docket No CWA-R1-AO-12-009, hereinafter referred to as the "Order", the City of Portland (City) is hereby submitting this CMOM Program Implementation Annual Report. This is the City's sixth Annual Report, which includes CMOM Program Implementation activities completed during the reporting period beginning January 1, 2018, and extending through December 31, 2018.

Administrative Order Compliance

The City of Portland prepared a CMOM Assessment and Corrective Action Plan (CAP) to address the requirements of the Order and to provide a detailed long-term Corrective Action Plan for wastewater system management. The CMOM Assessment and Corrective Action Plan was completed on November 12, 2013, and submitted to EPA. Subsequently, the City prepared and submitted the CMOM Corrective Action Plan Implementation Schedule, dated November 22, 2014, which was approved by the EPA.

With the intent to summarize the compliance activity information requested in Section IV of the Order for the period ending December 31, 2018, we have organized this Annual Report to be consistent with the sections of the Order, as outlined below:

Table 1: Compliance Activities

Administrative Order Ref.	Description	Status	Page Number
IV.2.	Corrective Action Plan Related Contracted Work	Addressed	2
IV.2.a.	Summary Listing of all SSOs	Addressed	5
IV.2.b.	Activities to Measure Effects to Comply with AO § V.	Addressed	8
IV.2.c.	Collection System Mapping	Addressed	9
IV.2.d.	Copies of Collection System O&M Budgets	Addressed	10
IV.2.e.	Measures Taken to Reduce Extraneous Flows	Addressed	10
IV.2.f.	Description of Easement Maintenance Programs	Addressed	11
IV.2.g.	Current Status of AO Schedule Work	Addressed	11
IV.2.h.	Projection of Current Year Work to Comply with AO § V.	Addressed	16

Order Section IV.2. – Corrective Action Plan Related Contracted Work

Throughout 2018, multiple efforts were undertaken related to the Corrective Action Plan. The following section describes this work:

The Franklin Street and Curtis Road Pump Station projects identified in the CMOM CAP report were awarded as design-build projects to Woodard and Curran. A guaranteed maximum price for each project has been accepted and construction will begin in the spring of 2019 as described below and in *Order Section IV.2.H – Current Status of AO Schedule Work*. The project descriptions are as follows:

Curtis Road Pump Station Comprehensive Upgrade – All components of the pump station except the wet well will be replaced and upgraded based on the Design-Basis Report prepared by Woodard and Curran. A Guaranteed Maximum Price of $706,000 was agreed upon and construction is scheduled to begin April 2019 and completed by July 2019. Contracts, including the Design Basis Report, and invoices for this work are included in Appendix A. The following work will be completed.

- A Gorman-Rupp package pump station will be installed. Two 20 horsepower pumps with 420 gallon per minute pumping rate capacity have been specified.
- An eight inch bypass connection adjacent to the wet well in a new bypass manhole will be constructed that will also function as a pig launching station for future force main cleaning.
- An inline electromagnetic flow meter will be installed.
- A Caterpillar standby generator with an automatic transfer switch will be installed along with an upgraded electrical system in coordination with Central Maine Power.
- An 8 x 12 fiberglass structure will encase the equipment.

Franklin Street Pump Station – This station was originally planned to be eliminated as part of the design of a 3.5 million gallon combined sewer overflow storage conduit, known as Back Cove South, but the storage conduit's location was modified and the station could not be eliminated. After an inspection of the existing conditions at the pump station, the original design-build proposal was modified to include extensive mechanical, electrical, and structural improvements. A Guaranteed Maximum Price of $3,097,000 was agreed upon and construction is scheduled to begin June 2019 and be completed by December 2019. Contracts, including the Design Basis Report and invoices for this work are included in Appendix A. The following work will be completed.

- The cooling water system upgrade will consist of three main items; replacement of the supply piping and valves to the pumps from the circulator pump, replacement of the return piping and valve, and modifications to the existing tank. In completing these items, all piping and valves will consist of uniform materials and the cooling water system will be automated to ensure proper cooling water conditions including level within the tank and temperature.*
- The existing motor control center will be replaced with an Allen-Bradley IntelliCenter Motor Control Center.*
- A Caterpillar standby generator with an automatic transfer switch will be installed along with an upgraded electrical system in coordination with Central Maine Power.
- Environmental remediation of hazardous material including asbestos PCB, and lead paint.

- A new channel grinder will be installed in the existing grinder bypass channel and electrically actuated slides will be installed upstream of the existing and proposed grinders.

- A new stainless steel isolation gate with a manual actuator will be installed to replace the existing non-operational gate.

- The existing suction isolation valves will be replaced and will have electric actuators. Additionally, existing suction pipe will be modified to allow for new plug valves, uncoated ductile iron pipe will be coated to prevent corrosion, and existing flange hardware on the suction piping will be replaced with stainless steel hardware.

- An air release valve will be added on the discharge force main header to expel air trapped in the line.

- An ADFM hot-tap flow meter will be installed in the existing vertical force main within the drywell.

*The cooling water system upgrade and motor control center replacement are two of the three items scheduled to be completed as part of the Administrative Order. The third item, upgrade of pump 3, has already been completed.

As part of the CMOM Corrective Action Plan Implementation Schedule, the contract with the Ted Berry Company Inc. included in the annual report submitted for 2015 was extended in order to ensure that the City met its obligation of inspecting six percent of the collection system. In 2018, the total amount of sewer inspections completed were 124,936 linear feet or 10.1 percent of the collection system. City staff inspected 35,259 linear feet of sewer pipe. Ted Berry Company inspected 77,684 linear feet of sewer pipe and 449 sewer manholes at a cost of $361,108.61. Ted Berry Company inspected most of the remaining sewer lines on the Portland peninsula that had not been inspected in the past five years and encountered several areas that required heavy cleaning. A total of 266 tons of debris were removed during their inspections. The City also added multisensory inspections to the contract to allow for both SoNAR and LiDAR to be used to inspect large diameter pipe in the Bayside neighborhood. This inspection technology was primarily used to inspect the Lancaster Street sewer which has a history of sediment buildup. An additional 8,818 linear feet CCTV inspections were completed by Ted Berry Company and 67 manholes were inspected by Flow Assessment Services as part of the Inflow and Infiltration Program which is described in *Order Section IV.2.H – Measures Taken to Reduce Extraneous Flows*. Precision Industrial Maintenance inspected 3,175 linear feet of the Presumpscot North Interceptor, a cross country pipe within a wooded right-of-way at a cost of $31,000. The Presumpscot North Interceptor was originally slated for replacement or rehabilitation but upon further inspection, it appears that the pipe itself is in good shape, though the manholes will likely need rehabilitation. This interceptor is also being investigated as part of the Inflow and Infiltration Program. All pipe inspections and manhole inspections are NAASCO rated with PACP and MACP and are managed through ITpipes software.

Arcadis was under contract for the Inflow and Infiltration Program. More information regarding these efforts can be found in Order Section IV.2.E – Infiltration and Inflow Reduction Measures.

In 2018, Woodard and Curran was under contract to provide SCADA services under the SCADA Serve and TRM contracts.

Multiple sewer separation projects were completed or began construction during this period and included sanitary sewer replacement. A limited contract document and associated most recent or final payment requisition documents for each project are included in Appendix A unless noted. Complete project documents are several hundred pages and can be sent upon request and include the original document, the proposal, and all bond and insurance information. The projects which had sanitary sewer replacement work are briefly described here:

Powsland - Mitton Sewer Replacement - Roughly 620 linear feet of 8" vitrified clay pipe sanitary sewer was replaced with 8" PVC in Mitton Street. A total of 1,620 linear feet of sanitary sewer pipe and 1,460 linear feet of lateral piping was replaced in this project. $350,182.72 of the $574,655 cost for the water resources portion of this project has been paid to R.E. Coleman to date. All pipe has been installed and the project will be substantially complete in the summer of 2019.

Madison-Washington-Walnut Sewer Separation Project – Roughly 2,000 linear feet of sanitary sewer pipe ranging from 10" to 24" and 1,460 linear feet of lateral piping has been replaced as part of this project in 2018. $1,471,168.27 of the $2,525,183.40 total project cost has been paid to D & C Construction to date. The total project cost includes all sanitary sewer, storm sewer, sidewalk and road reconstruction costs. All pipe has been installed and the project will be substantially complete in 2019.

Bedford Street Sewer Separation Project – Roughly 2,000 linear feet of 8" sanitary sewer pipe and 240 linear feet of lateral piping has been replaced as part of this project in 2018. Roughly 500 linear feet of 10" sewer and 250 linear feet of lateral piping will be installed in 2019. $2,820,229.1 of the $5,142,353.70 total project cost has been paid to Shaw Brothers to date. The total project cost includes all sanitary sewer, storm sewer, sidewalk and road reconstruction costs. The Bedford Street portion of the project will be completed by July 2019 and the Belmeade Street portion will be completed by July 2020.

The City is currently under contract with Flow Assessment Services to provide flow monitoring services for sanitary sewer flows. The data gathered within this contract has been utilized as part of many sanitary and sewer separation projects. Flow Assessment Services is also the subcontractor for the Inflow and Infiltration Program under Arcadis.

Copies of the readily available contracts, invoices, or pay requisitions related to this work are attached as Appendix A. Some contracts have been reduced in length but additional documents can be provided upon request.

Order Section IV.2.A – Sanitary Sewer Overflows

What follows is a listing of all documented sanitary sewer overflow (SSO) as described in the Order, which have occurred and reported since January 1st, 2018 through December 31st, 2018. A SSO is defined for purposes of the Order as overflow, spill, or other release from the Collection System, including building/private property backups, wet weather events, and dry-weather CSO outfall discharges.

During this period, there were nine documented SSO events, five of which were dry-weather events. The remaining four events were due to short duration high intensity rain events. All corrective actions were completed after the overflow was observed. Table 2 provides the listing of these events in chronological order, with the additional information as required in Section IV. Request for Information. Copies of the Maine DEP Non-Compliance Discharge Incident Reports, as prepared by the City are attached in Appendix B.

Table 2: SSO Detail *

Date / Time	Location	Notification Source	Cause	Volume Released and Method to Estimate	Potential MS4 Impact	Potential Surface Water Impact	Volume Released to MS4 or Surface Water and Method to Estimate	Corrective Measures	DEP Reporting Date	Last Event – Same Location
2/21/2018 Reported at 16:45, unknown start time	129 Revere Street	Property Owner	Sag in lined sewer. Additionally, downstream manhole had a resin oriented liner lip that caused a blockage at the offset.	No estimate	None	Back Cove	None	Sewage backed up into basement due to blockage caused by liner issue. Sewer main was rodded to remove blockage and the line was thoroughly cleaned. Added to monthly inspection list.	Verbal 2/22/2018 Written 2/26/2018	None known
4/17/2018 4 hour duration	6 and 18 Brookview Terrace	Property Owner	Blockage caused failed lateral plug and solids	No estimate	None	Capisic Brook	None	Sewage backed up into basements due to blockage caused by solids stuck on a failed lateral plug. Sewer main was jet cleaned with a vactor to remove blockage. Sewer was excavated to remove blockage and was repaired on 5/17/2018.	Verbal 4/17/2018 Written 4/23/2018	None known
6/18/2018 18:00, less than an hour	Combined Sewer Manhole York Street and Park Street, York Street and High Street	Field Crew	Short duration and high intensity rain event.	No estimate	Short duration with high intensity rain event, but no signs of wastewater orientated debris. Overflow ended up in catch basins at Commercial Street and High Street. Closest down gradient basins vary but distance is less than 100 feet away.	Casco Bay	None recorded	Cover was reset. The system was televised for obstructions, but none were found. Pipe capacity appears to be insufficient to carry the short duration, intense rainfall events.	Verbal 6/19/2018 Written 6/25/2018	York and High 7/25/2016 York and Park 10/21/2016
6/26/2018 unknown start time, considered short duration	17 Grafton Street	Property Owner	Root ball	No estimate	None	Casco Bay	None recorded	Sewage backed up into basement due to blockage caused by a large root ball. Sewer main was rodded and inspected.	Verbal 6/27/2018 Written 7/3/2018	None known
7/17/2018 14:00, less than 15 minutes	Combined Sewer Manhole York Street and Park Street, York Street and High Street, Maple at Commercial	Field Crew	Short duration and high intensity rain event.	No estimate	Short duration with high intensity rain event, but no signs of wastewater orientated debris. Overflow ended up in catch basins at Commercial Street and High Street. Closest down gradient basins vary but distance is less than 100 feet away.	Casco Bay	None recorded	Cover was reset. The system was televised for obstructions, but none were found. Pipe capacity appears to be insufficient to carry the short duration, intense rainfall events.	Verbal 7/19/2018 Written 7/24/2018	York and High 6/18/2018 York and Park 6/18/2018 Maple and Commercial 6/5/2016
8/22/2018 12:00, less than 15 minutes	Combined Sewer Manhole York Street and High Street, Maple at Commercial	Field Crew	Short duration and high intensity rain event.	No estimate	Short duration with high intensity rain event, but no signs of wastewater orientated debris. Overflow ended up in catch basins at Commercial Street and High Street. Closest down gradient basins vary but distance is less than 100 feet away.	Casco Bay	None recorded	Cover was reset. The system was televised for obstructions, but none were found. Pipe capacity appears to be insufficient to carry the short duration, intense rainfall events.	Verbal 8/22/2018 Written 8/24/2018	York and High 7/17/2018 Maple and Commercial 7/17/2018

Date / Time	Location	Notification Source	Cause	Volume Released and Method to Estimate	Potential MS4 Impact	Potential Surface Water Impact	Volume Released to MS4 or Surface Water and Method to Estimate	Corrective Measures	DEP Reporting Date	Last Event – Same Location
9/6/2018 12:00, less than 30 minutes	Combined Sewer Manhole York Street and Park Street, York Street and High Street, Maple at Commercial	Field Crew	Short duration and high intensity rain event.	No estimate	Short duration with high intensity rain event, but no signs of wastewater orientated debris. Overflow ended up in catch basins at Commercial Street and High Street. Closest down gradient basins vary but distance is less than 100 feet away.	Casco Bay	None recorded	Cover was reset. The system was televised for obstructions, but none were found. Pipe capacity appears to be insufficient to carry the short duration, intense rainfall events.	Verbal 9/7/2018 Written 9/11/2018	York and High 8/22/2018 York and Park 7/17/208 Maple and Commercial 8/22/2016
10/8/2018 4 hour duration	83 and 84 Illsey Street	Property Owner	Blockage caused roots	No estimate	None	Casco Bay	None	Sewage backed up into basements due to blockage caused by root intrusion. Sewer main was jet cleaned with a vactor to remove blockage. Inspection and root cutting was performed the following day.	Verbal 10/9/2018 Written 10/12/2018	None known
12/26/2018 Unknown duration	73 and 77 Inverness Street	Property Owner	Blockage caused roots	No estimate	None	Back Cove	None	Sewage backed up into basements due to blockage caused by root intrusion. Sewer main was jet cleaned with a vactor to remove blockage. Inspection and root cutting was performed the following day.	Verbal 12/26/2018 Written 12/31/2018	None known

*Copy of the MaineDEP Non-Compliance Discharge Incident Reports, as prepared by the City are attached in Appendix B. A map of SSOs locations is available upon request.

Order Section IV.2.B – Activities to measure effects to comply

The City has worked diligently during 2018 to comply with the Order through the Asset Management Program and in cooperation with other City Departments.

The City continues to expand its use of Cityworks for Water Resources field staff. Cityworks is being used both in the field on iPads and in the office for managing and tracking work orders and inspections for most sewer and stormwater field work. In 2018, the addition of tracking equipment, labor and material has increased the ability of Water Resources to understand the amount of labor hours and the costs associated with it so that a better estimate of what resources will be needed to complete necessary work can be made. Additionally, the Cityworks work order system has been expanded to include more tasks associated with each pump station. The ability to report out on work completed versus work scheduled allows for a better understanding of resources and needs.

In 2018, the Asset Management team, in conjunction with the GIS/IT Team added new attributes to the Sewer Gravity Mains dataset in order to allow for continual calculations of Risk for sewer gravity mains using both GIS tables as well as using a Cityworks provided application called Operational Insights. Operational insights allows the City to calculate Risk by configuring the application using the new attributes added to the GIS along with NASSCO condition scores using weights for each parameter to come up with a Risk number. This allows the City to show the pipe Consequence of Failure, Likelihood of Failure, and Risk in a graphical format on a map to show the locations of high risk pipes. Previously, the City relied on a spreadsheet based system that did not update in real-time as inspection data was added. A map of this data and additional information can be found in Appendix E.

Per the Administrative Order multiple staff members from Water Resources Operations and Maintenance (6) were trained and certified through the National Association of Sanitary Sewer Company Pipe Assessment Certification Program.

While incorporated into the Rules and Regulations for Use of the Sewer System in the summer of 2015, the Fats, Oils, and Grease (FOG) program began full implementation July 2016. In 2018, 478 Fats, Oils, and Grease inspections were completed by the Health Department. When a health inspection that indicates a non-compliant establishment is submitted to Water Resources, follow up is done to inform and correct the non-compliance. Much of the follow-up work, if required, is conducted by Water Resources staff and generally involves providing maintenance information or technical support for equipment upgrades. An additional 230 follow-up inspections were completed by Water Resources staff. Since the program was fully implemented, over 1000 inspections have been completed. From an administrative perspective, the FOG program continues to be integrated into the building permit and business licensing processes for any new food service establishments, establishments renewing their license, and existing establishments that are changing ownership. By being incorporated into the permitting and licensing process, FOG program requirements are enforced and equipment installed prior to final approval for construction or business license approval. As previously reported, the City is following a tiered system to ensure establishments are compliant with the program. Tier II, which covers establishments that lack records and whose business licenses renew yearly on a set date, will continue to be reviewed. Many restaurants were contacted and additional information was gathered in 2018 and were part of the 230 inspections completed by Water Resources Staff. Tier III, which covers establishments that lack records and whose business licenses do not renew on a set date but throughout the year due to liquor licenses, will also continue to be reviewed. As follow up inspections are completed at both Tier II and Tier III establishments, non-compliance results in the business licensing office putting a hold on the license renewal until compliance is regained. This system appears to be working well and only a single notice of violation had to be issued for non-compliance. The establishment regained compliance

shortly thereafter and was able to renew their license. Water Resources Staff are now inspecting and working with larger institutions throughout the City, some of which are not licensed in the same way as your common restaurant. This includes schools, universities, large office buildings with kitchens, places of worship, fraternal orders, and assisted living facilities. A total of eight of these institutions were addressed in 2018 and additional locations will be included in 2019.

The City has continued to use Smart Covers to alert Operations staff when the flow at the manholes begins to rise to a pre-determined height, indicative of a sewer back-up downstream. 12 Smart Covers are currently deployed in several areas. Besides the purchase of the covers, there is an annual fee for the reporting of flow information to the cloud. Copies of the invoices for this equipment and services paid in 2018 are attached as Appendix A.

Order Section IV.2.C – Collection system mapping

In order to improve the collection system mapping, the Asset Management team is constantly updating the GIS system. Whether it is due to the installation of new infrastructure, the abandonment of old infrastructure or field verification of unknowns, the collection system data is regularly revised. To help understand and improve how this process of updating and revising is completed, the following was completed in 2018:

As part of the Inflow and Infiltration Program, a gap analysis of the GIS system has been completed and provided to the City. The report highlights areas within the GIS system that are deficient or lack information. The report indicates that some attributes are populated with a percentage of nulls, which indicates a lack of data. Initial trace analysis indicated that 95% of the system is fully connected but at this time, the remaining 5% has been corrected to ensure that the GIS is fully connected. To address a lack of invert elevation data for manholes a survey-grade GPS unit for data collection has been purchased and Water Resources staff are being trained to be able to capture additional data. The data is vital to be creation of a dynamic model. Additional questions raised throughout the process have been answered and have been updated within the GIS. The Asset Management team continue to update the GIS system as needed.

The City continues to collect sewer assessment data with field inspections and closed circuit television inspections of collection system infrastructure. Since 2010, the City has inspected 45% of the collection system through CCTV. When the inspection data is received, the related GIS is reviewed, verified, and corrected if needed. As the data is updated, the risk analysis model can be run and kept up to date. This allows the City to make better-informed decisions regarding infrastructure repair or replacement. The asset management team was given the Asset Management Excellence Award from the Maine Water Environment Association for their work and willingness to help other communities with their asset management programs.

Map updates are ongoing and we would be pleased to provide a GIS copy of the most current system map upon request.

Order Section IV.2.D – Collection System Budgets

Attached in Appendix C is a copy of the FY19 Sewer Enterprise Fund Operations & Maintenance Budget and Capital Budget from the City's operating "Sewer Fund" budgets, for the period beginning July 1, 2018, through June 30, 2019. The City's Sewer Enterprise Fund generates revenue from all users of the system who pay monthly or quarterly fees, based on water volume. Capital projects including repair and replacement of sanitary sewer infrastructure are funded through this Sewer Enterprise Fund as well with financing using the State Revolving Loan Fund and City bonds. Combined Sewer Overflow abatement is funded using the same sources of funding. Collection System operations and maintenance budget is specifically described in the Enterprise Fund Budget as Sewer Districting; further breakdown of that budget is attached in Appendix C as Sewer Utility Districting General Fund/Operating Budget, along with FY19 Sewer Districting Expenditures Explanatories. In 2018, the City of Portland switched financial reporting information so some reports may appear different than the past or may not capture all information for spent accounts.

Additionally, attached in Appendix C is the City of Portland FY19 Capital Improvement Plan Project to Date report, limited to those pages including sewer-related projects.

Order Section IV.2.E – Infiltration and Inflow Reduction Measures

Arcadis was chosen and awarded a contract to complete the multiple year and phase Inflow and Infiltration Program beginning in May of 2017. All funding has been allocated for the Program.The final contract, which includes the scope of work for the program, is included in Appendix A.

The three phases of the program are:

1. Investigation and quantification of Inflow and Infiltration flows
2. Identification of major Inflow and Infiltration sources
3. Schedule of target opportunities for cost-effective mitigation

The Inflow and Infiltration program is concurrently in Phase 1 and Phase 2. Phase 1 is being completed over a two year period. In 2018, 20 meters were installed throughout the collection system and several sub-areas were identified as having excessive flows from either high infiltration or high delayed inflow. A total of 17 sub-areas were recommended for Phase 2 investigation, 9 of which had both high infiltration and high delayed inflow. The data collected in 2018 is included in Appendix D and can be found in the Phase 1 Investigation of Flows Report for 2018 Monitoring

Phase 2 investigations include flow isolation, CCTV inspections, and manhole inspections. A total of 194,740 linear feet of flow isolation, 27,611 linear feet of CCTV, and 443 manhole inspections are recommended based on the 2018 flow monitoring data. As of the end of 2018, Ted Berry Company and Flow Assessment Services had already begun phase 2 investigations and have completed 8,818 linear feet of CCTV inspection and 194,928 linear feet of flow isolation.

In addition to the field work completed, a Hydraulic Model Gap Analysis and GIS Gap Analysis report were prepared and submitted as part of phase 1. Appendix D has both of these reports along with the Phase 1 Investigation of Flows Report for 2018 Monitoring and an overall Program Status Report.

After completing the second year of flow monitoring in Phase 1 and investigations in Phase 2, Phase 3 of the program will result in a Wastewater Collection System Analysis and Action Plan. This plan will determine strategies to reduce inflow and infiltration, a cost estimate for those strategies, prioritized rehabilitation, repair, and replacement work, and a 10-year capital plan with short-term and long-term objectives. Finally, a comprehensive Inflow and Infiltration Study Report that incorporates the findings of all reports prepared in Phase 1, 2, and 3.

Arcadis has broken down the program into six tasks, some of which will be part of each phase. The proposal, final scope of work, and cost estimates are included in the contract, which can be found in Appendix A. All invoices to date are also included in Appendix A. Additional insurance documents are available upon request.

Order Section IV.2.F – Easement maintenance program

The City's Easement Maintenance Program is designed to protect public health and the environment by focusing on locating lost or buried manholes; the City periodically clears easements of trees and re-growth to prevent tree root penetration into sewer lines. The goal of the program is for line segments to be cleared on a regular interval, dependent upon site conditions. As easements are maintained, the sewer system within them are inspected to determine if rehabilitation is necessary. The City utilizes Public Works Survey staff to flag the easements prior to initiating clearing activities. The maintenance program includes mowing, selective vegetation removal, and tree cutting, and as required, use of EPA-approved spot herbicide applications. Additional equipment has been budgeted and purchased to maintain easements throughout the City.

In 2018, the City maintained two sewer easements throughout the City for a total of 2,950 linear feet and eight manholes were adjusted to grade and resealed. The easements maintained are:

Virginia Carter between Maine Avenue and Marlborough Street – 1,960 feet

Presumpscot North between Riverside Industrial Parkway and the Maine Turnpike – 990 feet

Public Works survey staff continue to assist in easement maintenance by providing research of property deeds and ownership along with flagging of the right of ways. Additionally, the City awarded a contract to Jones Associate to complete a survey of the Presumpscot North Interceptor south of Riverside Industrial Parkway.

Order Section IV.2.H – Current Status of AO Schedule Work

As part of the Administrative Order, a Capacity Management Operation and Maintenance Corrective Action Plan Implementation Schedule (CMOM CAP) was approved by the Environmental Protection Agency on November 22, 2014. The CMOM CAP includes program, staffing, and projects with associated deadlines and are italicized below. The current status is reported below each item.

Operations and Maintenance Recommendations

1. *Beginning July 1, 2014, perform annual CCTV assessment of at least 6% of the collection system and manholes;*
    a. *PACP and MACP data from the assessment shall be integrated into the City's CMMS within 30 days of collection.*

This has been completed annually each year on time through the combination of City sewer inspections and sewer assessment contracts with Ted Berry Company. In 2018, the total amount of sewer inspections completed were 124,936 linear feet or 10.1 percent of the collection system. 516 manholes were inspected which represents 9.4% of total manholes.

2. *By July 1, 2016, City's collection system CCTV and other inspection data collected since July 1, 2010, shall be assigned PACP and MACP scores and uploaded to the CMMS database.*

Data collected previously that did not have this rating was converted through a contract with Ted Berry and reported in the 2016 annual CMOM report and all data has been assigned PACP and MACP prior to the deadline.

3. *By July 1, 2016, the City shall assign unique individual asset identifiers for collection system structures (manholes, diversion structures, outfalls, hydro brakes, etc.) in the CMMS program to track maintenance activities and operational performance.*

This was completed on time through a contract with ESRI and reported in the 2016 annual CMOM report.

4. *Between January 1, 2015, and January 1, 2019, the City shall complete Phase I of an I/I program as described in Section 6.3.2 of the City's CMOM Correction Action Plan. A Phase I report that includes flow metering results and identified all sub-catchment areas that have I/I flows in excess of 4,000 GPD per inch diameter/mile of sewer shall be submitted to EPA no later than January 1, 2019.*

Arcadis has been contracted to complete the Inflow and Infiltration Program. The Phase 1 Investigation of Flows Report for 2018 Monitoring report was submitted on December 28, 2018. Currently, Arcadis is conducting a second year of Phase 1 monitoring and has begun Phase 2 of the program. A second Phase 1 report will be submitted with the data gathered in 2019.

5. *By July 1, 2019 the City shall submit Phase II of the I/I program as described in Section 6.3.3 of the City's CMOM Correction Action Plan that identifies all major source of I/I based on a methodology of assessment whose inputs are, at a minimum, the I/I program's Phase I results.*

During that time frame the following items will be developed and worked on by the City:

- *The City and the PWD currently own 41 CSO flow monitors, In addition, the City also owns 24 additional flow monitors utilized to monitor and model sub-catchment areas for the development of its CSO projects. Metering and modeling data will be collected from past and future projects and consolidated into SWMM 5.0. A Gap Analysis will then be performed to determine what parts of the system remain to be modeled and move forward with that task. InfoSWMM will help us to determine deficiencies within the collection system allowing us to focus on critical infrastructure*

first. To complement this effort, gaps in our GIS data will be identified and corrected for the highest level of accuracy in the model.

GIS and Hydraulic models gap analysis reports have been submitted in order to identify data gaps as part of Phase 1 of the Inflow and Infiltration Program. The City has purchased a survey-grade GPS unit for data collection to improve level and invert data required for a model. Funding to improve the model based on the recommendations from the gap analysis was requested in the Fiscal Year 2020 budget. Phase 2 of the Inflow and Infiltration program is on track to meet the July 1, 2019 deadline.

- *In addition to investing in modeling technology, the Department of Public Services will be seeking funds in FY16 to add a new truck and software for in-house CCTV as well as certifying additional staff on NASSCO PACP, MACP, and LACP to give us the best possible, consistent, objective data when prioritizing rehabilitation and replacement needs.*

This was completed through the purchase of the new CCTV truck as previously reported. In 2018, the City completed training and workflow implementation in order to take advantage of our new CCTV truck. This will allow the City to do a higher volume of proactive CCTV work.

- *A full and complete inventory of our assets and their condition and a plan to address I&I can be established and prioritized the results of an integrated plan.*

While this will be part of the I/I program, the City has retained Kleinfelder to prepare an Integrated Plan for Water Resources. The two year process is currently underway in and will help inform future decisions in how to address water quality issues.

- *Determine the best possible benchmark for measuring success in our efforts. We anticipate this measurement will be a reduction in base flows from Pump Stations to the East End Wastewater Treatment Plant.*

This may be part of the Inflow and Infiltration Program and Integrated Plan.

- *By July 1, 2016, the City shall finalize the CMMS program implementation for both the collection system and pump station assets in order to track all service requests, work orders, including predictive maintenance practices.*

This has been completed for collection system assets and pump station assets.

Additionally, the Asset Management team has offered several training opportunities to Operations and Maintenance staff in the use of iPads to complete work orders and inspections so that all of the information is digital and entered into the CMMS.

6. *By December 1, 2019, the City shall submit a schedule for the completion of Phase III as described in the City's CMOM CAP Section 6.3.4 and 6.3.5 that will be incorporated into the Administrative Order Docket number 12-009 unless EPA issues an order with an alternative schedule. Said alternative schedule shall be reviewed and jointly agreed to by the City of Portland Region 1 EPA office.*

This will be part of the Inflow and Infiltration Program.

Collection System and Pump Station Renewal Recommendations

1. *By January 1, 2020, the City shall submit to EPA and MEDEP for approval a plan for long-term collection system renewal based on CCTV assessments, SSES studies and asset management performed up to that date.*

This may be part of the Inflow and Infiltration Program and/or Integrated Planning efforts.

2. *By July 1, 2020, the City shall plan and execute short-term collection system renewal projects for all 'high priority renewal' projects identified in the CMOM Plan.*

The City has reviewed the projects identified in the CMOM plan and will continue to plan and execute the projects which are still considered to be priorities. Since the CMOM report was prepared with a small amount of data compared to what the City currently has collected with sewer assessments, not all of the projects identified in the report will be completed as other projects have taken higher priority.

3. *By July 1, 2020, the City shall plan to execute short-term pump station renewal projects identified in the CMOM Plan based on the following schedule:*

    a. *By July 1, 2016, upgrade the standby power connection at the Castine Pump Station*

This had previously been reported as completed but only the standby generator was upgraded and not the power source. The Central Maine Power line for Castine Avenue must be upgraded to a three phase 480 volt line. This work is being coordinated with Central Maine Power.

    b. *By December 31, 2017, the City shall eliminate the Franklin Street Pump Station, or implement as follows:*
        i. *Upgrade the cooling water system, and Pump 3 by July 1, 2016*
        ii. *Upgrade the MCC by July 1, 2017*

Woodard and Curran is under contract to complete this project in 2019. The project was awarded as a two-phase contract where Woodard and Curran would prepare design up to 60% along with a guaranteed maximum price. The City had the choice at that point to accept the guaranteed maximum price and move forward with Phase 2 which is the design-build process to construct the improvements. The City did accept the guaranteed maximum price and the project is anticipated to be completed in 2019. Detailed information regarding this can be found in Order Section IV.2. – Corrective Action Plan Related Contracted Work.

    c. *At the Riverside Pump Station:*
        i. *Upgrade the MCC system by July 1, 2016*
        ii. *Upgrade Pumps 1 and 2 by July 1, 2017*

This has been completed.

    d. *By July 1, 2018, eliminate the Curtis Pump Station and implement the recommended upgrades at the Hope Street Pump Station, or plan and implement of the other two alternatives described in the CMOM Plan by July 1, 2017.*

Woodard and Curran is under contract to complete this project in 2019. The project was awarded as a two-phase contract where Woodard and Curran would prepare design up to 60% along with a guaranteed maximum price. The City had the choice at that point to accept the guaranteed maximum price and move forward with Phase 2 which is the design-build process to construct the improvements. The City did accept the guaranteed maximum price and the project is anticipated to be completed in 2019. Detailed information regarding this can be found in Order Section IV.2. – Corrective Action Plan Related Contracted Work

e. *Upgrade the PLC and instruments at the Ashmont pump station by July 1, 2019.*

This is on schedule to be completed in 2019. The current equipment had been updated to sync with the existing system recently as part of the Woodard and Curran TRM contract.

f. *Replace the Riverton Pump Station with a submersible pump station by July 1, 2019.*

The project is under design by in-house staff and is anticipated to go out to bid Summer of 2019.
.

g. *By January 31, 2020, the City shall submit plans for long-term pump station renewal projects to be completed during the next five year period from July 1, 2020, through July 1, 2025.*

This may be part of the Integrated Planning efforts.

Wastewater Program and Ordinance Recommendation

1. *By January 31, 2015, the City shall 1) develop a Fats, Oils, and Grease (FOG) program that reduces grease accumulations so as to not impact Collection System capacity and contributing to Sanitary Sewer Overflows (SSO's) and 2) submit a written description of that program to EPA and MEDEP. The City shall implement the FOG program by July 1, 2016.*

This was completed on time. More detailed information can be found in Section IV.2.B – Activities to measure effects to comply.

2. *Beginning July 1, 2016, and annually thereafter, update the City's asset risk analysis and renewal planning priorities, to be submitted to EPA and MEDEP as part of the CMOM Program Implementation Annual Report.*

The risk analysis and renewal planning priorities are available and are provided in Appendix E, though the analysis and rehabilitation list is updated as additional information is gathered through inspections and CCTV work.

Staffing and Organizational Recommendations

1. *By July 30, 2015, complete the implementation of the organizational framework recommendations within the CMOM Plan including the establishment of a new division of Water Resources Management, the hiring of a full-time manager for this division, and the hiring of a full-time asset manager.*

This was completed on time.

Order Section IV.2.H – Projected measures

In addition to the ongoing work described in this Annual Report and as outlined in the approved CMOM Corrective Action Plan Implementation Schedule, the following activities plan to be completed by December 31st, 2019:

Sewer rehabilitation projects through the use of trenchless technologies and sewer replacement will be completed. Sewer rehabilitation projects will likely include a combination of Cured In Place Plastic Piping, pipe bursting, and sewer replacement. $1,100,000 is budgeted for each fiscal year and multiple years of funding have built up for expenditure. With additional sewer investigation as part of the Inflow and Infiltration Program, it is anticipated that many pipes and manholes will require rehabilitation. Pipe rehabilitation will be based on priority areas, condition assessments, in segments identified in the SSO reports found in Appendix B and based on risk assessment which can be found in Appendix E. The reporting period for 2019 will likely have projects utilizing multiple years of capital improvement plan funding.

Multiple sewer separation projects are anticipated to be placed out for bid and, if awarded, begin construction during 2019. As part of the sewer separation, sanitary sewer will be replaced. The planned projects include the following:

> Brighton Avenue Sewer Separation Project – Roughly 300 linear feet of sanitary sewer pipe and 400 linear feet of sewer lateral will be replaced as part of a sewer separation project located in Brighton Avenue. The project is out to bid.
>
> Preble Street Sewer Separation Project – Roughly 2,300 linear feet of sanitary sewer pipe will be replaced as part of a sewer separation project located in Preble Street, Kennebec Street, and Somerset Street. The project is out to bid
>
> Mackworth-Ocean-Walton Sewer Separation Project – Roughly 4,600 linear feet of sanitary sewer pipe will be replaced as part of a sewer separation project located on Mackworth Street, Ocean Avenue, Walton Street and smaller side streets within the area. The project is out to bid.

The Franklin Street and Curtis Road Pump Station projects identified in the CMOM report will be completed as described in Order Section IV.2.H – Current Status of AO Schedule Work.

The Riverton Pump Station replacement project will go out to bid.

The FOG program will continue to be enforced with additional efforts being made to incorporate FOG requirements into business license renewal. It is anticipated that over 500 restaurant inspections will be completed by the Health Department in 2019. The City will continue to enforce the FOG Program as part of the business license renewal process, which is the main trigger, along with building permits, in ensuring grease control equipment is installed.

A contract will be awarded to Jones Associate to complete a survey of the Presumpscot North Interceptor south of Riverside Industrial Parkway which, when completed, will allow the Operations and Maintenance crews to be able to clear additional easements where possible.

SUMMARY

We appreciate the opportunity to have submitted this CMOM Program Implementation Annual Report for the period ending December 31, 2018.

Should you have any questions, comments or need any additional information, please do not hesitate to contact Nancy Gallinaro, Water Resources Manager, at 207-874-8817.

Sincerely,

CITY OF PORTLAND

Benjamin Pearson

STATE OF MAINE
BENJAMIN NOAH PEARSON
No. 14088
LICENSED
PROFESSIONAL ENGINEER

Benjamin Pearson, P.E.
Compliance Coordinator
Department of Public Works
Water Resources Division

Attachments

Appendix A – Contracts and Invoices
Appendix B – Sanitary Sewer Overflow Reports
Appendix C – Municipal Budgets
Appendix D – Inflow and Infiltration Program Reports
Appendix E – Risk Analysis Map and Rehabilitation Priorities

BNP

cc: Jon Jennings, City of Portland, City Manager
Christopher Branch, City of Portland, Director of Public Works
Nancy Gallinaro, City of Portland, Water Resources Manager
Danielle West Chuhta, City of Portland, Corporation Counsel
Brad Roland, City of Portland, Senior Project Engineer
John Emerson, City of Portland, Utility Coordinator
Stuart Rose, MaineDEP WQM-Southern Region
Michael Wagner, Senior Enforcement Counsel, USEPA

Appendix A – Contracts and Invoices

Christopher C. Branch, P.E.
Director of Public Works

September 21, 2018

Barry Sheff, PE
Senior Principal
Woodard & Curran
41 Hutchins Drive
Portland, Maine 04102

Dear Mr. Sheff,

Please accept this letter and attached documents as the Notice to Proceed for Phase 2 of the Design-Build Services for Pump Station Replacement at Curtis Road. The attached documents include:

Guaranteed Maximum Price signed by Jon Jennings, Portland City Manager

Purchase Order #50817 in the amount of $706,000

With these documents, the City of Portland have accepted the Guaranteed Maximum Price as provided on July 27th, 2018. We look forward to continuing the process and getting the Curtis Road Pump Station replaced.

Thank you,

Benjamin Pearson

Benjamin Pearson, PE
Compliance Coordinator
Water Resources Division of Public Works
City of Portland

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, ME 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Via Electronic Mail

July 27, 2018

Mr. Benjamin Pearson
Compliance Coordinator
City of Portland Public Works
55 Portland Street
Portland, ME 04101

Re: Contract Modification Request for Phase 1 Services – Design-Build Services for Pump Station Replacement and Improvement Project

Dear Ben:

Woodard & Curran appreciates the opportunity to submit this Guaranteed Maximum Price (GMP) Proposal for the total amount of **Seven Hundred Six Thousand Dollars ($706,000.00)** in accordance with Section 2.2.1 of the executed Agreement Between the City of Portland and Woodard & Curran, Inc. dated March 27, 2018 for improvements requested by the City at the Curtis Road Pump Station as follows:

GMP Proposal

- **2.2.1.a.i Contractor's Fee:** Shall be 10% of the Cost of Work for the Curtis Road Pump Station Phase 2. Cost of Work does not include Bonds, Insurance and Phase 2 Engineering costs. Engineering services will be provided per the enclosed Woodard & Curran - Rate Table 184 (2017 - 2018).
- **2.2.1.a.ii Estimated Cost of Work:** As defined in Section 2.7, Phase 2 of Attachment A, Scope of Work – Detailed in the enclosed GMP Cost Estimate dated July 25, 2018.
- **2.2.1.b Documents:** Enclosed Curtis Road Pump Station Upgrades Drawings (List of Drawings on Sheet G-001) dated July 26, 2018.
- **2.2.1.c Assumptions:** List of assumptions, exceptions, and clarifications made by Woodard & Curran in the preparation of the GMP Proposal, intended to supplement and clarify the information contained in the drawings and specifications as outlined in the enclosed Assumptions List dated July 27, 2018.
- **2.2.1.d Schedule:** Final engineering, permitting, procurement, construction, commissioning, start-up and close-out is outlined in the enclosed Curtis Road Pump Station Upgrades Design-Build Project Schedule dated July 27, 2018.
- **2.2.1.e Allowances:** Not applicable.
- **2.2.1.f Alternates**: Not Applicable.
- **2.2.1.g Unit Prices**: Not Applicable.
- **2.2.1.h Additional Services**: Not Applicable.
- **2.2.1.i Time Limit**: City of Portland time limit for acceptance of the GMP Proposal is thirty (30) calendar days from the date of this proposal of by August 27, 2018.

- **2.2.1.j Permits:** GMP proposal assumes MEDEP, and City Building and Electrical Permits are required for the upgrades of the existing Curtis Road Pump Station. We have assumed City of Portland permit fees will be waived.

Terms and Conditions of this GMP Proposal will be per the executed Agreement for the project between City of Portland and Woodard & Curran, dated March 27, 2018. With this proposal, we request a change in Article 5.0 Contract Time of that Agreement, in accordance with the dates within the attached Project Schedule. If acceptable, please indicate your agreement by signing this letter and returning electronic copy for our records.

We appreciate the opportunity to submit this Phase 2 GMP Proposal request for consideration and look forward to the successful completion of the project with the City of Portland.

Please do not hesitate to contact me with any questions you may have.

Sincerely,

WOODARD & CURRAN

Barry Sheff, P.E.
Senior Principal

PN: 231265

Finance Director
City of Portland, Maine

Accepted this 7th Day of September 2018

By: _____

Name: Jon P. Jennings

Title: City Manager

APPROVED AS TO FORM:

CORPORATION COUNSEL'S OFFICE

Enclosures

Curtis Road PS Upgrades 60% Design Drawings dated July 26, 2018

Curtis Road PS Upgrades GMP Estimate dated July 25, 2018

Curtis Road PS Upgrades GMP Estimate List of Assumptions dated July 26, 2018

Curtis Road PS Upgrades GMP Project Schedule dated July 27, 2018

Woodard & Curran - Rate Table 184 (2017 - 2018)

Purchase Order

City of Portland, Maine
City Hall, 389 Congress Street
Portland, Maine 04101
207-874-8654

BILL TO
Accounts Payable
City Hall, Room 104
389 Congress Street
Portland, ME 04101

THIS NUMBER MUST APPEAR ON ALL INVOICES, PACKAGES AND SHIPPING PAPERS.

Purchase Order # 50817

VENDOR
WOODARD & CURRAN INC
41 HUTCHINS DRIVE
PORTLAND, ME 04102

SHIP TO
Public Works Admin.
55 Portland St.
Portland, ME 04101

Date Ordered	Deliver By	Requisition Number	Vendor Contact Name
09/18/2018		2734	CHARMAIN HALLETT

Vendor Number	Date Required	Freight Method/Terms	Department Contact
2694		net 30	Public Works

Item#	Description/PartNo	QTY	UOM	Unit Price	Extended Price
	The Above Purchase Order Number Must Appear On All Correspondence - Packing Sheets And Bills Of Lading				
1	Design/Build Curtis Pump Station (Phase 2)	1.0	EACH	$706,000.00	$706,000.00
	********** GL SUMMARY **********				
	0370-50-31-3100-31000-0000-403500- $706,000.00				

By: _____
Authorized Signature

PO Total **$706,000.00**

CITY OF PORTLAND, MAINE
PURCHASE ORDER TERMS AND CONDITIONS

ACKNOWLEDGE RECEIPT OF THIS ORDER AND CONFIRM SHIPMENT DATE.

BY ACCEPTANCE OF THIS ORDER THE CONTRACTOR AGREES TO COMPLY WITH THE STATE OF MAINE CODE OF FAIR PRACTICES AND AFFIRMATIVE ACTION.

THIS ORDER MUST NOT BE FILLED in greater quantities or at prices higher than shown without written approval of the Purchasing Department. If price is not shown on the order, it is agreed that you will ship the items ordered at a price no higher than when last purchased or you will notify the Purchasing Department before proceeding with the order.

SALES AND EXCISE TAXES. The City is exempt from the payment of any sales, excise or federal transportation taxes. The price must be net, exclusive of taxes and will be so construed.

SALES AND USE TAX LAW AND REGULATIONS References: Title 36, Section 1760 Bureau of Taxation
1. Sales made directly to the federal government, this State or any political subdivision of this State, or to any agency of the above, are exempt from sales tax. In addition to the federal government, the State of Maine, and any county, **city**, town, or plantation in the State of Maine, this exemption covers sales to:

School Districts in Maine;
Water, Power, Parking and other Districts in Maine established by legislative Act as quasi-municipal corporations; Village Corporations;
Maine Turnpike Authority.

In the case of the above no evidence of exemption in the case of a sale at retail will be required other than the invoice of the seller indicating sales to such exempt entity.

ITEMIZED INVOICES IN DUPLICATE showing the Purchase Order number must be sent to the ordering department, at the time of each shipment, accompanied by a copy of bill of lading, and on all prepaid shipments chargeable to us attach transportation receipt to invoice.

QUANTITY ON THIS ORDER CANNOT BE EXCEEDED. All overruns will be furnished at your expense unless approval is obtained from Purchasing Agent before delivery is made.

NO SUBSTITUTION OF MATERIAL will be permitted on this order unless authorized by Purchasing Department. The City reserves the right to reject all material not in accordance with specifications.
Separate packing slips must be included in each shipment showing the purchase order number, quantity, part number and a description of goods. No charge for packing will be allowed.
In the event this order is not filled in each particular as specified, we reserve the right to do any one or more of the following:

To cancel this order.
To recover all loss, damage and expense caused by such failure.
To require delivery by any means, seller to pay any increased transportation expense. To procure from another source, charging seller for any excess costs.

Charges for extras must be approved in writing by the Purchasing Department before being incurred.

Buyer recognizes that seller may for operating convenience, desire to utilize its own form of sale note in acknowledging this order, or otherwise acknowledge it than by simple acceptance. Therefore, it is agreed that any provisions in the form of acceptance used which modify, conflict with, or contradict any provision of this order, shall be deemed to be waived, and that the provisions of this order, by such acceptance, constitute the whole contract between the parties.

Seller guarantees that the goods herein described do not infringe any patent and agrees to defend any suit that may arise in respect thereto and to indemnify and save buyer harmless form any loss and expense which may be incurred by the assertion of any patent rights therein.

Cancellation on account of insolvency. Either party shall have the right to cancel the order in the event that the other party becomes bankrupt or insolvent or makes an assignment for benefit of creditors.

Anti-Discrimination. Seller shall not, in performing the work required by this order, discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, or sexual orientation.

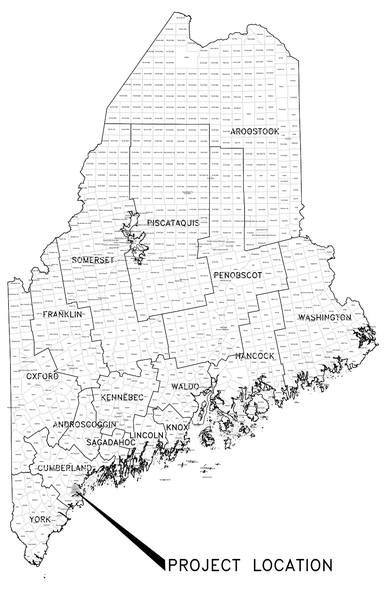
In addition to the above terms and conditions, this order shall be subject to any and all provisions required by any federal, state or local law in effect at the time this order is placed, including all price regulations, and seller agrees that in filling this order it has complied with such laws and regulations, and will furnish buyer with written proof of such compliance upon request in writing from buyer.

CITY OF PORTLAND, MAINE
CURTIS ROAD PUMP STATION UPGRADES

PROJECT NO. 0231265.00

JULY 26, 2018

60% DESIGN REVIEW-
NOT FOR CONSTRUCTION



PROJECT LOCATION MAP

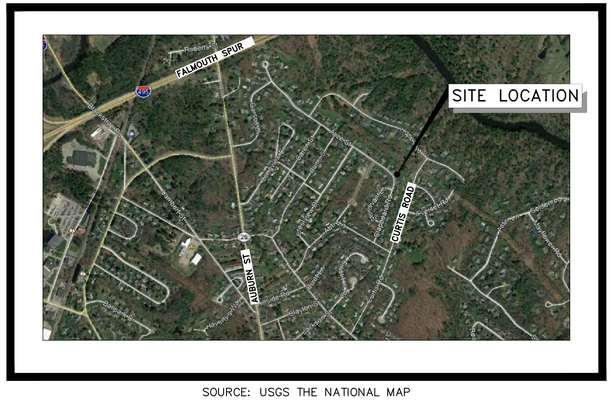
50 0 50 100
scale mile

N W E S

WOODARD & CURRAN

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS



SOURCE: USGS THE NATIONAL MAP

CURTIS ROAD PUMP STATION
SITE LOCATION MAP

1000 0 1000 2000
scale feet

N W E S

\\woodardcurran.net\shared\Projects\0231265.00 Portland - Curtis and Franklin PS Des Bid\wip\Drawings\General\0231265-G-000.dwg, Jul 26, 2018 - 4:40pm

22x34 SHEET
1:1

GENERAL NOTES

1. THE PROJECT IS LOCATED IN PORTLAND MAINE, ON CLAPBOARD ROAD AND IS GENERALLY DESCRIBED IN REBUILDING THE CURTIS ROAD PUMP STATION. THE WORK INCLUDES INSTALLATION OF A PACKAGE PUMP STATION, EMERGENCY GENERATOR, MODIFICATIONS TO THE EXISTING WETWELL, ELECTRICAL WORK, AND CONTROLS & COMMUNICATIONS WORK.
2. BASE PLAN COMPILED FROM THE FOLLOWING:
   –CURTIS ROAD PUMPING STATION FORCE MAIN AND GRAVITY SEWERS BY CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS DATED 1978.
3. LOCATIONS OF PROPERTY LINES AND RIGHT OF WAYS ARE APPROXIMATE (SHOWN FOR REFERENCE ONLY), UNLESS NOTED OTHERWISE, AND ARE NOT INTENDED TO REPRESENT LEGAL BOUNDARIES.
4. STATIONS AND OFFSETS FOR MANHOLES AND OTHER STRUCTURES ARE SHOWN TO THE CENTER OF EACH.
5. COMPLETE WORK IN ACCORDANCE WITH THE APPLICABLE FEDERAL, STATE AND LOCAL CODES. LAY OUT PROPOSED WORK AS SHOWN ON DRAWINGS. FIELD VERIFY KNOWN UTILITY LOCATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND EXCAVATE TEST PITS AS NECESSARY TO VERIFY KNOWN UTILITY LOCATIONS AND DEPTHS AT NO ADDITIONAL COST TO OWNER.
6. PERFORM CONSTRUCTION ACTIVITIES WITHIN THE CONFINES OF THE RIGHTS OF WAY OR WITHIN THE CONFINES OF TEMPORARY CONSTRUCTION EASEMENTS SECURED BY THE OWNER. OBTAIN PERMISSION FROM AND COORDINATE WITH PRIVATE PROPERTY OWNERS FOR ACTIVITY, MATERIAL STORAGE ETC., ON PRIVATE PROPERTY AT NO ADDITIONAL COST TO OWNER.
7. COORDINATE CONSTRUCTION WITH THE CITY OF PORTLAND, MAINE, UTILITY COMPANIES, DIG SAFE, EMERGENCY SERVICES WHERE APPLICABLE. NOTIFY UTILITIES PRIOR TO COMMENCING WORK TO ALLOW SUFFICIENT TIME TO LOCATE AND MARK THE LOCATION OF BURIED UTILITIES. CONTACT "DIG SAFE", TELEPHONE 811 OR 877–DIG–SAFE.
8. PROVIDE COORDINATION AND THE SERVICES OF CENTRAL MAINE POWER CO. (CMP) WHERE NECESSARY FOR COMPLETION OF WORK. PROVIDE COORDINATION OF WORK WITH CMP AT LEAST THREE BUSINESS DAYS PRIOR TO THE DATE THAT WORK OR SERVICES OF CMP ARE REQUIRED.
9. INCORPORATE EROSION CONTROL MEASURES COMPLIANT WITH THE LATEST VERSION OF "MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES".
10. TAKE NECESSARY PRECAUTIONS TO PREVENT EQUIPMENT FLUIDS FROM LEAKING OR REACHING ANY WATER COURSE. IMMEDIATELY CONTAIN AND CLEAN FLUID DISCHARGES USING ALL MEANS NECESSARY, AS DETERMINED AND/OR APPROVED BY THE ENGINEER.
11. PROTECT, REMOVE OR RELOCATE EXISTING ITEMS, AREAS AND SURFACES. REPLACE, RESTORE AND REPAIR ITEMS, AREAS AND SURFACES, FACILITIES AND IMPROVEMENTS DISTURBED OR DAMAGED BY CONTRACTOR'S OPERATIONS TO ORIGINAL CONDITION OR MATCH IN KIND, UNLESS NOTED OTHERWISE ON DRAWINGS, AT NO ADDITIONAL COST TO OWNER. THIS APPLIES TO GRAVEL, PAVEMENT, PAVEMENT MARKINGS, CURBING, SIDEWALKS, GRASS, PLANTINGS, TREES, SIGNAGE, MAIL BOXES AND EXISTING UTILITIES. LIMIT SAW–CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE REQUIRED OR AS SHOWN ON THE DRAWINGS.
12. MAINTAIN ACTIVE WATER DISTRIBUTION SYSTEM THROUGHOUT THE PROJECT AREA AND SERVICE TO RESIDENTS WITHIN THE PROJECT AREA AT ALL TIMES.
13. PROVIDE A MINIMUM 6.0 FEET OF COVER OVER SEWERS AND FORCE MAIN PIPING UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.
14. ITEMS SHOWN IN GRAY SCALE AND LABELED N.I.C. (NOT IN CONTRACT) ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
15. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT WILL BE RESET AT THE CONTRACTOR'S EXPENSE, BY A REGISTERED LAND SURVEYOR APPROVED BY THE ENGINEER.
16. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC. SITE SHALL BE LEFT WITH APPROPRIATE SAFETY MEASURES IN PLACE DURING NON–WORKING HOURS. SITE SAFETY IS THE RESPONSIBILITY OF CONTRACTOR, DURING BOTH WORKING AND NON–WORKING HOURS.
17. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS.
18. A COMPLETE SET OF "RECORD" DRAWINGS THAT REFLECT ANY AND ALL MODIFICATIONS TO THE SANITARY SEWER SYSTEM AND ANY OTHER UTILITY INSTALLATIONS OR ALTERATIONS WITHIN THE PROJECT LIMITS MUST BE SUBMITTED IN "RED LINE" FORMAT. THESE DRAWINGS SHALL BE SUBMITTED IN BOTH DIGITAL AND HARD COPY FORMAT AS DEFINED IN THE SPECIFICATIONS PRIOR TO PAYMENT OF FINAL RETAINAGE.
19. PROVIDE 4–INCHES OF LOAM AND SEED IN ALL LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS WHERE EXISTING SURFACES WAS GRASS/LAWN.

ABBREVIATIONS

AC	ASBESTOS CEMENT
&	AND
A.G.	ABOVE GROUND
ALUM	ALUMINUM
B	BORING
BIT.	BITUMINOUS
BK	BOOK
BM	BENCHMARK
CB	CATCH BASIN
CI	CAST IRON
CK	CHECKED
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
DI	DUCTILE IRON
DES	DESIGNED
DIA	DIAMETER
DR	DRAWN
E	EAST
EL	ELEVATION
ELEC	ELECTRICAL
EX	EXISTING
FB	FIBERGLASS
FF	FINISH FLOOR
FIN	FINISH
FL	FLOOR
FT	FOOT/FEET
GALV	GALVANIZED
GR	GORMAN RUPP
GRND	GROUND
H	HEIGHT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
IN	INCH
INV	INVERT
LF	LINEAR FEET
LP	LIQUEFIED PETROLEUM
MAX	MAXIMUM
MDOT	MAINE DEPT. OF TRANSPORTATION
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
MON	MONUMENT
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERT. DATUM
N.I.C.	NOT IN CONTRACT
NO	NUMBER
N.T.S.	NOT TO SCALE
O.D.	OUTSIDE DIAMETER
±	PLUS OR MINUS
PLS	PROFESSIONAL LAND SURVEYOR
PSI	PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R.O.W.	RIGHT–OF–WAY
R/W	RIGHT–OF–WAY
RCP	REINFORCED CONCRETE PIPE
REINF.	REINFORCED
REQ'D	REQUIRED
RET	RETAINING
RLS	REGISTERED LAND SURVEYOR
RT	ROUTE
S	SLOPE
S	SEWER
SD	STORM DRAIN
SS	STAINLESS STEEL
SCH	SCHEDULE
STA.	STATION
TYP.	TYPICAL
UC	UNDERGROUND CABLE
W	WATER
W	WEST
W/	WITH
WV	WATER VALVE

LEGEND:

DESCRIPTION	EXISTING	PROPOSED
SANITARY SEWER MANHOLE AND OFFSET		X FT.
SANITARY SEWER SERVICE CLEANOUT	CO	CO
STORM DRAIN MANHOLE		
CATCH BASIN		
TELECOMM MANHOLE		
TELECOMM SERVICE BOX	T	
ELECTRIC MANHOLE		
TRANSFORMER		
UTILITY POLE W/GUY		
UTILITY POLE		
LIGHTPOST		
WATER GATE		
CURB STOP		
HYDRANT		
WATER WELL	W	
SIGN		
MAILBOX		
FLAGPOLE	FP	
CONIFEROUS TREE		
DECIDUOUS TREE		
SURVEY STATION		
TEMPORARY BENCH MARK AND NUMBER	XX	
IRON PIN		
MONUMENTS	MF	MS
SPOT ELEVATION	XXX.XX	XXX.XX
TEST PIT & NUMBER	TP–X	
BORING & NUMBER	B–X	TB
MONITORING WELL	MW–X	
CONTOUR (1' OR 2' INTERVAL)	122	122
CONTOUR (INDEX)	120	120
SANITARY SEWER	S	S
FORCE MAIN	FM	FM
STORM DRAIN	SD	SD
UNDERDRAIN	UD	UD
WATER MAIN	W	W
OVERHEAD UTILITY	OU OU	OU OU
HOUSE SERVICE / LATERAL	S	S
PROPERTY LINE		
RIGHT OF WAY	R/W	R/W
EASEMENT		
EDGE OF VEGETATION		
FENCE	X	X
CENTERLINE	℄	℄
CURB		
EDGE OF PAVEMENT		

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GENERAL NOTES, LEGEND AND ABBREVIATIONS

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 1 OF 11

G-001

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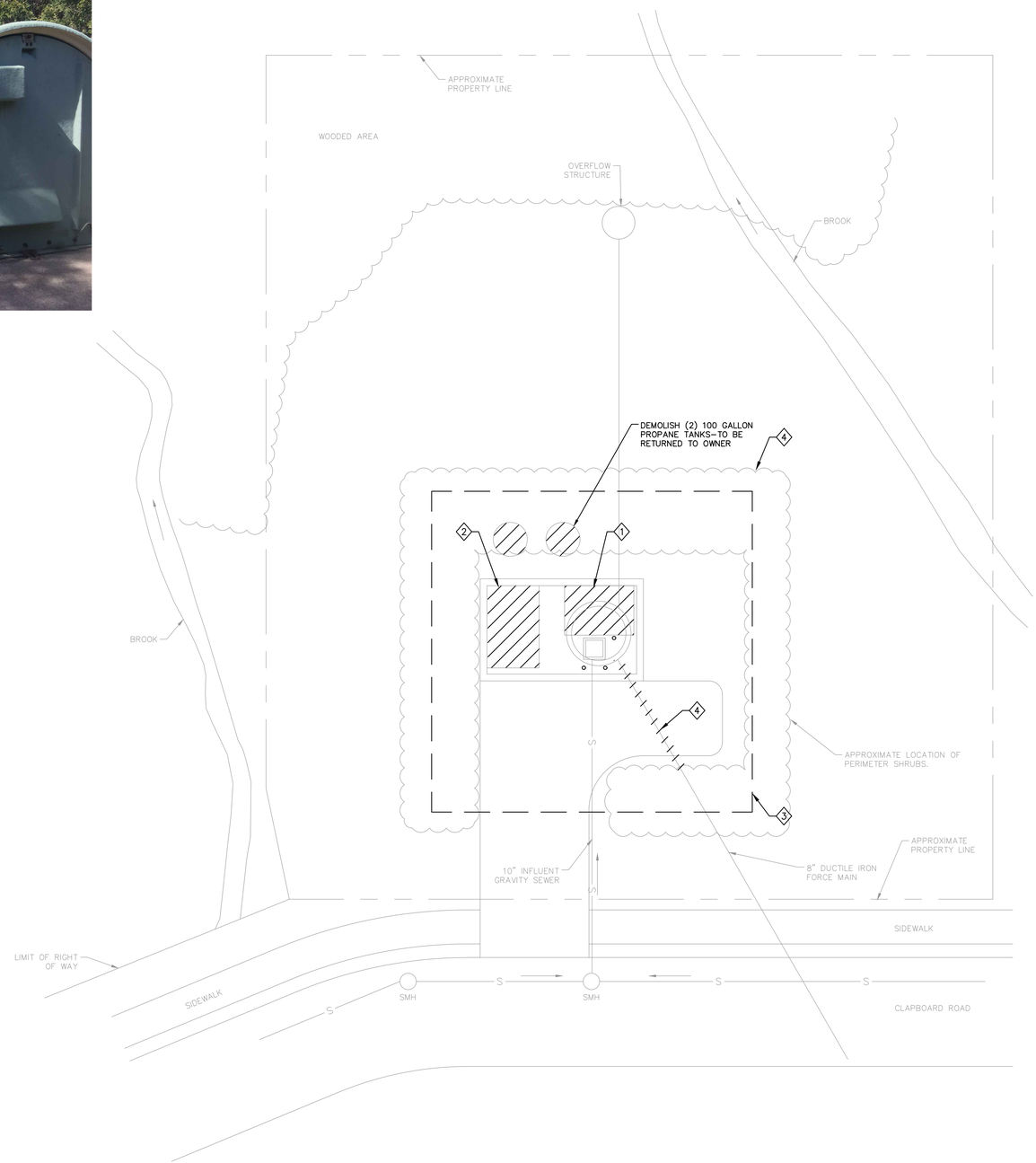
22x34 SHEET
1:1

EXISTING SITE CONDITIONS



DEMOLITION GENERAL NOTES

1. EXISTING PIPING, EQUIPMENT, ETC. TO BE DEMOLISHED AS SHOWN AS BOLD OR HATCHED OVER.
2. THE INTENT OF THE DEMOLITION PLANS IS TO IDENTIFY EXISTING CONDITIONS. HOWEVER, ALL SYSTEMS MAY NOT NECESSARILY BE AS INDICATED ON THE DRAWINGS. FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND. NOTIFY ENGINEER OF ALL CONDITIONS THAT DIFFER FROM THE DRAWINGS.
3. ALL ITEMS INDICATED FOR DEMOLITION SHALL BE DEMOLISHED WITH ALL ASSOCIATED HARDWARE AND ACCESSORIES COMPLETE BACK TO SOURCE OR AS INDICATED ON THE DRAWINGS.
4. CONTRACTOR SHALL MAINTAIN FLOWS AT ALL TIMES DURING CONSTRUCTION.
5. CONTRACTOR SHALL PROVIDE BYPASS PUMPING FOR THE CURTIS ROAD PUMP STATION AS REQUIRED TO MAINTAIN FLOW DURING CONSTRUCTION.
6. CLAPBOARD ROAD AND SIDEWALK LOCATIONS ARE APPROXIMATE. CONTRACTOR TO VERIFY AS NEEDED.

DEMOLITION KEY NOTES

1. CONTRACTOR SHALL DEMOLISH EXISTING PUMP STATION ENCLOSURE, PUMPS, VALVES, PIPING, LEVEL ELEMENTS, AND APPURTENANCES.
2. CONTRACTOR SHALL DEMOLISH EXISTING GENERATOR AND GENERATOR ENCLOSURE. DISCONNECT POWER PRIOR DEMOLITION WORK. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL DETAILS.
3. CONTRACTOR'S LIMIT OF STORAGE. CONTRACTOR SHALL NOT STORE ANY EQUIPMENT, MATERIALS, VEHICLES OR OTHER CONSTRUCTION–RELATED DEBRIS BEYOND THESE LIMITS DURING THE WORK, WITHOUT PRIOR CITY APPROVAL.
4. CONTRACTOR SHALL PROTECT EXISTING SHRUBS SURROUNDING PUMP STATION DURING CONSTRUCTION.
5. DEMOLISH EXISTING FORCE MAIN AND REPLACE IT WITH NEW 6" DI PIPING.

10' 0 10' 20'
BAR SCALE
1" = 10'
CHECK GRAPHIC SCALE BEFORE USING

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SITE PLAN-EXISTING CONDITIONS AND DEMOLITION

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 2 OF 11

CD-101

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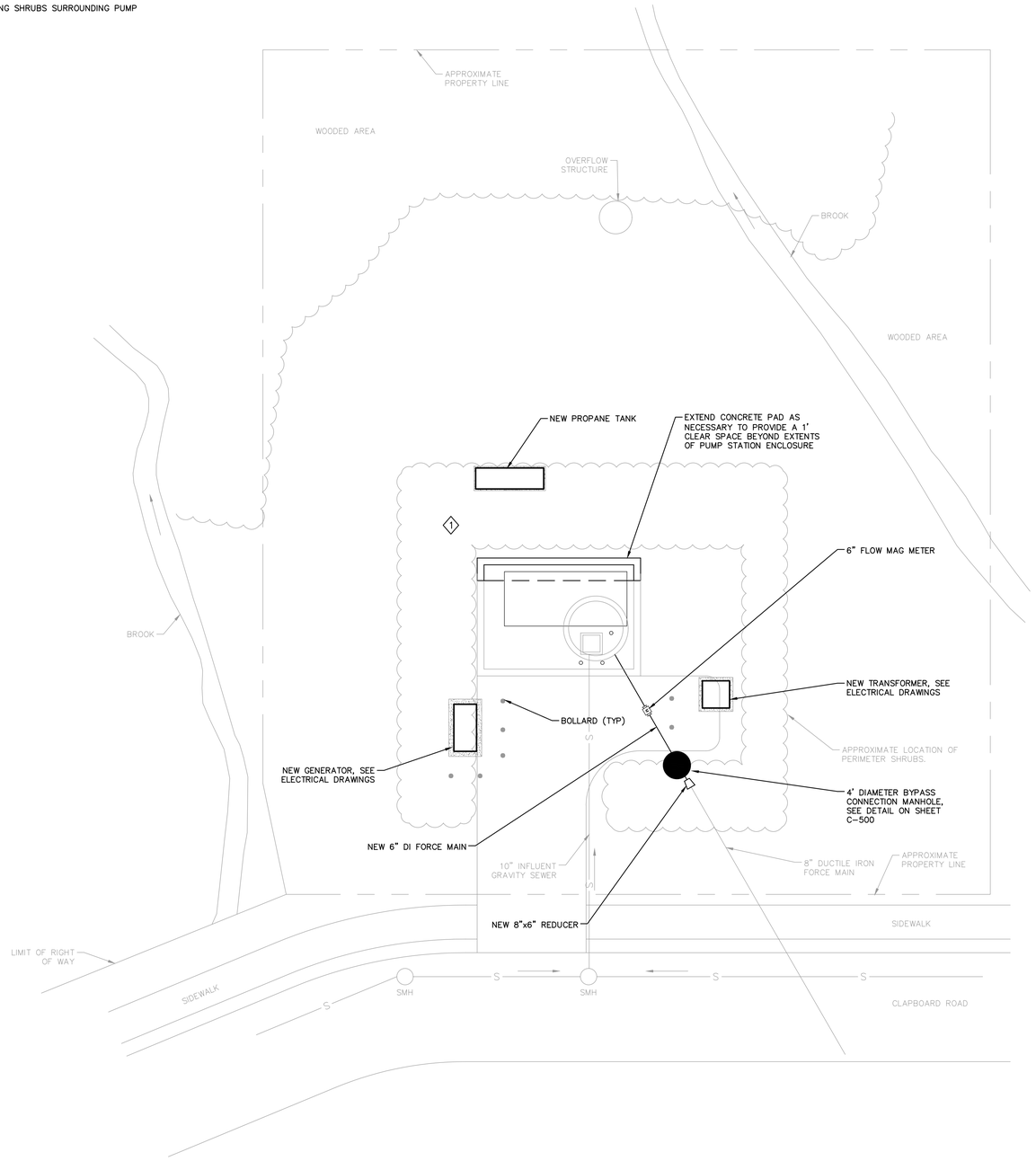
22x34 SHEET
1:1

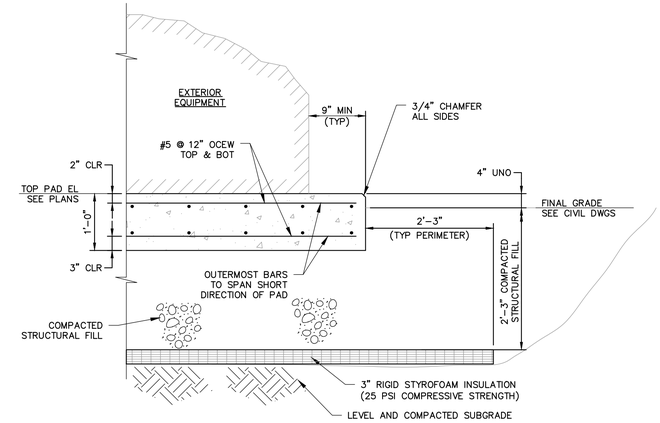
GENERAL NOTES

1. CLAPBOARD ROAD AND SIDEWALK LOCATIONS ARE APPROXIMATE. CONTRACTOR TO VERIFY AS NEEDED.

KEY NOTES

1. CONTRACTOR SHALL PROTECT EXISTING SHRUBS SURROUNDING PUMP STATION DURING CONSTRUCTION.

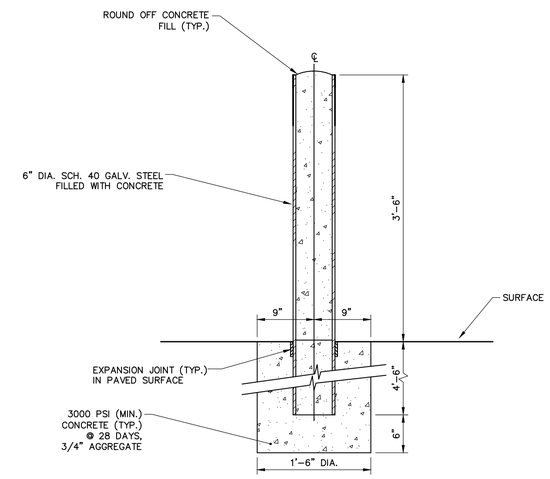




NOTES:

1. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR EQUIPMENT LOCATIONS, QUANTITIES, AND LAYOUT
2. PAD SHALL PROJECT A MINIMUM OF 9-INCH BEYOND MECHANICAL EQUIPMENT FOOTPRINT, UNLESS NOTED OTHERWISE. FOR ANCHOR RODS 5/8" DIA OR LESS, PAD PROJECTIONS MAY BE REDUCED FROM 9-INCH TO 6-INCH
3. TOP OF PAD SHALL BE LEVEL WITHIN 1/8-INCH
4. PROVIDE SACK-RUBBED FINISH TO ALL EXPOSED SIDES OF EQUIPMENT PAD AND A TROWEL FINISH TO THE TOP SURFACE
5. PROVIDE COMPACTED STRUCTURAL FILL UNDER PAD FOOTPRINT TO FROST DEPTH TO PREVENT FROST HEAVE. IF OVER-EXCAVATION IS NOT FEASIBLE, PROVIDE 2-INCH RIGID INSULATION UNDER ENTIRE PAD AND EXTENDING A MINIMUM OF 2-FT BEYOND ALL SIDES OF THE EQUIPMENT PAD. PLACE CONCRETE DIRECTLY ON TOP OF RIGID INSULATION LAYER
6. PROVIDE SAWED JOINT (SJ) IN EQUIPMENT PADS, IF SHOWN AND NOTED ON PLANS.
8. ANCHOR RODS SHALL BE 316 AISI STAINLESS STEEL, UNLESS NOTED OTHERWISE
9. PRIOR TO EQUIPMENT INSTALLATION, APPLY CURE AND SEAL COMPOUND OR WATERPROOFING TO EQUIPMENT PAD SURFACES

EXTERIOR EQUIP PAD
NOT TO SCALE



NOTES:

1. ALL BOLLARDS SHALL BE SLEEVED WITH HDPE COVERS. PROVIDE SLEEVES TO MATCH EXISTING BOLLARDS AT TOWN PUMP STATIONS.
2. COLOR SELECTED BY ENGINEER.

BOLLARD DETAIL
NOT TO SCALE

10' 0 10' 20'
BAR SCALE
1" = 10'
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SITE PLAN-PROPOSED CONDITIONS

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 3 OF 11

C-101

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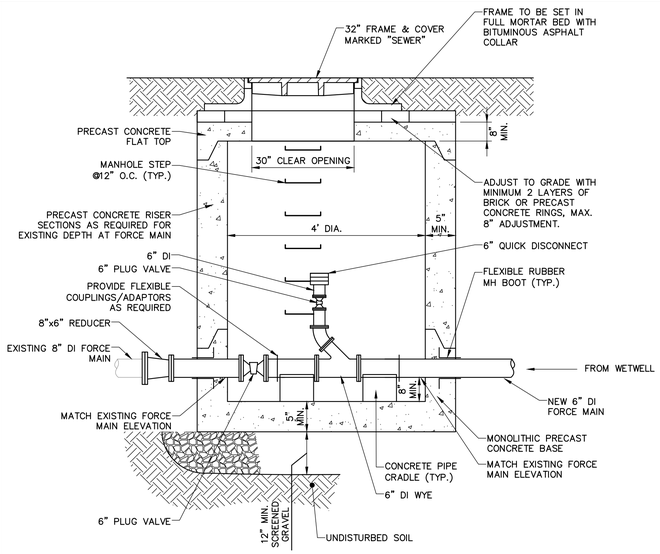
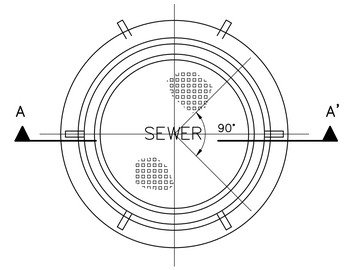


NOTES:

1. CONTRACTOR SHALL CONFIRM ELEVATION AND ALIGNMENT OF PROPOSED FORCE MAIN AND GROUND SURFACE AT BYPASS MANHOLE PRIOR TO ORDERING.

BYPASS CONNECTION MANHOLE

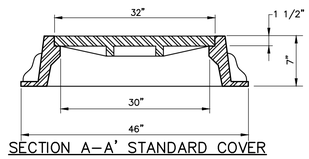
N.T.S.



NOTES:

1. COVER TO READ "SEWER"

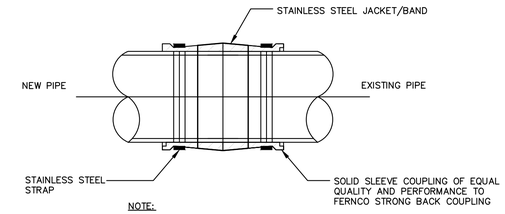
PLAN



SECTION A–A' STANDARD COVER

SEWER & DRAIN MANHOLE FRAME & COVER

N.T.S.

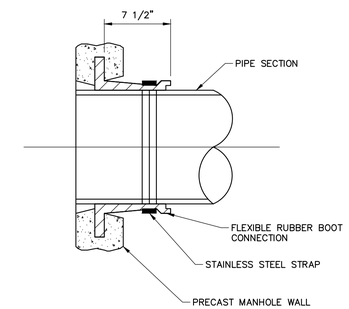


NOTE:

1. ENSURE COUPLING PROVIDED IS ECCENTRIC AND SPECIFICALLY MADE FOR THE PIPE MATERIALS BEING JOINED AS SPECIFIED.

NEW PIPE TO EXISTING PIPE CONNECTION

N.T.S.



SANITARY SEWER MANHOLE RUBBER BOOT CONNECTION

N.T.S.

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CIVIL DETAILS

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 4 OF 11

C-500

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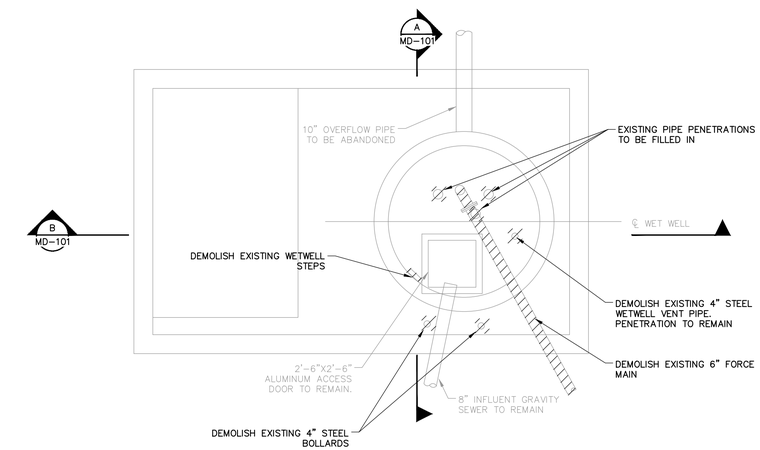
22x34 SHEET
1:1

EXISTING PUMP STATION

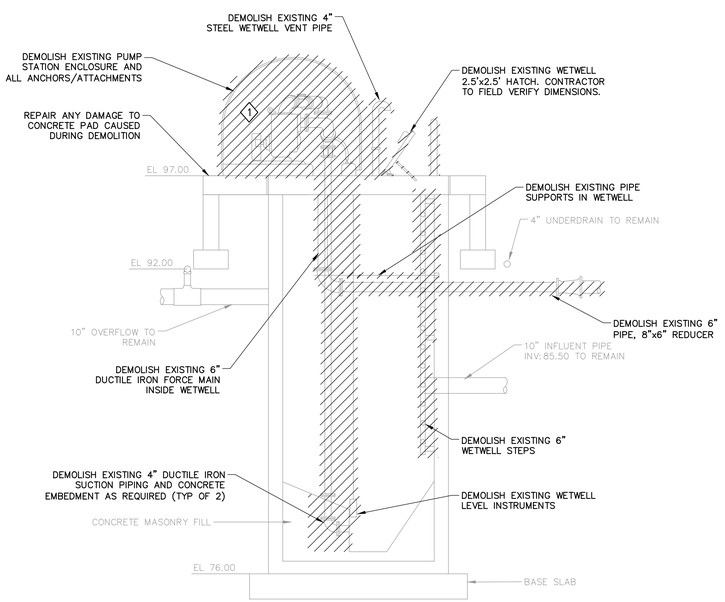


MECHANICAL DEMOLITION GENERAL NOTES

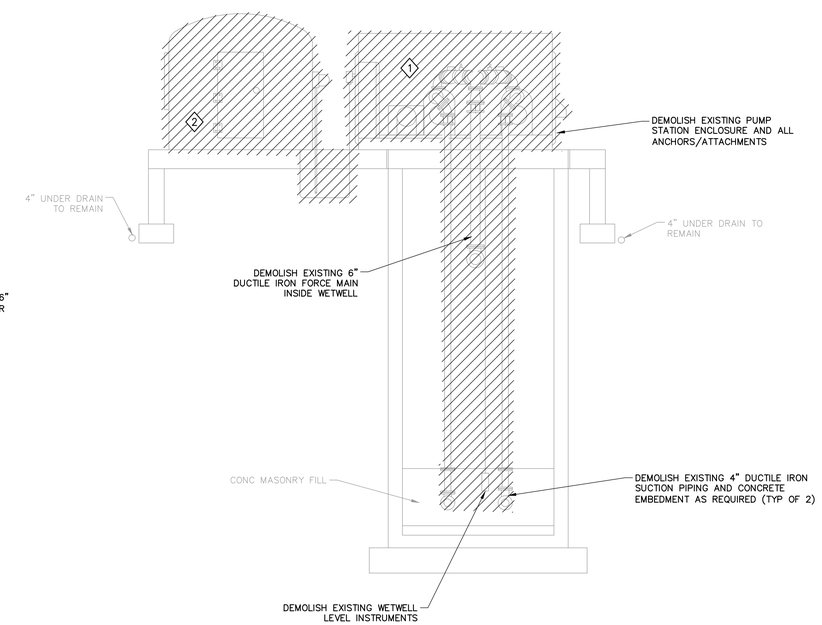
1. EXISTING PIPING, EQUIPMENT, ETC. TO BE DEMOLISHED AS SHOWN AS BOLD OR HATCHED OVER.
2. THE INTENT OF THE DEMOLITION PLANS IS TO IDENTIFY EXISTING CONDITIONS. HOWEVER, ALL SYSTEMS MAY NOT NECESSARILY BE AS INDICATED ON THE DRAWINGS. FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND. NOTIFY ENGINEER OF ALL CONDITIONS THAT DIFFER FROM THE DRAWINGS.
3. ALL ITEMS INDICATED FOR DEMOLITION SHALL BE DEMOLISHED WITH ALL ASSOCIATED HARDWARE AND ACCESSORIES COMPLETE BACK TO SOURCE OR AS INDICATED ON THE DRAWINGS.
4. ALL FLOOR AND WALL PENETRATIONS NOT TO BE REUSED SHALL BE IN-FILLED AND BROUGHT BACK TO A FINISHED APPEARANCE.
5. REFER TO ELECTRICAL SHEETS FOR DEMOLITION OF ELECTRICAL EQUIPMENT.

MECHANICAL DEMOLITION KEY NOTES

1. DEMOLISH ALL PUMP STATION EQUIPMENT INSIDE ENCLOSURE INCLUDING BUT NOT LIMITED TO: PUMPS, VALVES PIPING, WIRING, BASES AND SUPPORTS. EXISTING CONTROL PANEL TO BE SALVAGED AND REUSED.
2. DEMOLISH EXISTING 16'-0"x17'-8" GENERATOR ENCLOSURE, GENERATOR, AUTOMATIC TRANSFER SWITCH (ATS) AND GENERATOR CONTROLS.



SECTION A MD-101
SCALE: 1/4"=1'-0"



SECTION B MD-101
SCALE: 1/4"=1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
1/4" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING

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PUMP STATION DEMOLITION PLAN

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 5 OF 11

MD-101

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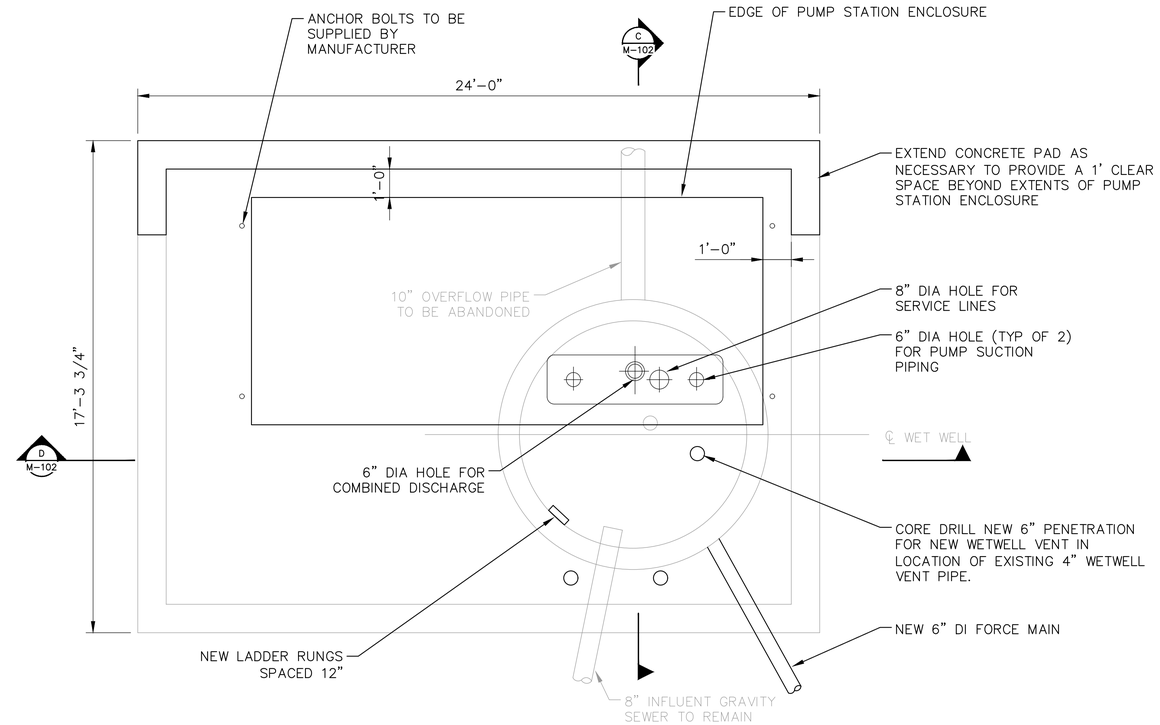
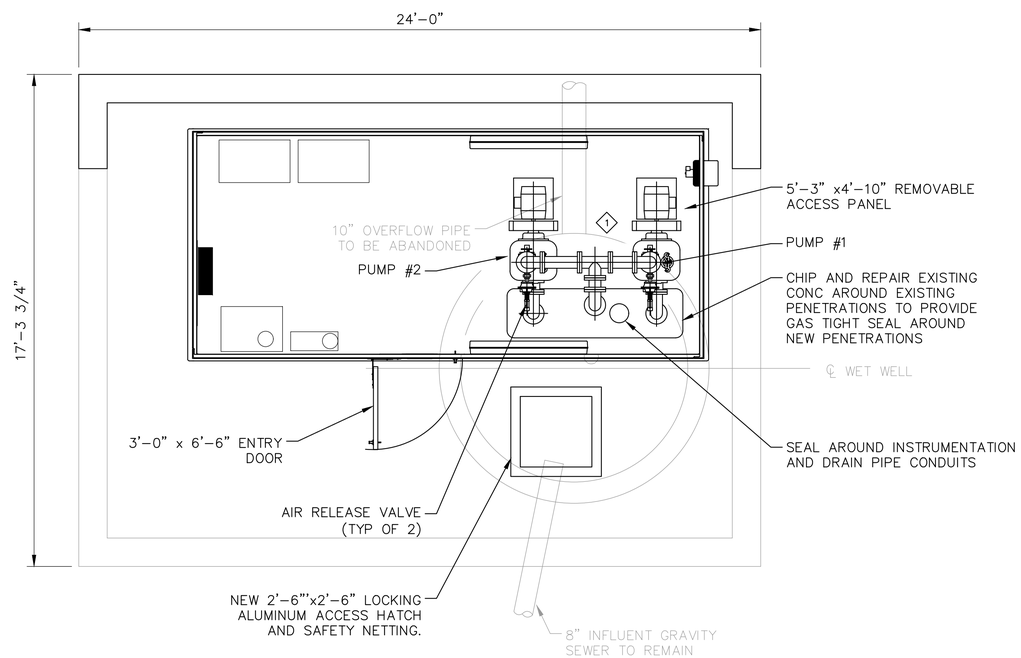


LOWER LEVEL PLAN VIEW

SCALE 3/8" = 1'-0"

MECHANICAL KEY NOTES

1. SKID MOUNTED PACKAGE PUMP STATION TO BE ANCHORED ON EXISTING CONCRETE PAD.



UPPER LEVEL PLAN VIEW

SCALE 3/8" = 1'-0"

4' 3' 2' 1' 0 3' 6'

BAR SCALE
3/8" = 1'-0"
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PUMP STATION MECHANICAL PLAN

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 6 OF 11

M-101

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22x34 SHEET
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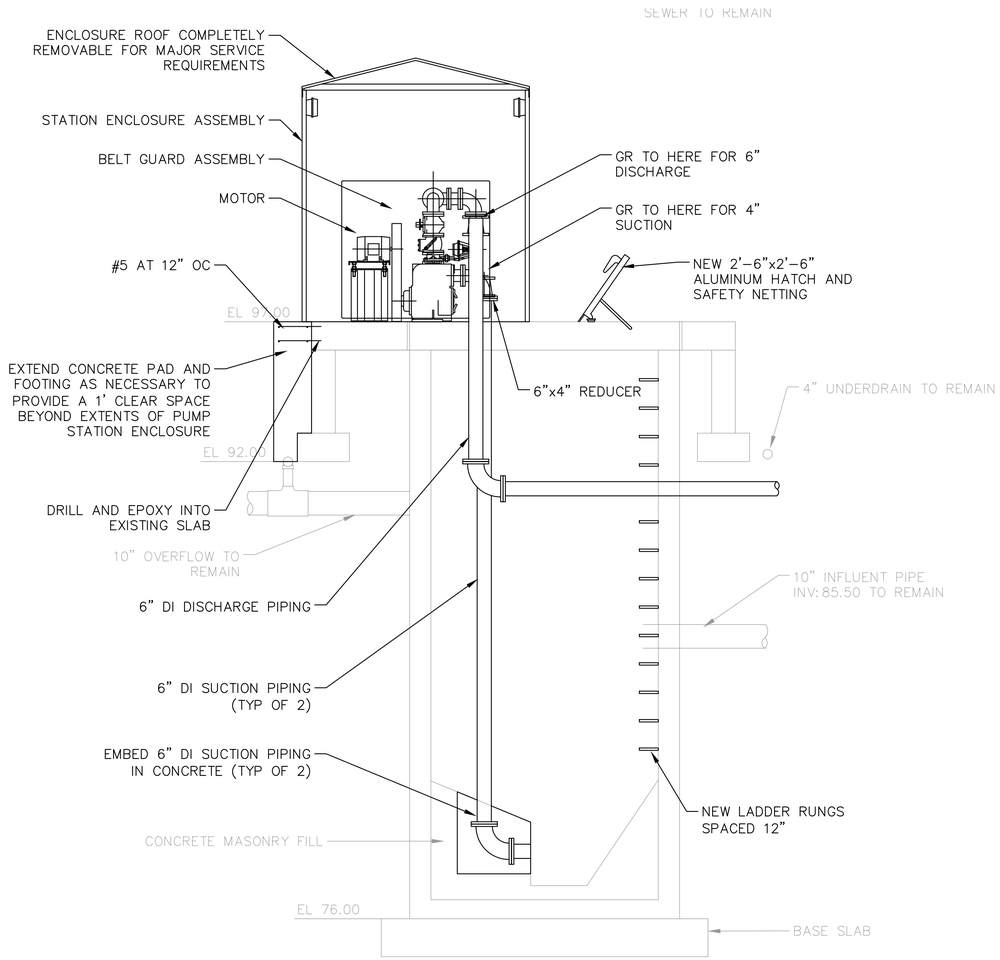
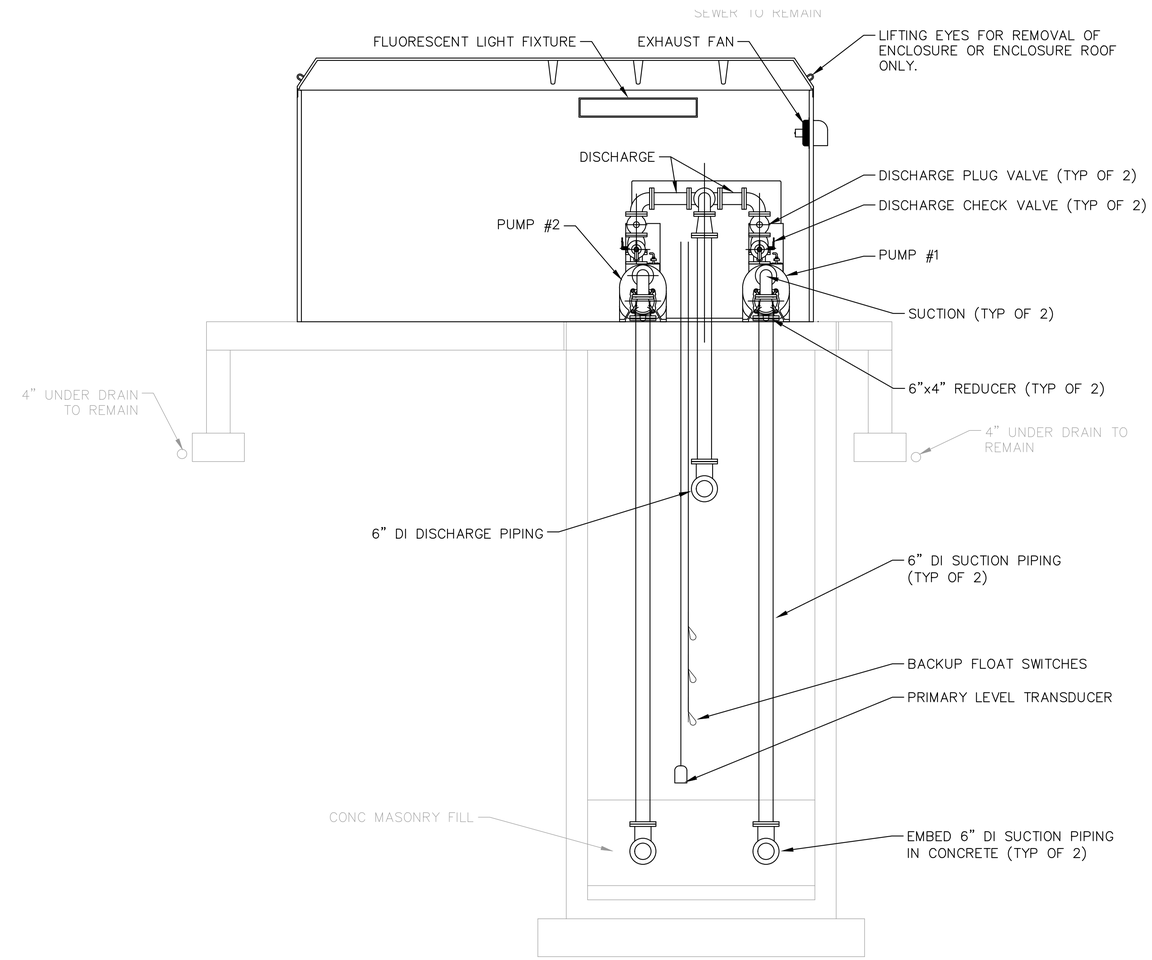


SECTION C M-101
SCALE: 3/8"=1'-0"



SECTION D M-101
SCALE: 3/8"=1'-0"

4' 3' 2' 1' 0 3' 6'
BAR SCALE
3/8" = 1'-0"
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PUMP STATION MECHANICAL SECTIONS

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 7 OF 11

M-102

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22x34 SHEET
1:1

GENERAL

P1–## (home run symbol)
- HOME RUN. ARROWS INDICATE NUMBER OF CIRCUITS, CROSS LINES INDICATE NUMBER OF WIRES, OTHER THAN TWO (2) PLUS BOND, WIRE SIZE NOT SHOWN INDICATES #12AWG MIN.
- INDICATES CIRCUIT NUMBER
- PANEL DESIGNATION
- WIRING IN RACEWAY
- WIRING IN RACEWAY CONCEALED UNDERGROUND OR UNDERSLAB, MINIMUM 3/4"C
- 3/C #nn W/GND, EquipNo–P — CONDUIT AND CABLE ID TAG
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- CONDUIT STUB
- EY CONDUIT SEAL
- FLEXIBLE NON–METALLIC CONDUIT
- PANELBOARD
- CONTROL PANEL
- ATC — AUTOMATIC TEMPERATURE CONTROL PANEL
- ISBP — INTRINSIC SAFETY BARRIER PANEL
- POWER COMPANY METER
- HS H/O/A — LOCAL SELECTOR SWITCH
  H/O/A – HAND/OFF/AUTO
  H/O/R – HAND/OFF/REMOTE
  L/O/R – LOCAL/OFF/REMOTE
- PUSHBUTTON STATION, WITH "EM" EMERGENCY
- J — JUNCTION BOX
- MD — MOTORIZED DAMPER
- T — THERMOSTAT
- R — RELAY
- B T — DOOR BELL/BUZZER AND TRANSFORMER – MTD CL UP 7'–0" AFF
- x–# / EQUIP# — EQUIPMENT TAGS
- X — KEYED NOTE TAG
- X — REVISION TRIANGLE
- BRACKET

POWER

- NON–FUSED SAFETY SWITCH
- F — FUSED SAFETY SWITCH
- NON–FUSED DISCONNECT/MAGNETIC MOTOR STARTER
- M — MANUAL MOTOR SWITCH (MOTOR RATED SWITCH), TOGGLE OPERATED, SINGLE PHASE. 1 OR 2 POLE AS REQUIRED
- CB 100A — ENCLOSED CIRCUIT BREAKER W/AMPERE RATING
- M — ELECTRIC MOTOR, NUMBER INDICATES HORSEPOWER RATING, "F" INDICATES FRACTIONAL LESS THAN 1/20HP OR 100W
- T — TRANSFORMER
- P — POWER POLE
- DUPLEX RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED."WP" WEATHER PROOF, "G" PROTECTED BY GFCI RECEPTACLE OR BREAKER UPSTREAM, "H" MOUNTED 0'–6" BELOW CEILING, "TV" MOUNT 7'–6" UP
- DOUBLE DUPLEX RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED
- SINGLE RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED
- GFCI DUPLEX RECEPTACLE, NEMA 5–20R – MOUNTED CL UP 48" OR 6" ABOVE COUNTER
- DOUBLE DUPLEX GFCI RECEPTACLE, NEMA 5–20R – MOUNTED CL UP 48" OR 6" ABOVE COUNTER
- FLUSH FLOOR OUTLET, DUPLEX RECEPTACLE, NEMA 5–20R
- MULTI SERVICE FLUSH FLOOR BOX WITH DUPLEX RECEPTACLE AND PROVISIONS FOR DATA
- POWER RECEPTACLE, NEMA CONFIGURATION AS NOTED OR AS REQUIRED FOR EQUIPMENT SERVED.
- FLUSH CEILING MTD DEVICE BOXES, ONE W/ DUPLEX RCPT FOR PROJECTOR POWER AND ONE FOR DATA TO SERVE OH PROJECTOR. RUN ONE 1 1/2"C TO JBOX LOCATED AT FRONT OF ROOM FOR PROJECTOR CABLE PATHWAY. VERIFY FINAL LOCATION W/ OWNER PRIOR TO ROUGH IN.
- MULITI–OUTLET POWER STRIP, MOUNT 0'–6" ABOVE COUNTERTOP, RECEPTACLE SPACING AS NOTED.

MISCELLANEOUS

- B / 80.01 — SECTION #, SHEET # — SECTION CALL OUT
- DETAIL TITLE, 1 / X–0X — DETAIL CALL OUT

LIGHTING

- 2x4 LIGHT FIXTURE
- Ab — ASSOCIATED CONTROL DEVICE; FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
- 1x4 LIGHT FIXTURE
- 2x2 LIGHT FIXTURE
- FIXTURE WITH INTEGRAL EMERGENCY BATTERY PACK
- FIXTURE WIRED TO UNSWITCHED EMERGENCY CIRCUIT
- DOWN LIGHT
- WALL MOUNTED FIXTURES
- POLE MOUNTED SITE LIGHTING FIXTURE; ab — FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
- FLOOD LIGHT
- EXIT SIGN, CEILING MOUNTED. ARROW INDICATES EGRESS DIRECTION. SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED
- EXIT SIGN, WALL MOUNTED 7'–6" AFF OR 0'–6" ABOVE DOOR. SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.
- BATT — DUAL HEAD EMERGENCY LIGHT BATTERY PACK WITH NUMBER OF HEADS AS INDICATED – WALL MOUNTED MTD 7'–6" AFF. NUMERAL INDICATES BATTERY ID NUMBER.
- TANDEM EMERGENCY LIGHT BATTERY PACK & EXIT SIGN – WALL MOUNTED MTD 7'–6" AFF OR 0,–6" ABOVE DOOR. NUMERAL INDICATES BATTERY ID NUMBER.
- REMOTE EMERGENCY LIGHTING HEAD – WALL MOUNTED MTD 7'–6" AFF. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.
- S — SINGLE POLE TOGGLE SWITCH – MTD CL UP 4'–0" AFF
- S_2 — DOUBLE POLE TOGGLE SWITCH – MTD CL UP 4'–0" AFF
- S_3 — 3–WAY TOGGLE SWITCH – MTD CL UP 4'–0" AFF
- S_4 — 4–WAY TOGGLE SWITCH – MTD CL UP 4'–0" AFF
- S_M — WALL MOUNTED OCCUPANCY SENSOR – MTD CL UP 4'–0" AFF
- S_P — TOGGLE SWITCH WITH PILOT LIGHT – MTD CL UP 4'–0" AFF
- S_D — DIMMER SWITCH – MTD CL UP 4'–0" AFF
- S_{LV} — LOW VOLTAGE SWITCH – MTD CL UP 4'–0" AFF
- a — OCCUPANCY SENSOR a. INDICATES CONTROLLED FIXTURE
- PC — PHOTOCELL
- LC — LIGHTING CONTACTOR
- MS — MOTION SENSOR

FIRE ALARM DIAGRAM SYMBOLS

- FACP — FIRE ALARM CONTROL PANEL
- FAA — FIRE ALARM ANNUNCIATOR
- FCPS — FIELD CHARGER POWER SUPPLY
- M — FIRE ALARM MASTER BOX
- K — KNOX BOX
- F — FIRE ALARM MANUAL PULL STATION – WALL MTD CL UP 4'–0"
- H L — FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED – WALL MTD BOTTOM UP 80" AFF. "H" HORN, "V" VOICE.
- L — FIRE ALARM VISUAL NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED – WALL MTD BOTTOM UP 80" AFF
- CEILING MOUNTED SMOKE DETECTOR
- CEILING MOUNTED HEAT DETECTOR
- DUCT SMOKE DETECTOR S=SUPPLY, R=RETURN
- FS — SPRINKLER SYSTEM FLOW SWITCH
- TS — SPRINKLER SYSTEM TAMPER SWITCH
- PS — SPRINKLER SYSTEM PRESSURE SWITCH
- DH — FIRE ALARM SYSTEM MAGNETIC DOOR HOLDER
- Z — MONITOR MODULE
- C — CONTROL MODULE
- R — RELAY MODULE

COMMUNICATIONS

- TEL — TELEPHONE BACKBOARD
- wx — PROVISIONS FOR TELEPHONE OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE
  W–INDICATES WALL MOUNTED AT 60" AFF
  P–INDICATES PAYPHONE MOUNTED AT 4'–0" AFF
  X–INDCATES NUMBER OF JACKS, SINGLE BOX
- PROVISIONS FOR DATA OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.
- 2D2T — PROVISIONS FOR TELEPHONE & DATA OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.
- PROVISIONS FOR SCADA SYSTEM OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE
- CEILING MOUNTED TELEPHONE SYSTEM OUTLET
- CEILING MOUNTED DATA SYSTEM OUTLET
- CEILING MOUNTED VOICE & DATA OUTLET
- FLUSH TELEPHONE FLOOR OUTLET
- FLUSH DATA FLOOR OUTLET
- FLUSH VOICE & DATA FLOOR OUTLET
- TV — TELEVISION COAXIAL OUTLET. MOUNTED UP SAME AS ASSOCIATED RECEPTACLE

SECURITY

- SEC — SECURITY PANEL
- DS — DOOR INTRUSION SWITCH
- DE — ELECTRIC DOOR STRIKE
- CR — CARD READER
- KP — KEY PAD
- MOTION DETECTOR
- CAM — SECURITY CAMERA PTZ = PAN/TILT/ZOOM

INTERCOM & PAGING SYSTEM

- S — CEILING MOUNTED SPEAKER
- PA — PAGING SYSTEM CONTROL PANEL
- HS — PAGING SYSTEM HANDSET

INSTRUMENTATION

- LS / XX — FIELD MOUNTED INSTRUMENT; INSTRUMENT IDENTIFICATION TYPE; INSTRUMENT LOOP #
- FS / XX — VENDER SUPPLIED INSTRUMENT

INSTRUMENT IDENTIFIER:

AE	ANALYSIS ELEMENT
AIT	ANALYSIS INDICATING TRANSMITTER
AT	ANALYSIS TRANSMITTER
DPS	DIFFERENTIAL PRESSURE SWITCH
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FIT	FLOW INDICATING TRANSMITTER
FT	FLOW TRANSMITTER
FS	FLOW SWITCH
LE	LEVEL ELEMENT
LIT	LEVEL INDICATING TRANSMITTER
LT	LEVEL TRANSMITTER
LS	LEVEL SWITCH
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
MOV	MOTOR OPERATED VALVE
PE	PRESSURE ELEMENT
PIT	PRESSURE INDICATING TRANSMITTER
PT	PRESSURE TRANSMITTER
PS	PRESSURE SWITCH
SV	SOLENOID VALVE
TE	TEMPERATURE ELEMENT
TIT	TEMPERATURE INDICATING TRANSMITTER
TT	TEMPERATURE TRANSMITTER
ZS	PROXIMITY SWITCH

MISC TERMINALS

- ARROW, SMALL
- ARROW, LARGE
- ARROW, TRIANGULAR
- CONTINUE, SMALL
- CONTINUE, LARGE
- DOT, SMALL
- DOT, MEDIUM
- DOT, LARGE
- POLARITY SQUARE
- SCREW TERMINAL
- TERMINAL POINT, SMALL
- TERMINAL POINT, LARGE
- TERMINAL POINT, SQUARE
- SHIELD
- SHIELD W/TERMINAL POINT

ONE–LINE DIAGRAM SYMBOLS

- 52 GCB1 / CB 800A E.O / 52 — HV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER ELECTRICALLY OPERATED; MV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER WITH MANUAL CONTROL SWITCH
- AT/AF EO — LOW VOLTAGE CIRCUIT BREAKER
  AF – AMP FRAME
  AT – AMP TRIP
  EO – ELECTRICALLY OPERATED
- ST — ST – SHUNT TRIP
  GF – GROUND FAULT
  EO – ELECTRICALLY OPERATED
- DISCONNECT, ISOLATION OR SAFETY SWITCH
- FUSED DISCONNECT SWITCH
- 1 — MAGNETIC MOTOR STARTER. NUMERAL INDICATES NEMA SIZE FVNR UNLESS OTHERWISE NOTED.
  FVR – FULL VOLTAGE REVERSING
  RVAT – REDUCING VOLTAGE AUTO TRANSFORMER
  2S – TWO SPEED
  YD – WYE DELTA REDUCED VOLTAGE STARTER
- CAPACITOR
- VFD 11 — VFD = VARIABLE FREQUENCY DRIVE
  SS = SOLID STATE STARTER
  DC = DC VARIABLE DRIVE
  NUMERAL INDICATES AMP RATING
- OA — POWER TRANSFORMER
  OA – LIQUID TYPE SELF COOLED
  AA – DRY TYPE SELF COOLED
  FA – FAN COOLED
  CONNECTION
- 2, 480/120 — POTENTIAL TRANSFORMER; RATIO; NUMBER REQUIRED
- 2, 600/5 — CURRENT TRANSFORMER; RATIO; PHASE
- 5 — MOTOR, NUMERAL INDICATES HORSEPOWER
- X — GENERAL LOAD, NUMERAL INDICATES LOAD IN KVA
- GENERATOR
- N E L ATS — ATS – AUTOMATIC TRANSFER SWITCH
  MTS – MANUAL TRANSFER SWITCH
- A — METER
  A – AMMETER
  V – VOLTMETER
  W – WATTMETER
  KWH – KILOWATT HOUR
  KVAR – KILOVAR METER
  VAR – VAR METER
  HZ – FREQUENCY METER
  PF – POWER FACTOR METER
- 3 — LINE OR LOAD REACTOR NUMERAL INDICATES % IMPENDENCE
- DPM — DIGITAL POWER MONITOR
- AS — METER TRANSFER SWITCH
  AS – AMMETER SWITCH
  VS – VOLTMETER SWITCH
- SPD — SPD = SURGE PROTECTION DEVICE
  ENDN = ETHERNET TO DEVICENET LINKING DEVICE
  DPS = DEVICENET POWER SUPPLY
- MEDIUM VOLTAGE CABLE TERMINATION
- DRAWOUT DEVICE
- LA — LIGHTNING ARRESTOR
- K — KEY INTERLOCK

GROUNDING

- BARE COPPER GROUND CABLE. (SIZE 4/0 UNLESS OTHERWISE NOTED)
- 3/4ø X 10'–0" LONG GROUND ROD. (10'–0" MINIMUM LENGTH)
- EQUIPMENT BOLTED CONNECTION OR APPROVED EQUAL.
- CADWELD EXOTHERMIC CONNECTION
- GROUND

CONTROL DIAGRAM SYMBOLS

NOTE: ALL CONTROL SYMBOLS ARE DRAWN ASSUMING DE–ENERGIZED CIRCUITS, EMPTY TANKS, UNPRESSURIZED LINES, ETC.

OPEN ON INCREASE / CLOSE ON INCREASE
- PRESSURE SWITCH
- LEVEL SWITCH
- FLOW SWITCH
- TEMPERATURE SWITCH

NORMALLY CLOSED / NORMALLY OPEN
- PUSH BUTTON
- INSTANTANEOUS CONTACT
- TIMED CLOSE CONTACT
- TIMED OPEN CONTACT
- LIMIT SWITCH
- H O A, XOO, OOX — SELECTOR SWITCH: QUANTITY OF ARROWS INDICATES NUMBER OF POSITIONS. XOO INDICATES UPPER CONTACT CLOSED IN LEFT POSITION AND OPEN IN CENTER AND RIGHT POSITIONS
- INTERNAL WIRING
- FIELD WIRING
- RELAY COIL

ABBREVIATIONS

A,AMP	AMPERES
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AIC	AMPERE INTERRUPT CAPACITY
AWG	AMERICAN WIRE GAUGE
BFG	BELOW FINISHED GRADE
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CL	CENTER LINE
CKT	CIRCUIT
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
E.C.	ELECTRICAL CONTRACTOR
EMT	ELECTRIC METALLIC TUBING
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FWE	FURNISHED WITH EQUIPMENT
G.C.	GENERAL CONTRACTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
G,GND	GROUND
HP	HORSEPOWER
HZ	FREQUENCY IN CYCLES/SECOND
IG	ISOLATED GROUND
IMT	INTERMEDIATE METALLIC CONDUIT
JBOX	JUNCTION BOX
K	KILO
KCMIL	1000 CIRCULAR MILS
KVA	KILOVOLT AMPERE
KVAR	KILOVOLT AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR
MCC	MOTOR CONTROL CENTER
MCB	MAIN CIRCUIT BREAKER
MFG	MANUFACTURER
MH	MANHOLE
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTR	MOTOR
MV	MEDIUM VOLTAGE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEUT	NEUTRAL
NO	NORMALLY OPEN
OL	OVERLOAD ELEMENT
PF	POWER FACTOR
PH	PHASE
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RGS	RIGID STEEL CONDUIT
RTD	RESISTANCE TEMPERATURE DETECTOR
SEC	SECONDARY
SS	STAINLESS STEEL
SV	SOLENOID VALVE
TEMP	TEMPERATURE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UE	UNDERGROUND ELECTRIC
UG	UNDERGROUND
UPS	UNINTERRUPTED POWER SUPPLY
V	VOLTS
VA	VOLT–AMPERES
VAR	VOLT–AMPERE REACTIVE
W	WATT
WM	WATT METER
WP	WEATHER PROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

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CHECKED BY: AJF
DRAWN BY: SAA
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ELECTRICAL LEGEND

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 8 OF 11

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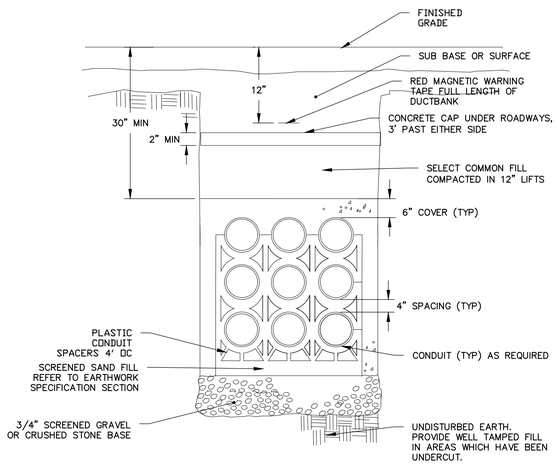
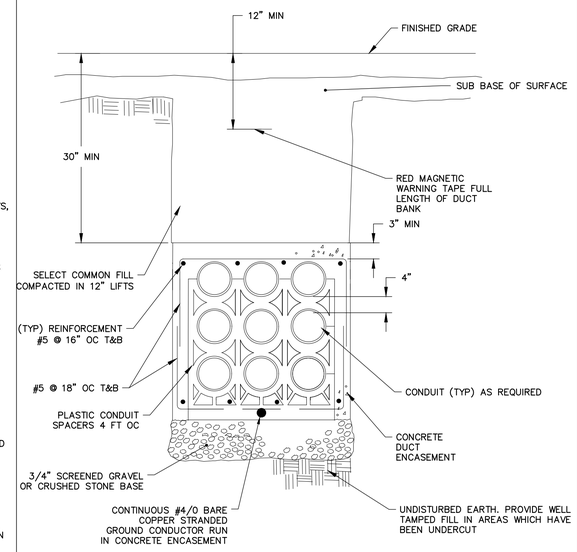


1 XX-XXX

TYPICAL SAND ENCASED/ CONCRETE CAPPED UNDERGROUND DUCT BANK DETAIL

SCALE: N.T.S.



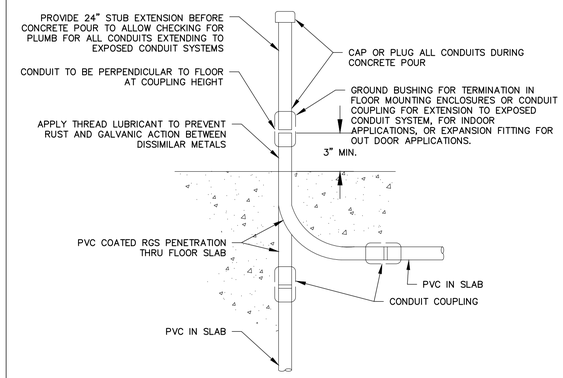
2 XX-XXX

TYPICAL REINFORCED CONCRETE ENCASED UNDERGROUND DUCT BANK DETAIL

SCALE: N.T.S.

NOTES:

1. APPLICABLE IN ALL AREA UNLESS NOTED OTHERWISE



3 XX-XXX

CONDUIT STUB-UP/UNDERGROUND PENETRATION DETAIL

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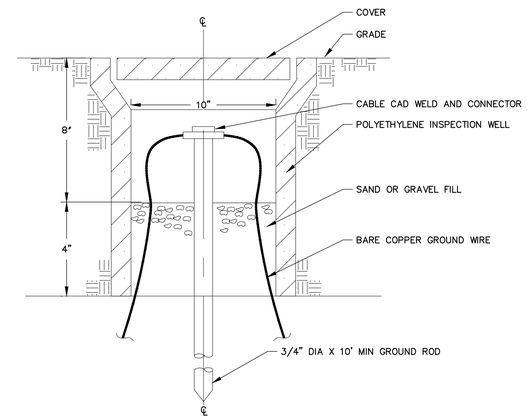


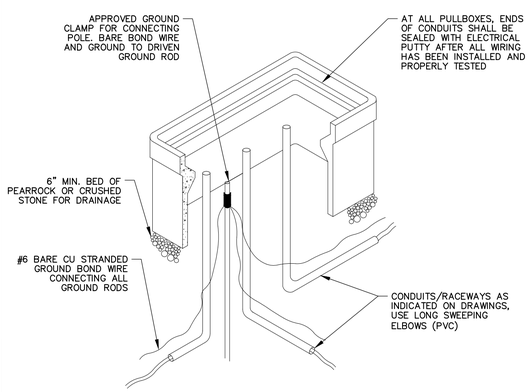
4 XX-XXX

TYPICAL GROUND WELL DETAIL

SCALE: N.T.S.

GENERAL NOTES:

1. FINAL DIMENSIONS OF PULL BOXES SHALL BE AS VERIFIED IN THE FIELD AND SHALL BE IN ACCORDANCE WITH NEC.
2. PULLBOX COVERS SHALL BE CAST IRON. PROVIDE EXTENSION AS REQUIRED.
3. PULLBOXES SHALL BE PRECAST EQUAL TO: GEORGE ROBERTS, BROOKS, OR A.C. MILLER.
4. REFER TO SPECIFICATIONS FOR FURTHER REQUIREMENTS.



5 XX-XXX

PULL BOX/HANDHOLE DETAIL

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CHECKED BY: AJF
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ELECTRICAL DETAILS

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 9 OF 11

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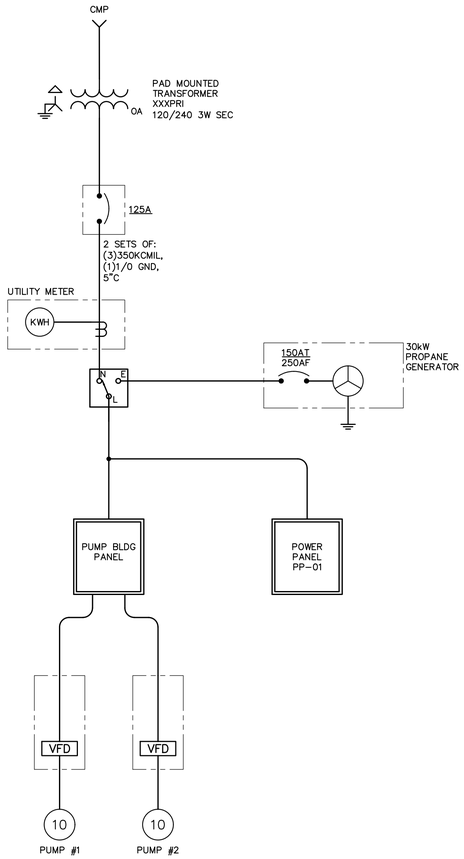


DIRECTORY	BRKR	POLE	CKT #	KVA	KVA LOADS A	KVA LOADS B	KVA	CKT #	POLE	BRKR	DIRECTORY
PUMP 1	60	2	1	7.50	15.00		7.50	2	2	60	PUMP 2
			3			0.00		4			
CP	20	1	5	0.50	0.70		0.20	6	1	20	LIT
FAN	20	1	7	0.10		0.10		8			
			9		0.00			10			
			11			0.00		12			
			13		0.00			14			
			15			0.00		16			
				SUBTOTAL	15.70	0.10	SUBTOTAL				
VOLTAGE:	120/240			TOTAL kVA	15.80				PANEL NAME:		PNL-2
MAIN BREAKER:	MLO			TOTAL AMPS	66				LOCATION:		
BUSES:	100								MOUNTING:		SURFACE
PH & WIRES:	1PH 3W								AIC RATING:		10 kAIC
NOTES:											

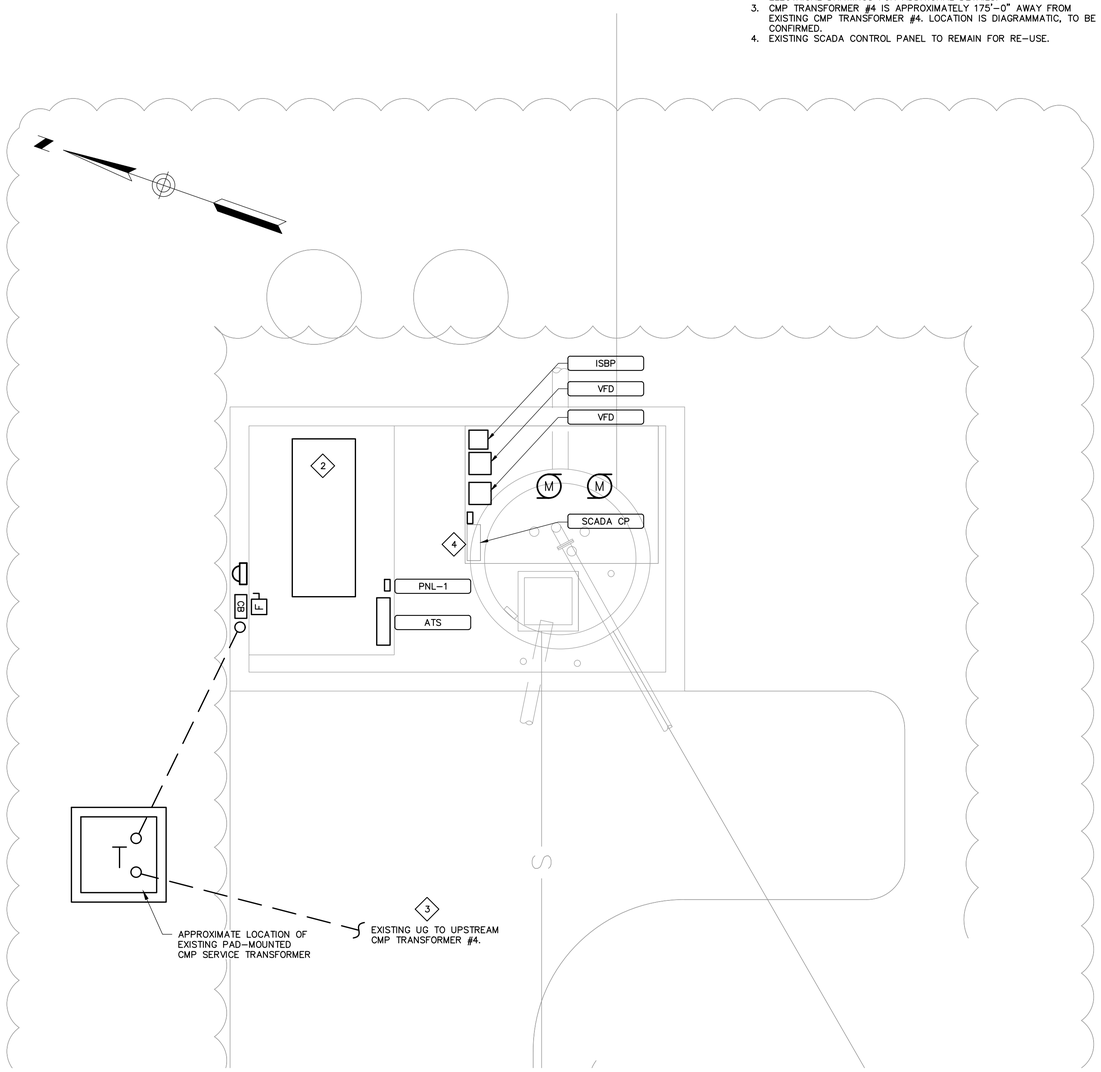
DIRECTORY	BRKR	POLE	CKT #	KVA	KVA LOADS A	KVA LOADS B	KVA	CKT #	POLE	BRKR	DIRECTORY
GEN BLOCK HEATER	15	2	1	2.50	2.50			2	2	60	MAIN
			3	2.50		2.50		4			
SPACE HEATER	15	2	5	2.50	2.60		0.10	6	1	15	RECEPTACLE
			7	2.50		2.70	0.20	8	1	15	LIGHTS
HEATER, WALL (UNDER BKR PNL)	15	2	9	2.50	2.50			10			
			11	2.50		2.50		12			
			13		0.00			14			
			15			0.00		16			
				SUBTOTAL	7.60	7.70	SUBTOTAL				
VOLTAGE:	120/240			TOTAL kVA	15.30				PANEL NAME:		PNL-1
MAIN BREAKER:	60			TOTAL AMPS	64				LOCATION:		
BUSES:	100								MOUNTING:		SURFACE
PH & WIRES:	1PH 3W								AIC RATING:		10 kAIC
NOTES:											

GENERAL DEMOLITION NOTES:

1. THE INTENT OF THE DEMOLITION PLANS IS TO DOCUMENT EXISTING CONDITIONS. HOWEVER, ALL ELECTRICAL EQUIPMENT MAY NOT NECESSARILY BE INDICATED ON THE DRAWINGS. FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND.
2. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING EQUIPMENT TO REMAIN. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES EQUIPMENT TO BE DEMOLISHED AND/OR NEW WORK OR EQUIPMENT. ALL ITEMS INDICATED FOR REMOVAL SHALL BE REMOVED WITH ALL ASSOCIATED HARDWARE AND ACCESSORIES COMPLETE BACK TO SOURCE INCLUDING, BUT NOT LIMITED TO: CONDUIT, BOXES, WIRING, CABLES, HANGERS, ETC.

KEYED DEMOLITION NOTES:

1. CONTRACTOR SHALL DEMOLISH EXISTING PUMP ENCLOSURE, PUMPS, VALVES, LEVEL ELEMENTS, AND APPURTENANCES.
2. CONTRACTOR SHALL DEMOLISH EXISTING GENERATOR AND GENERATOR ENCLOSURE. DISCONNECT POWER PRIOR DEMOLITION WORK. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL DETAILS.
3. CMP TRANSFORMER #4 IS APPROXIMATELY 175'-0" AWAY FROM EXISTING CMP TRANSFORMER #4. LOCATION IS DIAGRAMMATIC, TO BE CONFIRMED.
4. EXISTING SCADA CONTROL PANEL TO REMAIN FOR RE-USE.



EXISTING SITE CONDITIONS

SCALE: 1" = 4'

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EXISTING ELECTRICAL SITE PLAN

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
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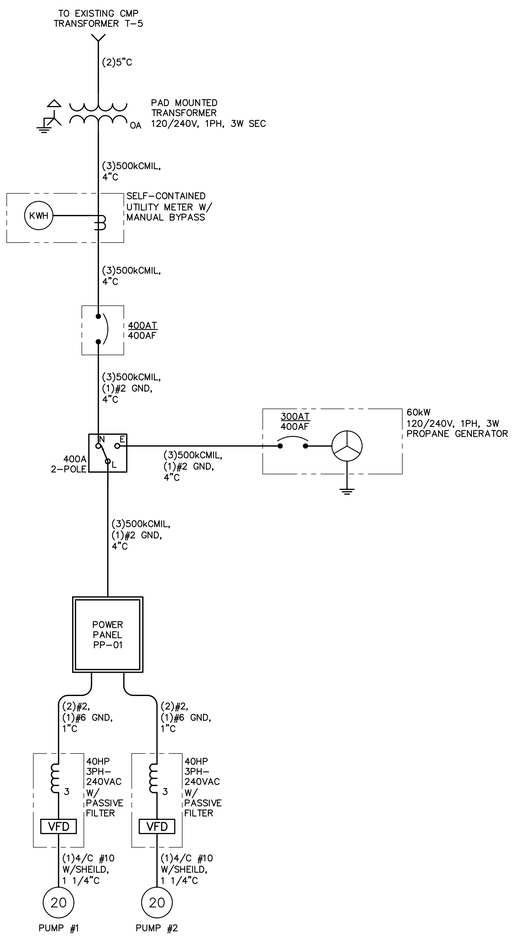
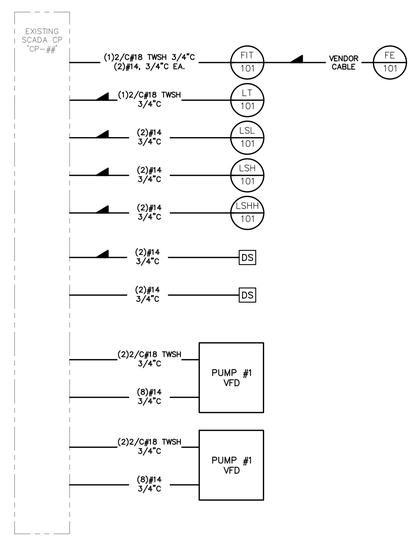


ELECTRICAL ONE-LINE DIAGRAM

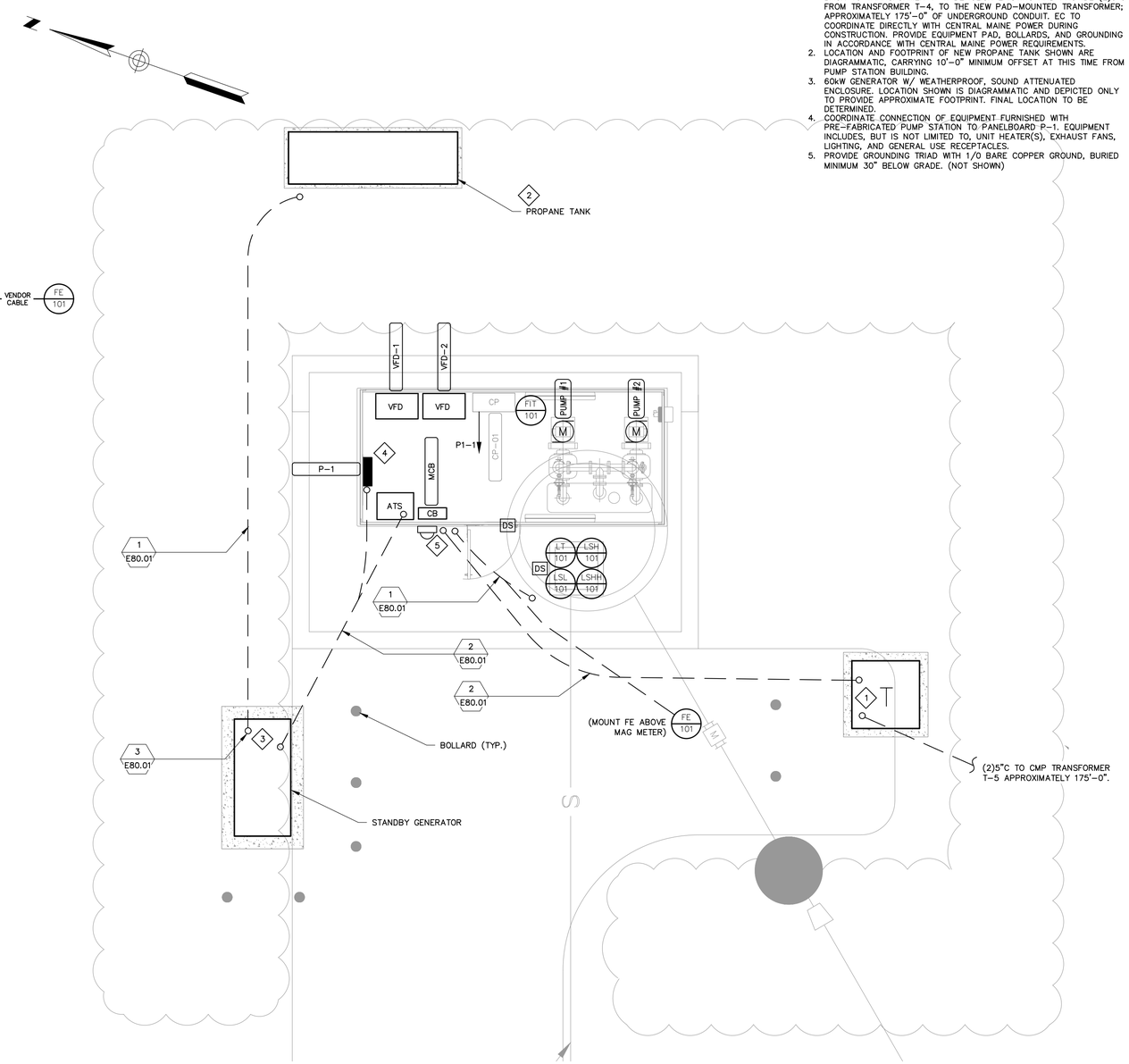


INSTRUMENTATION AND CONTROLS RISER DIAGRAM

DIRECTORY	BRKR	POLE	CKT #	KVA	KVA LOADS A	KVA LOADS B	KVA	CKT #	POLE	BRKR	DIRECTORY
PUMP 1	60	2	1	10.80	21.60		10.80	2	2	60	PUMP 2
			3	10.80		21.60	10.80	4			
GEN BLOCK HEATER	20	2	5	2.50	6.25		3.75	6	2	40	SPACE HEATER
			7	2.50		6.25	3.75	8			
SPARE	20	2	9	0.00	0.50		0.50	10	1	20	CP
			11	0.00		0.20	0.20	12	1	20	LIT
FAN	20	1	13	0.10	0.20		0.10	14	1	20	RECEPTACLE
LIGHTS	20	1	15	0.20		0.20		16		20	SPARE
SPARE	20		17		0.00			18		20	SPARE
SPARE	20		19			0.00		20			SPACE
SPACE			21		0.00			22			SPACE
SPACE			23			0.00		24			SPACE
				SUBTOTAL	28.55	28.25	SUBTOTAL				

VOLTAGE:	120/240	TOTAL KVA	56.80	PANEL NAME:	CURTIS NEW POWER PANEL
MAIN BREAKER:	300	TOTAL AMPS	237	LOCATION:	PUMP STATION INTERIOR
BUSES:	400			MOUNTING:	SURFACE
PH & WIRES:	1PH 3W			AIC RATING:	42
NOTES:					

PANEL SCHEDULE



ELECTRICAL PLAN
SCALE: 1"=4'

GENERAL NOTES:

1. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING EXISTING. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES NEW WORK, UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. ALL EQUIPMENT AND LOCATIONS ARE SHOWN DIAGRAMMATICALLY AND SHALL BE COORDINATED IN THE FIELD PRIOR TO INSTALLATION.

KEYED NOTES:

1. NEW PAD-MOUNTED TRANSFORMER LOCATION SHOWN IS DIAGRAMMATIC. FINAL LOCATION TO BE COORDINATED WITH CENTRAL MAINE POWER COMPANY. FIELD COORDINATE EXISTING PRIMARY DUCT BANK ROUTING BACK TO TRANSFORMER T-4. DEMOLISH EXISTING AND PROVIDE (2)5"C FROM TRANSFORMER T-4, TO THE NEW PAD-MOUNTED TRANSFORMER; APPROXIMATELY 175'-0" OF UNDERGROUND CONDUIT. EC TO COORDINATE DIRECTLY WITH CENTRAL MAINE POWER DURING CONSTRUCTION. PROVIDE EQUIPMENT PAD, BOLLARDS, AND GROUNDING IN ACCORDANCE WITH CENTRAL MAINE POWER REQUIREMENTS.
2. LOCATION AND FOOTPRINT OF NEW PROPANE TANK SHOWN ARE DIAGRAMMATIC, CARRYING 10'-0" MINIMUM OFFSET AT THIS TIME FROM PUMP STATION BUILDING.
3. 60kW GENERATOR W/ WEATHERPROOF, SOUND ATTENUATED ENCLOSURE. LOCATION SHOWN IS DIAGRAMMATIC AND DEPICTED ONLY TO PROVIDE APPROXIMATE FOOTPRINT. FINAL LOCATION TO BE DETERMINED.
4. COORDINATE CONNECTION OF EQUIPMENT FURNISHED WITH PRE-FABRICATED PUMP STATION TO PANELBOARD P-1. EQUIPMENT INCLUDES, BUT IS NOT LIMITED TO, UNIT HEATER(S), EXHAUST FANS, LIGHTING, AND GENERAL USE RECEPTACLES.
5. PROVIDE GROUNDING TRIAD WITH 1/0 BARE COPPER GROUND, BURIED MINIMUM 30" BELOW GRADE. (NOT SHOWN)

4' 0 4' 8'
BAR SCALE
1" = 4'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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REV	DESCRIPTION	DATE

DESIGNED BY: SEH
DRAWN BY: SAA
CHECKED BY: AJF
(705.02.dwg)

PROPOSED ELECTRICAL SITE PLAN

CITY OF PORTLAND, ME

CURTIS ROAD PUMP STATION UPGRADES

JOB NO.: 0231265.00
DATE: JULY 26, 2018
SCALE: AS NOTED
SHEET: 11 OF 11

E05.02

22x34 SHEET
1:1

\\woodardcurran.net\shared\Projects\0231265.00 Portland - Curtis and Franklin PS Des Bid\wip\Drawings\Electrical\E05.02.dwg, Jul 26, 2018 - 4:45pm

Estimate Summary

Curtis Road Pump Station - GMP Proposal Estimate

Woodard & Curran
41 Hutchins Drive
Portland, Maine 04102

Date: 7/26/2018
Time: 4:11 PM
Project No.: 231265

		Labor	Material	Const. Equip.	Subcontract	Temp Matl	Proces Equip.	Other	Totals
Direct Construction Cost	%								
Base labor		$60,659	$172,496	$17,123	$64,380	$0	$123,000	$0	$437,658
Labor burden	35.00%	$21,231							$21,231
Labor fringes		$21,899							$21,899
Labor manhours		1,272							
Material sales tax	0.00%		$0						$0
Equipment shipping	3.50%			$599					$599
Temporary material markup	0.00%					$0			$0
Equipment rental markup	0.00%						$0		$0
Other markup	0.00%							$0	$0
Cost of Work		$103,789	$172,496	$17,722	$64,380	$0	$123,000	$0	$481,387
Project Contingency	10%								$48,139
Total Construction Cost		$103,789	$172,496	$17,722	$64,380	$0	$123,000	$0	$529,526
Design-Build Fee	10%								$52,953
Sub-Total									$582,479
Final Design (after 60%)	6%								$34,949
Engr. Services During Const.	12%								$69,897
Sub-Total									**$687,325**
General Liability Insurance	0.85%								$6,001
Builder's Risk Insurance	0.15%								$1,059
Payment & Performance Bonds	$11,615								$11,615
GMP Total									**$706,000**

Curtis Road Pump Station - GMP Proposal Estimate

Recap - With Taxes and Insurance

Group 1: Divisions

Estimator : K. Rosner

Note: Indirect costs not included in these totals.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
General requirements			40,962.21	8,222.40	1,200.30	3,579.44					53,964
Existing site conditions			1,064.19	528.80	22,980.00	176.24					24,749
Concrete			8,642.78	1,803.60							10,446
Metals			1,278.42	1,372.51		13.41					2,664
Finishes					6,000.00						6,000
HVAC			158.59								159
Electrical			28,842.59	139,386.34	18,000.00	632.34					186,861
Earthwork			4,300.03	365.22		4,103.09					8,768
Site construction			129.93	302.40	7,800.00	30.46					8,263
Utilities			6,731.04	15,865.79	4,800.00	2,137.78					29,535
Process instrumentation and interconnections			867.83	3,496.80	3,600.00						7,965
Process gas and liquid handling, purification			10,811.38	1,152.00		7,049.59	123,000.00				142,013
Total Gross Cost			103,788.98	172,495.84	64,380.30	17,722.36	123,000.00				481,387

Estimate Detail - Curtis Road Pump Station - GMP Proposal Estimate

Detail - With Taxes and Insurance | Group 1: Divisions

Estimator : K. Rosner

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
General requirements											
Mobilize/Demobilize	1	LS	2,278.70	3,000.00						5,278.70	5,279
Project Manager	2	WEEK	9,072.00							4,536.00	9,072
Project Superintendent	6	WEEK	25,272.00							4,212.00	25,272
Safety Engineer	1	WEEK	2,980.80							2,980.80	2,981
Building Permit - Assume Fee is Waived		EXCL									
Electrical Permit - Assume Fee is Waived		EXCL									
Materials Testing	1	LS			1,200.00					1,200.00	1,200
Job telephone/communications	1	MO		240.00						240.00	240
Temporary toilets	1	MO		180.00						180.00	180
Water, ice and cups	1	MO		90.00						90.00	90
First aid supplies	1	MO		60.00						60.00	60
Safety supplies	1	MO		240.00						240.00	240
Office supplies	1	MO		60.00						60.00	60
Small tools	1	MO				248.40				248.40	248
Gasoline and lubricating oil	190	GALS		798.00						4.20	798
Automobile	1	MO				745.20				745.20	745
Pick-up truck	1	MO				1,095.44				1,095.44	1,095
Support Equipment	1	MO				1,490.40				1,490.40	1,490
Temporary security fence	400	LNFT	829.44	3,014.40						9.61	3,844
Job clean up	1	MO	529.27	540.00	0.30					1,069.57	1,070
*** Total General requirements**			**40,962.21**	**8,222.40**	**1,200.30**	**3,579.44**					**53,964**
Existing site conditions											
Remove existing steps in wetwell	1	LS	529.27							529.27	529
Trim/Remove Shrubs as Necessary	1	LS			1,080.00					1,080.00	1,080
Remove Propane Tanks (100 Gal.) - by Propane Supplier	2	EXCL									
Remove Existing Wet Well Hatch	1	EACH	264.64							264.64	265
Core drilling @ wetwell	5	EACH			900.00					180.00	900
Remove bollards	2	EACH	270.28	28.80		176.24				237.66	475
Disposal of Demolition Debris	1	LS		500.00						500.00	500
Setup/Operate/Remove Bypass Pumping System	2	WEEKS			21,000.00					10,500.00	21,000
*** Total Existing site conditions**			**1,064.19**	**528.80**	**22,980.00**	**176.24**					**24,749**
Concrete											
Concrete Encasement of Suction Piping	1	CUYD	1,234.53	123.60						1,358.13	1,358
Extend Concrete Pad/Footing	7	CUYD	7,408.25	1,680.00						1,298.32	9,088
*** Total Concrete**			**8,642.78**	**1,803.60**							**10,446**
Metals											
Install New 30 x 30 Aluminum Hatch	1	EACH	341.81	840.00						1,181.81	1,182
Concrete filled pipe bollard	6	EACH	936.61	532.51		13.41				247.09	1,483
*** Total Metals**			**1,278.42**	**1,372.51**		**13.41**					**2,664**
Finishes											
Painting Subcontractor	1	LS			6,000.00					6,000.00	6,000
*** Total Finishes**					**6,000.00**						**6,000**
HVAC											

Detail - With Taxes and Insurance | Group 1: Divisions

Estimator : K. Rosner
Project Size : 0 SQFT

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
Install Enclosure Heater	1	EACH	158.59							158.59	159
*** Total HVAC**			**158.59**								**159**
Electrical											
DEMO SERVICE ENTRANCE, FEEDERS, MISC	1	EA	2,267.69							2,267.69	2,268
DEMO GEN	1	EA	2,267.69							2,267.69	2,268
DEMO PANELBOARD	1	EA	453.54							453.54	454
DEMO ATS	1	EA	453.54							453.54	454
DEMO MISC CABLE AND CONDUIT	1	LS	1,360.61							1,360.61	1,361
CMP Fees	1	EA		12,000.00						12,000.00	12,000
Grounding - Bare Cu, 2/0	1	CLF	130.39	297.60						427.99	428
Grounding Trench	50	LF		600.00						12.00	600
GEN, XFMR, AND TANK PADS	1	LS			18,000.00					18,000.00	18,000
40HP VFD (1 PH IN 3 PH 240V OUT, NEMA 12, FILTER)	2	EA	1,360.61	28,800.00						15,080.31	30,161
METER SOCKET - SELF CONTAINED	1	EA	226.77	1,200.00						1,426.77	1,427
SERVICE BREAKER 200A NEMA 3R	1	EA	566.92	900.00						1,466.92	1,467
60KW PROPANE GEN (incl enclosure)	1	EA	1,360.61	57,000.00						58,360.61	58,361
PROPANE TANK - by Propane Supplier		EXCL									
ATS	1	EA	453.54	4,800.00						5,253.54	5,254
PANELBOARD	1	EA	1,133.84	6,000.00						7,133.84	7,134
CIRCUIT BREAKERS	12	EA	680.31	1,440.00						176.69	2,120
500kCMIL CU XHHW (1 sets of 4)	2	CLF	566.92	2,117.52						1,342.22	2,684
4" RGS (2)	125	LF	2,834.61	2,772.00						44.85	5,607
Lug Terminations	4	EA	259.20	21.12						70.08	280
#2 THHN CU (4)	2	CLF	204.09	291.48						247.79	496
1" RGS (1)	50	LF	340.15	420.60						15.22	761
Lug Terminations	8	EA	165.09	8.83						21.74	174
4/C #10 THHN CU (1)	1	CLF	212.60	330.00						1,085.19	543
1" RGS (1)	50	LF	348.65	420.00						15.37	769
Lug Terminations	8	EA	121.10	6.82						15.99	128
#12 (4)	2	CLF	82.43	26.16						54.30	109
3/4" RGS (1)	200	LF	1,360.61	1,682.40						15.22	3,043
3/4" RGS, PVC COATED	100	LF	623.61	1,146.00						17.70	1,770
Exterior Wallpacks	2	EA	113.38	600.00						356.69	713
2/C #18 CU	1	CLF	64.80	57.00						121.80	122
#14 CU THHN	3	CLF	104.60	32.04						45.55	137
#12 THHN CU	2	CLF	61.82	19.62						54.30	81
EXISTING CP COORDINATION/MODS	1	LS	1,360.61	3,000.00						4,360.61	4,361
UG work - PROPANE TANK	20	LF		1,200.00						60.00	1,200
CONDUIT SEALS	12	EA	1,700.77	2,880.00						381.73	4,581
UG DUCTBANK		****									
Ductbank concrete 3000 psi direct	20	CUYD	525.11	2,277.37		13.97				143.95	2,816
Ductbank rebar		TONS	643.09	422.60						3,631.30	1,066
Machine excavate ductbank	47	CUYD	401.69	34.12		383.29				17.52	819
Hand excavate ductbank	12	CUYD	123.07							10.53	123
Finish ductbank top surface	430	Sqft	123.87	3.14		58.84				0.43	186
Mach backfill ductbank	54	CUYD	184.70	15.68		176.24				7.01	377
(2) 5"C PVC SCHED 40	350	LF	2,579.51	2,011.80						13.12	4,591
(2) 4"C PVC SCHED 40	70	LF	396.85	269.64						9.52	666

Detail - With Taxes and Insurance

Group 1: Divisions

Estimator : K. Rosner
Project Size : 0 SQFT

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
(4) 1"C PVC SCHED 40	100	LF	170.08	82.80						2.53	253
HANDHOLE - PRECAST CONCRETE	1	LS	453.54	4,200.00						4,653.54	4,654
*** Total Electrical**			**28,842.59**	**139,386.34**	**18,000.00**	**632.34**					**186,861**
Earthwork											
Excavate for Bypass MH w/backhoe	52	CUYD	893.43	75.88		852.51				35.04	1,822
Excavate pipe trench w/backhoe	50	CUYD	859.06	72.97		819.72				35.04	1,752
Machine backfill	44	CUYD	1,007.96	85.61		961.80				46.71	2,055
Machine backfill	67	CUYD	1,539.58	130.76		1,469.06				46.71	3,139
*** Total Earthwork**			**4,300.03**	**365.22**		**4,103.09**					**8,768**
Site construction											
Compacted Gravel for Entry Drive	14	CY	129.93	302.40		30.46				33.06	463
Asphalt Paving @ Entry Drive (2" Thk)	10	TONS			1,800.00					180.00	1,800
Misc. Site Restoration	1	LS			6,000.00					6,000.00	6,000
*** Total Site construction**			**129.93**	**302.40**	**7,800.00**	**30.46**					**8,263**
Utilities											
4' diameter precast bypass manhole	7	VLF	1,513.59	5,460.00		986.94				1,137.22	7,961
32" 620# std MH cvr/frm	1	EACH	180.19	673.79		117.49				971.47	971
Furnish & Install New Ladder Rungs in Wetwell	14	EACH	1,025.42	252.00						91.24	1,277
Clean Existing Wetwell/Confined Space Watchman	1	LS	1,693.67							1,693.67	1,694
6" ductile iron MJ pipe (replace 8" discharge)	30	LNFT	1,081.14	1,800.00		1,033.35				130.48	3,914
6" ductile iron MJ pipe (suction & discharge piping)	60	LNFT	761.24	6,840.00						126.69	7,601
Bypass Connection FM Modifications	1	LS	475.78	840.00						1,315.78	1,316
Force Main Cleaning	1,000	LF			4,800.00					4.80	4,800
*** Total Utilities**			**6,731.04**	**15,865.79**	**4,800.00**	**2,137.78**					**29,535**
Process instrumentation and interconnections											
Controls Upgrades/Integration	1	LS			3,600.00					3,600.00	3,600
Inline Electromagnetic Flowmeter	1	EACH	867.83	3,496.80						4,364.63	4,365
*** Total Process instrumentation and interconn**			**867.83**	**3,496.80**	**3,600.00**						**7,965**
Process gas and liquid handling, purification and storage											
Packaged Pump Station (Curtis - Gorman Rupp)	1	LS					123,000.00			123,000.00	123,000
Packaged Pump Station Installation/Remove Old	1	LS	10,811.38	1,152.00		7,049.59				19,012.97	19,013
*** Total Process gas and liquid handling, purifi**			**10,811.38**	**1,152.00**		**7,049.59**	**123,000.00**				**142,013**
Total Gross Cost			**103,788.98**	**172,495.84**	**64,380.30**	**17,722.36**	**123,000.00**				**481,387**

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
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Curtis Road Pump Station Design/Build Guaranteed Maximum Price Estimate
List of Assumptions, Exceptions, and Clarifications
July 26, 2018

Overall

1. This estimate is based on the Design Review drawing set by Woodard & Curran – dated July 26, 2018. The Design Basis Memo for this project dated May 2018 further defines the design.
2. Wage rates assumed to be non-prevailing standard wages for Portland, Maine.
3. This estimate assumes that most work will be accomplished during normal working hours (7:00 AM to 5:00 PM), Monday through Friday excluding holidays.
4. No "winter conditions" construction is anticipated in this estimate. Construction work is expected to follow the construction schedule submitted with this GMP.
5. The GMP estimate and schedule assume reasonable durations for permit procurement.
6. This estimate excludes sales tax on all materials and major equipment. We assume that the City will provide a tax-exempt certificate to Woodard & Curran for this project.
7. This estimate includes Builders' Risk insurance coverage.
8. This estimate includes a Payment and Performance Bond.

General Conditions

1. Assumes a contract will be awarded and notice to proceed given on or before September 17, 2018 so that final design and pump station equipment procurement can begin.
2. GMP Pricing is valid for 30 days from date of submission.
3. Assumes that some construction staging, and storage will be allowed outside the City right-of-way on City property outside the limit of storage.
4. Estimate assumes that utilities on site (electricity and water) can be used by Woodard & Curran and subcontractors at no cost.
5. No cost for building permit or electrical permit is included. We assume that the City will waive the fees for these permits. If the City does not intend to waive the fees, add $11,500 to the GMP total.
6. No provision for site security is included in this estimate.

Site Work

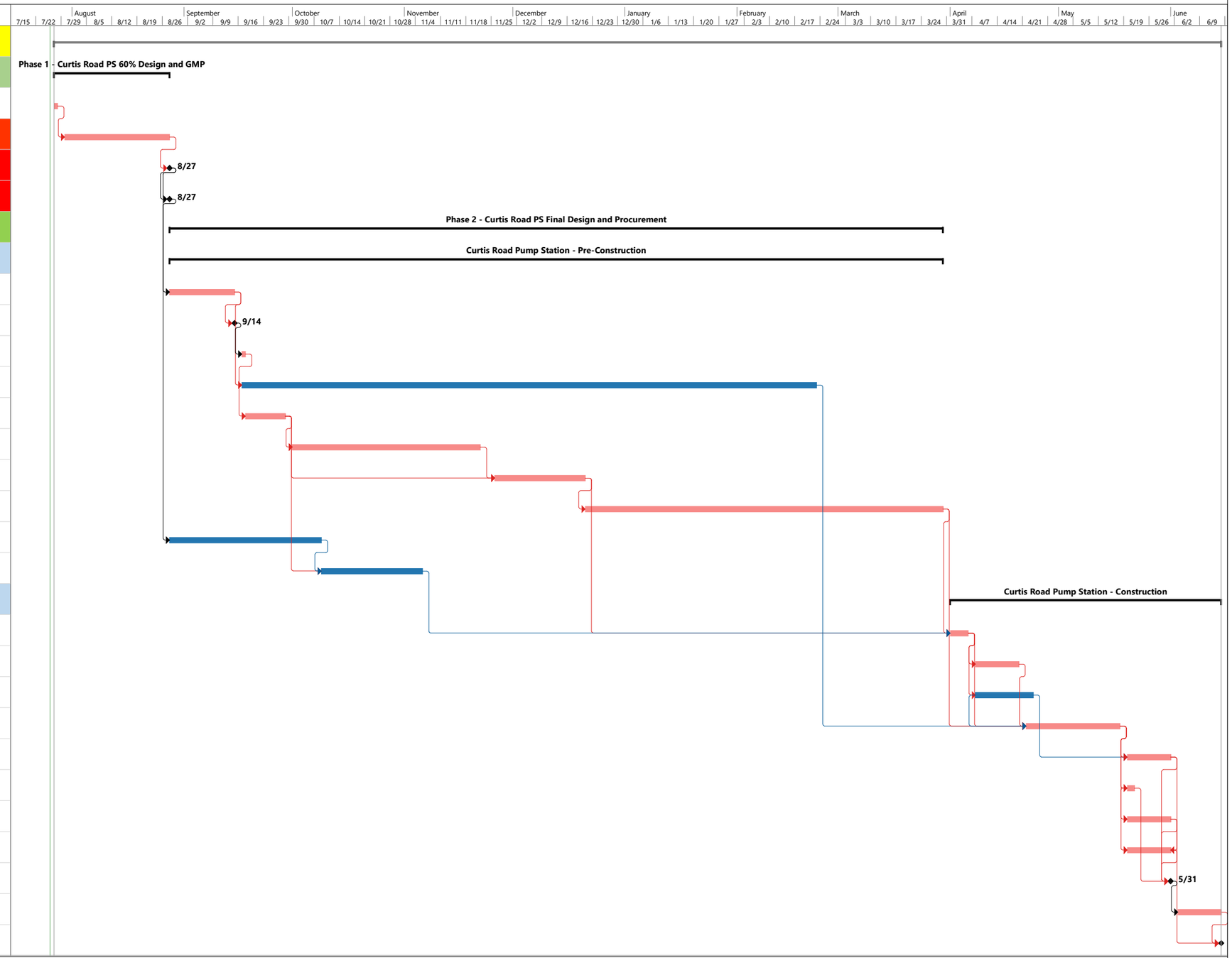
1. Remediation of unknown hazardous materials (asbestos, lead, PCBs, etc.) at this site is not included.
2. Rock excavation and/or removal is not included.
3. Some nominal dewatering for excavations is included.
4. Temporary pumping during pump removal and replacement is included.
5. Interferences or relocation of existing unknown or unforeseen underground utilities is not included in the estimate.
6. New propane tank is not included. Assumed that the propane supplier will provide the tank.
7. Removal of the existing propane tanks is not included. Assumed that the propane supplier will remove the tanks.

Process/Mechanical/Electrical

1. Equipment selection is as outlined in our Design Basis Memo.
2. An estimate for the utility fees has been included. The amount of these fees is unknown.
3. GMP assumes all demolition will be disposed of by Woodard & Curran and the City does shall not retain any of the equipment or structures to be removed.

City of Portland, Maine
Curtis Road Pump Station Design-Build Project Schedule

ID	Task Name	Duration	Start	Finish
0	**Curtis Road PS Design-Build Project Schedule**	**223 days**	**Fri 7/27/18**	**Fri 6/14/19**
1	**Phase 1 - Curtis Road PS 60% Design and GMP**	**22 days**	**Fri 7/27/18**	**Mon 8/27/18**
2	Submit Curtis Road PS GMP to City	1 day	Fri 7/27/18	Fri 7/27/18
3	City Review of Curtis Road PS GMP	21 days	Mon 7/30/18	Mon 8/27/18
4	GMP Construction Proposal Acceptance	0 days	Mon 8/27/18	Mon 8/27/18
5	Phase 2 Notice to Proceed	0 days	Mon 8/27/18	Mon 8/27/18
6	**Phase 2 - Curtis Road PS Final Design and Procurement**	**147 days**	**Tue 8/28/18**	**Fri 3/29/19**
7	**Curtis Road Pump Station - Pre-Construction**	**147 days**	**Tue 8/28/18**	**Fri 3/29/19**
8	90% Design Development	13 days	Tue 8/28/18	Fri 9/14/18
9	90% Design Development Submittal	0 days	Fri 9/14/18	Fri 9/14/18
10	90% Design Development Workshop	1 day	Mon 9/17/18	Mon 9/17/18
11	Procure Gorman-Rupp Pump and Generator Packages	109 days	Mon 9/17/18	Fri 2/22/19
12	Complete 100% IFC Design Documents	9 days	Tue 9/18/18	Fri 9/28/18
13	Submit 100% Documents to MEDEP	38 days	Mon 10/1/18	Wed 11/21/18
14	Apply for Building & Electrical Permits	19 days	Mon 11/26/18	Thu 12/20/18
15	Procure All Remaining Equipment & Materials	67 days	Fri 12/21/18	Fri 3/29/19
16	Subcontractor Pre-Qualification	29 days	Tue 8/28/18	Mon 10/8/18
17	Subcontractors Bidding & Awards (2 packages)	20 days	Tue 10/9/18	Mon 11/5/18
18	**Curtis Road Pump Station - Construction**	**54 days**	**Mon 4/1/19**	**Fri 6/14/19**
19	Mobilize	5 days	Mon 4/1/19	Fri 4/5/19
20	Construct Frost Wall & Pad Extension	10 days	Mon 4/8/19	Fri 4/19/19
21	Implement By-Pass Pumping (including manhole)	12 days	Mon 4/8/19	Tue 4/23/19
22	Install Pumps, Enclosure and Generator	20 days	Mon 4/22/19	Fri 5/17/19
23	Site Restoration	9 days	Mon 5/20/19	Fri 5/31/19
24	Commissioning, Training & Start-up	2 days	Mon 5/20/19	Tue 5/21/19
25	O&M Manuals	9 days	Mon 5/20/19	Fri 5/31/19
26	Record Drawings	9 days	Mon 5/20/19	Fri 5/31/19
27	Substantial Completion	0 days	Fri 5/31/19	Fri 5/31/19
28	Punchlist	10 days	Mon 6/3/19	Fri 6/14/19
29	Final Completion	0 days	Fri 6/14/19	Fri 6/14/19



Curtis Road PS Design-Build
Schedule Date: Thu 7/26/18

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Baseline | Baseline Milestone | Baseline Summary | Progress | Manual Progress | Slippage

2017 - 2018 Rate Schedule

WOODARD &CURRAN

Consultant Personnel	
Labor Category	Hourly Rate
I. Support Services	
- Administrative / Clerical	$73
- Drafter	$83
- Project Assistant	$97
II. Professional Services	
- Designer	$87
- Technician	$92
- Inspector	$95
- Consultant	$96
- Technician 2	$97
- GIS Analyst / Operations Specialist	$98
- Designer 2	$107
- Control System Engineer / Scientist	$108
- Geologist 1/ GIS Developer	$112
- Technical Service Specialist 1	$113
- Engineer 1 / GIS Analyst 2	$114
- Scientist 2	$118
- Geologist 2	$120
- Designer 3	$122
- Resident Engineer	$123
- Geologist 3	$124
- Engineer 2	$126
- Scientist 3	$128
- Senior Designer	$131
- Technical Service Specialist 2	$133
- GIS Solutions Analyst / Planner	$134
- Project Geologist / Project Scientist	$140
- GIS App Developer / GIS Manager	$144
- Construction Manager / Engineer 3 / Project Geologist 2 / Project Technical Specialist	$145
- GIS App Developer 2	$148
- Project Engineer	$155
- GIS Administrator	$159
- Project Scientist 2 / Project Technical Specialist 2	$160
- Senior Planner	$163
- Project Engineer 2	$165
- Senior Engineer / Senior Geologist / Senior Project Engineer / Service Manager	$170
- Technical Manager 1	$172
- Project Manager 1 / Technical Leader	$175
- Technical Manager 2	$193
- Principal Project Manager / Project Manager 2	$195
- Senior Project Manager / Senior Technical Manager	$210
- Licensed Site Professional	$220
- Principal / Senior Vice President / Vice President	$225

This Rate Schedule is confidential and for customer internal use only.
W&C reserves the right to adjust billing rates annually at the beginning of each calendar year.

Expense Category

Travel[1]	.535/mile
Expenses	At Cost Plus 10%

1. Mileage rate will change as the federal allowable rate is modified.

#184

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DRIVE RESULTS

41 Hutchins Drive
Portland, ME 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD &CURRAN

Via Electronic Mail

October 24, 2018

Mr. Benjamin Pearson
Compliance Coordinator
City of Portland Public Works
55 Portland Street
Portland, ME 04101

Re: Phase 2 Services Proposal – Design-Build Services Franklin Street Pump Station Upgrades

Dear Ben:

Woodard & Curran appreciates the opportunity to submit this Guaranteed Maximum Price (GMP) Proposal for the total amount of **Three Million Ninety Seven Thousand Dollars ($3,097,000.00)** in accordance with Section 2.2.1 of the executed Agreement Between the City of Portland and Woodard & Curran, Inc. dated March 27, 2018 for improvements requested by the City at the Franklin Street Pump Station as follows:

GMP Proposal

- **2.2.1.a.i Contractor's Fee:** Shall be 10% of the Cost of Work for the Franklin Street Pump Station Phase 2. Cost of Work does not include Bonds, Insurance and Phase 2 Engineering costs. Engineering services will be provided per the enclosed Woodard & Curran - Rate Table.
- **2.2.1.a.ii Estimated Cost of Work:** As defined in Section 2.7, Phase 2 of Attachment A, Scope of Work – Detailed in the enclosed GMP Cost Estimate dated October 23, 2018.
- **2.2.1.b Documents:** Enclosed Franklin Street Pump Station Upgrades Drawings (List of Drawings on Sheet G-001) dated October 2018, and City of Portland Contract Drawings Franklin St. Pump Station Wet Well Stair Replacement dated May 2018.
- **2.2.1.c Assumptions:** List of assumptions, exceptions, and clarifications made by Woodard & Curran in the preparation of the GMP Proposal, intended to supplement and clarify the information contained in the drawings and specifications as outlined in the enclosed Assumptions List dated October 24, 2018.
- **2.2.1.d Schedule:** Final engineering, permitting, procurement, construction, commissioning, start-up and close-out is outlined in the enclosed Franklin Street Pump Station Upgrades Design-Build Project Schedule dated October 24, 2018.
- **2.2.1.e Allowances:** CMP Utility Fee - $12,000; HVAC Upgrades - $85,000
- **2.2.1.f Add Alternates:** Not Applicable.
- **2.2.1.g Unit Prices**: Not Applicable.
- **2.2.1.h Additional Services**: Not Applicable.
- **2.2.1.i Time Limit**: City of Portland time limit for acceptance of the GMP Proposal is forty-five (45) calendar days from the date of this proposal, or by December 10, 2018.

- **2.2.1.j Permits**: GMP proposal assumes MEDEP, and City Building and Electrical Permits are required for the upgrades of the existing Franklin Street Pump Station. We have assumed City of Portland permit fees will be waived.

Terms and Conditions of this GMP Proposal will be per the executed Agreement for the project between City of Portland and Woodard & Curran, dated March 27, 2018. With this proposal, we request a change in Article 5.0 Contract Time of that Agreement, in accordance with the dates within the attached Project Schedule.

If acceptable, please indicate your agreement by signing this letter and returning electronic copy for our records. City signatures shall serve as "City acceptance of the Contract Price" and our "Notice to Proceed" in accordance with Section 1.3 and 5.1.2 of our executed Agreement with the City.

We appreciate the opportunity to submit this Phase 2 GMP Proposal request for consideration and look forward to the successful completion of the project with the City of Portland.

Please do not hesitate to contact us with any questions you may have.

Sincerely,

WOODARD & CURRAN

John Kitchin
Senior Vice President

Barry Sheff, P.E.
Senior Principal

PN: 231265

Accepted this 30th Day of November 2018

By: _____

Name: Jon P. Jennings

Title: City Manager, City of Portland

Finance Director
City of Portland, Maine

APPROVED AS TO FORM:
CORPORATION COUNSEL'S OFFICE

Enclosures

Franklin Street PS Upgrades 60% Design Drawings dated October 24, 2018

City Contract Drawings Franklin St. Pump Station Wet Well Stair Replacement dated May 2018

Franklin Street PS Design Basis Memo dated September 2018

Franklin Street PS Upgrades GMP Estimate dated October 23, 2018

Franklin Street PS Upgrades GMP Estimate List of Assumptions dated October 24, 2018

Franklin Street PS Upgrades GMP Project Schedule dated October 24, 2018

Credere Associates Franklin Street PS Upgrades HBMS Report dated August 22, 2018

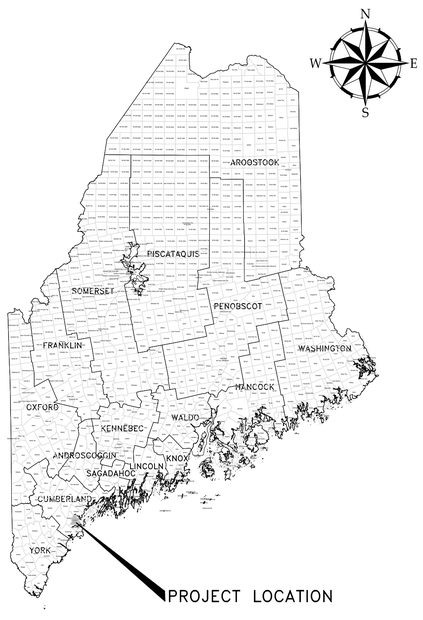
Woodard & Curran - Rate Table 184 (2017 - 2018)

CITY OF PORTLAND, MAINE
FRANKLIN STREET PUMP STATION UPGRADES

PROJECT NO. 0231265.00

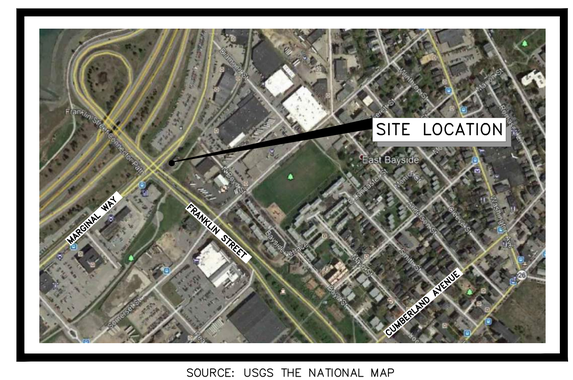
OCTOBER 24 2018

60% GMP SUBMISSION-
NOT FOR CONSTRUCTION



PROJECT LOCATION MAP

50 0 50 100
scale mile



SOURCE: USGS THE NATIONAL MAP

FRANKLIN STREET PUMP STATION
SITE LOCATION MAP

1000 0 1000 2000
scale feet

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22x34 SHEET
1:1

GENERAL NOTES

1. THE PROJECT IS LOCATED IN PORTLAND MAINE, AT THE INTERSECTION OF FRANKLIN ST AND MARGINAL WAY AND IS GENERALLY DESCRIBED AS UPGRADES TO THE FRANKLIN STREET PUMP STATION. THE WORK INCLUDES UPGRADES TO THE WASTEWATER PUMPS COOLING WATER SYSTEM, MODIFICATIONS TO THE INFLUENT CHANNELS ADDITION OF A REDUNDANT CHANNEL GRINDER, REPLACEMENT OF THE EMERGENCY GENERATOR, MCC, ELECTRICAL WORK, AND CONTROLS AND COMMUNICATIONS WORK.
2. BASE PLAN COMPILED FROM THE FOLLOWING:
   –CITY OF PORTLAND, MAINE FRANKLIN STREET SEWAGE PUMPING STATION CONTRACT DRAWINGS DATED 1964 PREPARED BY METCALF AND EDDY ENGINEERS.
3. LOCATIONS OF PROPERTY LINES AND RIGHT OF WAYS ARE APPROXIMATE (SHOWN FOR REFERENCE ONLY), UNLESS NOTED OTHERWISE, AND ARE NOT INTENDED TO REPRESENT LEGAL BOUNDARIES.
4. PORTLAND TRAILS BICYCLE PATH IS IMMEDIATELY ADJACENT TO THE SOUTH SIDE OF THE PUMP STATION. THE TRAIL IS NOT TO BE BLOCKED OR OBSTRUCTED FOR ANY REASON DURING CONSTRUCTION.
5. STATIONS AND OFFSETS FOR MANHOLES AND OTHER STRUCTURES ARE SHOWN TO THE CENTER OF EACH.
6. COMPLETE WORK IN ACCORDANCE WITH THE APPLICABLE FEDERAL, STATE AND LOCAL CODES. LAY OUT PROPOSED WORK AS SHOWN ON DRAWINGS. FIELD VERIFY UTILITY LOCATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND EXCAVATE TEST PITS AS NECESSARY TO VERIFY UTILITY LOCATIONS AND DEPTHS AT NO ADDITIONAL COST TO OWNER.
7. PERFORM CONSTRUCTION ACTIVITIES WITHIN THE CONFINES OF THE RIGHTS OF WAY OR WITHIN THE CONFINES OF TEMPORARY CONSTRUCTION EASEMENTS SECURED BY THE OWNER. OBTAIN PERMISSION FROM AND COORDINATE WITH PRIVATE PROPERTY OWNERS FOR ACTIVITY, MATERIAL STORAGE ETC., ON PRIVATE PROPERTY AT NO ADDITIONAL COST TO OWNER.
8. COORDINATE CONSTRUCTION WITH THE CITY OF PORTLAND, MAINE, UTILITY COMPANIES, DIG SAFE, EMERGENCY SERVICES AND MAINE DEPARTMENT OF TRANSPORTATION (MDOT) WHERE APPLICABLE. NOTIFY UTILITIES PRIOR TO COMMENCING WORK TO ALLOW SUFFICIENT TIME TO LOCATE AND MARK THE LOCATION OF BURIED UTILITIES. CONTACT "DIG SAFE", TELEPHONE 811 OR 877–DIG–SAFE.
9. PROVIDE COORDINATION AND THE SERVICES OF CENTRAL MAINE POWER CO. (CMP) WHERE NECESSARY FOR COMPLETION OF WORK. COSTS ASSOCIATED WITH ANY AND ALL CMP WORK SHALL BE INCIDENTAL TO THE PROJECT. PROVIDE COORDINATION OF WORK WITH CMP AT LEAST THREE BUSINESS DAYS PRIOR TO THE DATE THAT WORK OR SERVICES OF CMP ARE REQUIRED.
10. INCORPORATE EROSION CONTROL MEASURES COMPLIANT WITH THE LATEST VERSION OF "MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES".
11. TAKE NECESSARY PRECAUTIONS TO PREVENT EQUIPMENT FLUIDS FROM LEAKING OR REACHING ANY WATER COURSE. IMMEDIATELY CONTAIN AND CLEAN FLUID DISCHARGES USING ALL MEANS NECESSARY, AS DETERMINED AND/OR APPROVED BY THE ENGINEER.
12. PROTECT, REMOVE OR RELOCATE EXISTING ITEMS, AREAS AND SURFACES. REPLACE, RESTORE AND REPAIR ITEMS, AREAS AND SURFACES, FACILITIES AND IMPROVEMENTS DISTURBED OR DAMAGED BY CONTRACTOR'S OPERATIONS TO ORIGINAL CONDITION OR MATCH IN KIND, UNLESS NOTED OTHERWISE ON DRAWINGS, AT NO ADDITIONAL COST TO OWNER. THIS APPLIES TO GRAVEL, PAVEMENT, PAVEMENT MARKINGS, CURBING, SIDEWALKS, GRASS, PLANTINGS, TREES, SIGNAGE, MAIL BOXES AND EXISTING UTILITIES. LIMIT SAW–CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE REQUIRED OR AS SHOWN ON THE DRAWINGS.
13. PROVIDE A MINIMUM 6.0 FEET OF COVER OVER SEWERS AND FORCE MAIN PIPING UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.
14. ITEMS SHOWN IN GRAY SCALE AND LABELED N.I.C. (NOT IN CONTRACT) ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
15. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT WILL BE RESET AT THE CONTRACTOR'S EXPENSE, BY A REGISTERED LAND SURVEYOR APPROVED BY THE ENGINEER.
16. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC. SITE SHALL BE LEFT WITH APPROPRIATE SAFETY MEASURES IN PLACE DURING NON–WORKING HOURS. NO TRENCH SHALL BE LEFT OPEN DURING NON–WORKING HOURS. SITE SAFETY IS THE RESPONSIBILITY OF CONTRACTOR, DURING BOTH WORKING AND NON–WORKING HOURS.
17. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS. PERMIT APPLICATIONS SHALL BE SUBMITTED WITH ADEQUATE TIME SO AS NOT TO DELAY CONSTRUCTION.
18. A COMPLETE SET OF "RECORD" DRAWINGS THAT REFLECT ANY AND ALL MODIFICATIONS TO THE SANITARY SEWER SYSTEM AND ANY OTHER UTILITY INSTALLATIONS OR ALTERATIONS WITHIN THE PROJECT LIMITS MUST BE SUBMITTED IN "RED LINE" FORMAT. THESE DRAWINGS SHALL BE SUBMITTED IN BOTH DIGITAL AND HARD COPY FORMAT AS DEFINED IN THE SPECIFICATIONS PRIOR TO PAYMENT OF FINAL RETAINAGE.
19. PROVIDE 4–INCHES OF LOAM AND SEED IN ALL LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS WHERE EXISTING SURFACES WAS GRASS/LAWN OR NO OTHER SURFACE TREATMENT IS SHOWN

LEGEND:

DESCRIPTION	EXISTING	PROPOSED
SANITARY SEWER MANHOLE AND OFFSET		X FT.
SANITARY SEWER SERVICE CLEANOUT	CO	CO
STORM DRAIN MANHOLE		
CATCH BASIN		
TELECOMM MANHOLE		
TELECOMM SERVICE BOX	T	
ELECTRIC MANHOLE		
TRANSFORMER		
UTILITY POLE W/GUY		
UTILITY POLE		
LIGHTPOST		
WATER GATE		
CURB STOP		
HYDRANT		
WATER WELL	W	
SIGN		
MAILBOX		
FLAGPOLE	FP	
CONIFEROUS TREE		
DECIDUOUS TREE		
SURVEY STATION		
TEMPORARY BENCH MARK AND NUMBER	XX	
IRON PIN		
MONUMENTS	MF	MS
SPOT ELEVATION	XXX.XX	XXX.XX
TEST PIT & NUMBER	TP–X	
BORING & NUMBER	B–X	TB
MONITORING WELL	MW–X	
CONTOUR (1' OR 2' INTERVAL)	122	122
CONTOUR (INDEX)	120	120
SANITARY SEWER	S	S
FORCE MAIN	FM	FM
STORM DRAIN	SD	SD
UNDERDRAIN	UD	UD
WATER MAIN	W	W
OVERHEAD UTILITY	OU OU	OU OU
HOUSE SERVICE / LATERAL	S	S
PROPERTY LINE		
RIGHT OF WAY	R/W	R/W
EASEMENT		
EDGE OF VEGETATION		
FENCE	X	X
CENTERLINE	℄	℄
CURB		
EDGE OF PAVEMENT		

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C–101	SITE PLAN–PROPOSED CONDITIONS
C–501	CIVIL DETAILS
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E05.01	EXISTING ELECTRICAL SITE PLAN
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E30.01	DEMOLITION POWER PLAN
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E30.03	ELECTRICAL LIGHTING PLAN
E80.01	ELECTRICAL DETAILS SHEET 1
E80.02	ELECTRICAL DETAILS SHEET 2

ABBREVIATIONS

AC	ASBESTOS CEMENT
&	AND
A.G.	ABOVE GROUND
ALUM	ALUMINUM
B	BORING
BIT.	BITUMINOUS
BK	BOOK
BM	BENCHMARK
CB	CATCH BASIN
CI	CAST IRON
CK	CHECKED
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
DI	DUCTILE IRON
DES	DESIGNED
DIA	DIAMETER
DR	DRAWN
E	EAST
EL	ELEVATION
ELEC	ELECTRICAL
EX	EXISTING
FB	FIBERGLASS
FF	FINISH FLOOR
FIN	FINISH
FL	FLOOR
FT	FOOT/FEET
GALV	GALVANIZED
GR	GORMAN RUPP
GRND	GROUND
H	HEIGHT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
IN	INCH
INV	INVERT
LF	LINEAR FEET
LP	LIQUEFIED PETROLEUM
MAX	MAXIMUM
MDOT	MAINE DEPT. OF TRANSPORTATION
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
MON	MONUMENT
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERT. DATUM
N.I.C.	NOT IN CONTRACT
NO	NUMBER
N.T.S.	NOT TO SCALE
O.D.	OUTSIDE DIAMETER
±	PLUS OR MINUS
PLS	PROFESSIONAL LAND SURVEYOR
PSI	PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R.O.W.	RIGHT–OF–WAY
R/W	RIGHT–OF–WAY
RCP	REINFORCED CONCRETE PIPE
REINF.	REINFORCED
REQ'D	REQUIRED
RET	RETAINING
RLS	REGISTERED LAND SURVEYOR
RT	ROUTE
S	SLOPE
S	SEWER
SD	STORM DRAIN
SS	STAINLESS STEEL
SCH	SCHEDULE
STA.	STATION
TYP.	TYPICAL
UC	UNDERGROUND CABLE
W	WATER
W	WEST
W/	WITH
WV	WATER VALVE

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CHECKED BY: JJ
G–001.dwg

GENERAL NOTES, LEGEND AND ABBREVIATIONS

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 1 OF 24

G-001

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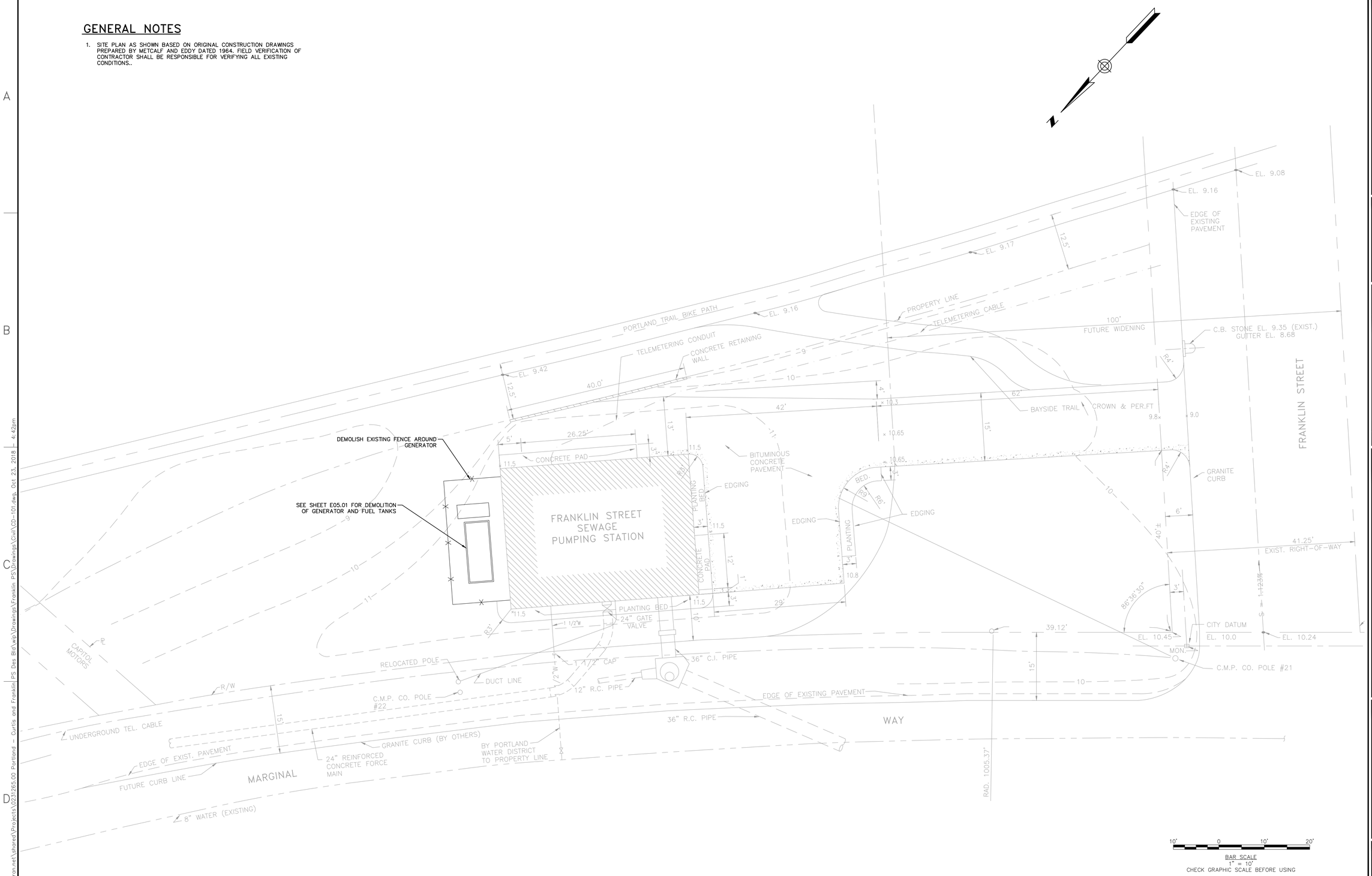
22x34 SHEET
1:1

GENERAL NOTES

1. SITE PLAN AS SHOWN BASED ON ORIGINAL CONSTRUCTION DRAWINGS PREPARED BY METCALF AND EDDY DATED 1964. FIELD VERIFICATION OF CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS..



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SITE PLAN-EXISTING CONDITIONS AND DEMOLITION

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 2 OF 24

CD-101

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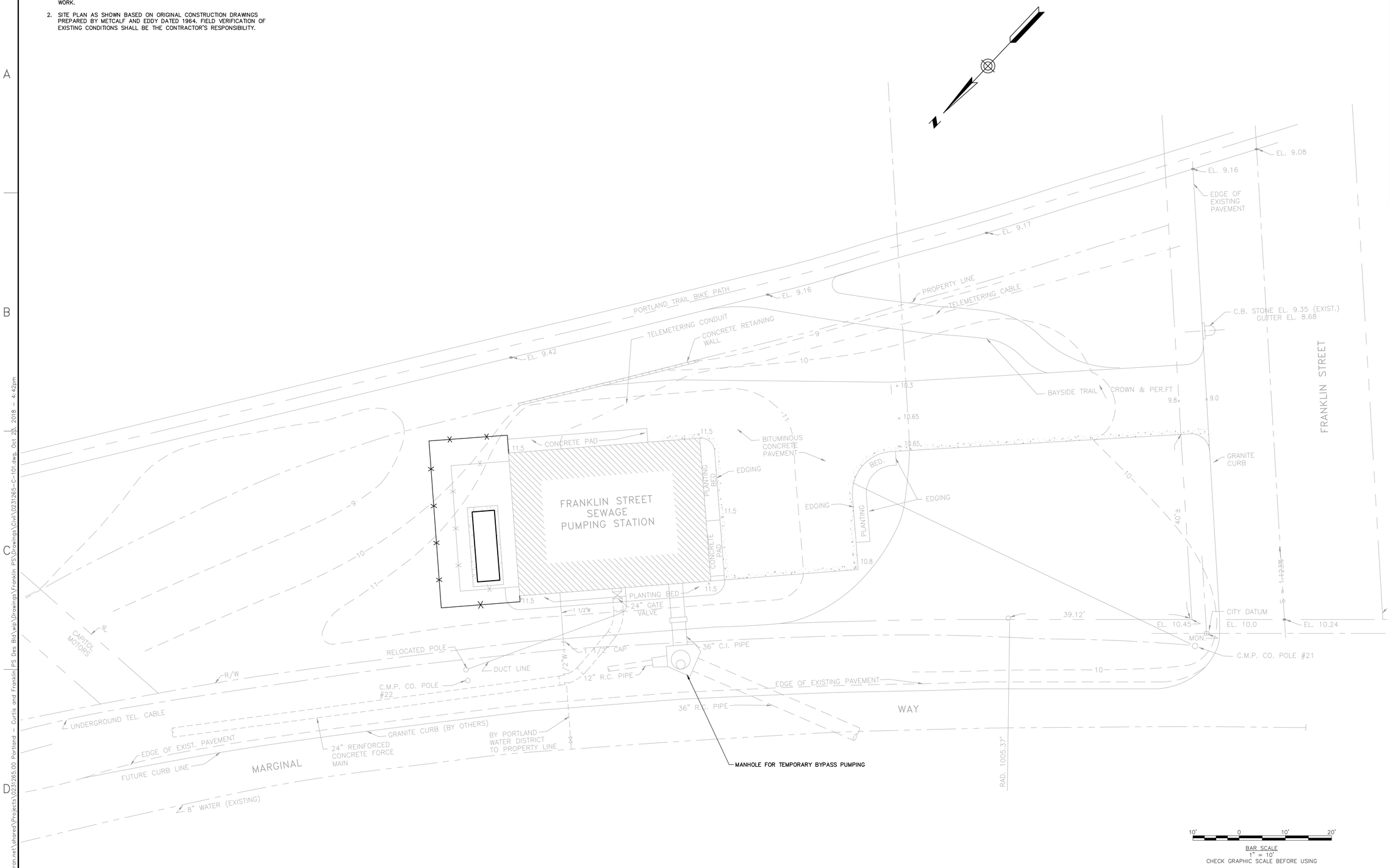
GENERAL NOTES

1. ALL SIDEWALKS, PROPERTY LINES, OVERHEAD WIRES AND UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AS REQUIRED FOR WORK.
2. SITE PLAN AS SHOWN BASED ON ORIGINAL CONSTRUCTION DRAWINGS PREPARED BY METCALF AND EDDY DATED 1964. FIELD VERIFICATION OF EXISTING CONDITIONS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.



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0231265-C-101.dwg

SITE PLAN-PROPOSED CONDITIONS

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 3 OF 24

C-101

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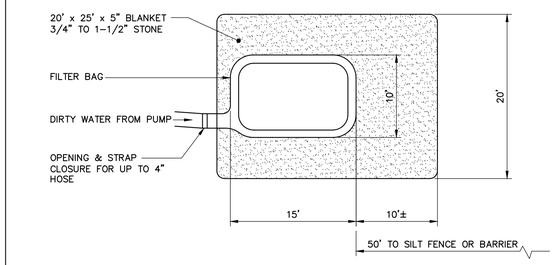
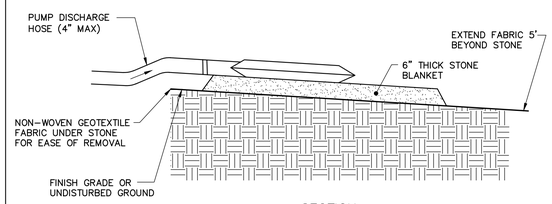


PLAN

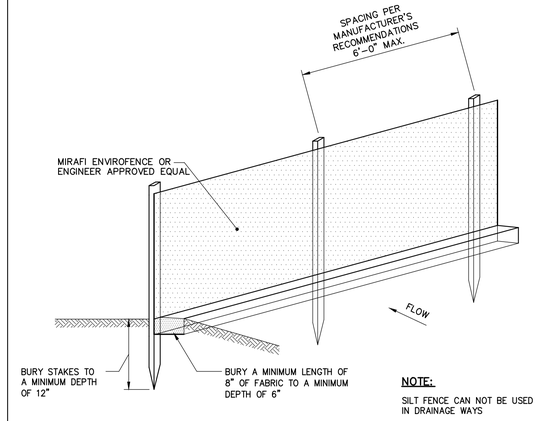


SECTION

PUMPED DISCHARGE SEDIMENT CONTROL DEVICE DETAIL

1 / C-101

SCALE: N.T.S.



NOTE:

SILT FENCE CAN NOT BE USED IN DRAINAGE WAYS

MAINTENANCE: INSPECT FOR TEARS IN THE FABRIC OR DAMAGE TO SUPPORTS. REPAIR DAMAGED AREAS AND REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES A DEPTH OF SIX INCHES OR MORE.

REMOVAL: WHEN UPSLOPE AREAS ARE STABILIZED, THE STRUCTURE AND AND ACCUMULATED SEDIMENT WILL BE REMOVED.

SILT FENCE DETAIL

2 / C-101

SCALE: N.T.S.

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CIVIL DETAILS

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 4 OF 24

C-501

22x34 SHEET
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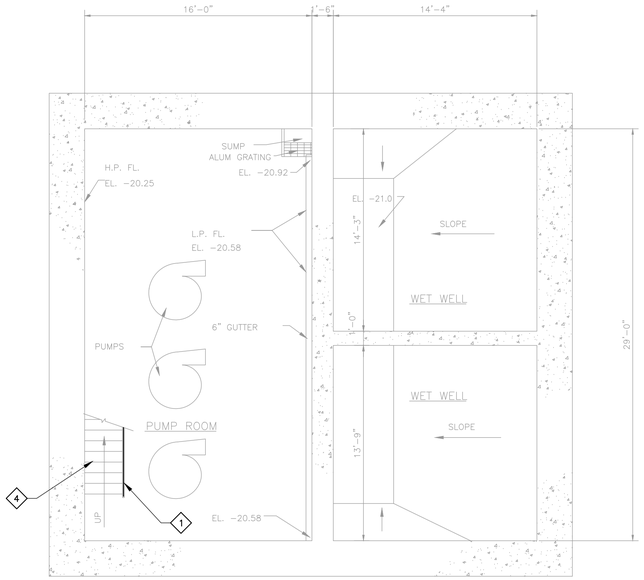
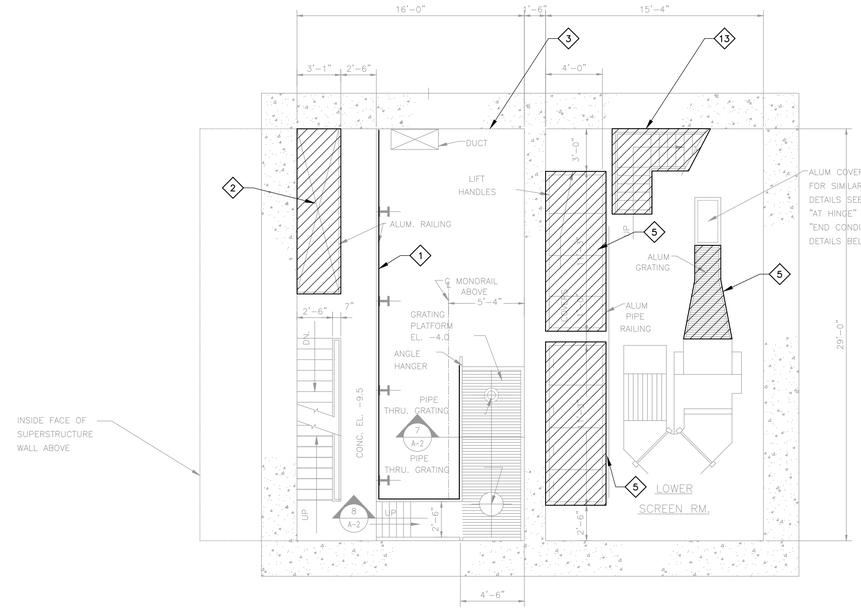


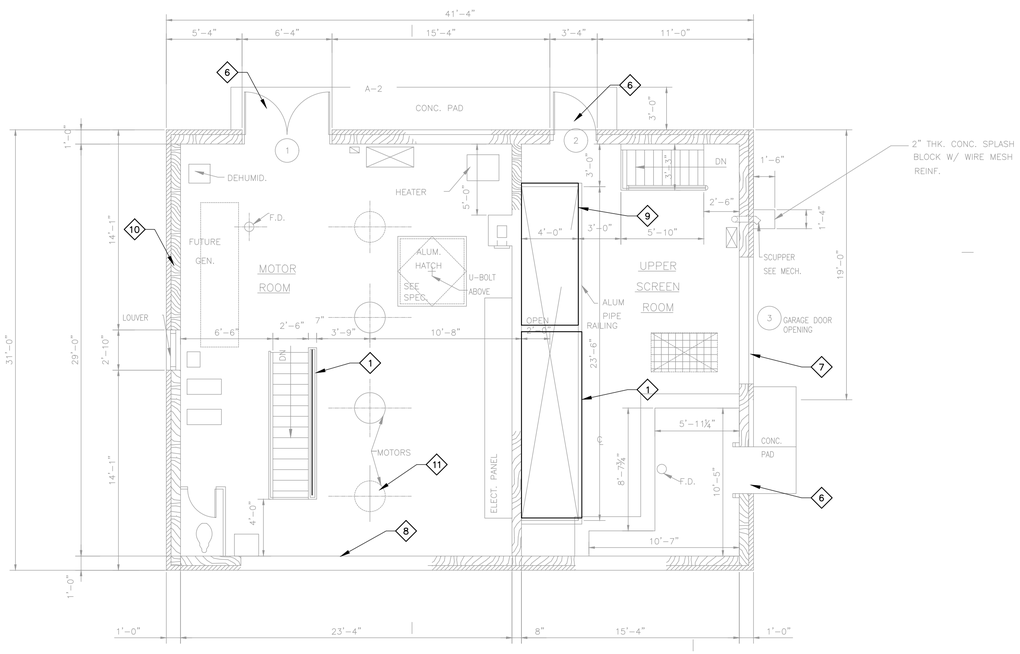
BASEMENT FLOOR PLAN
SCALE: 3/16" = 1'-0"



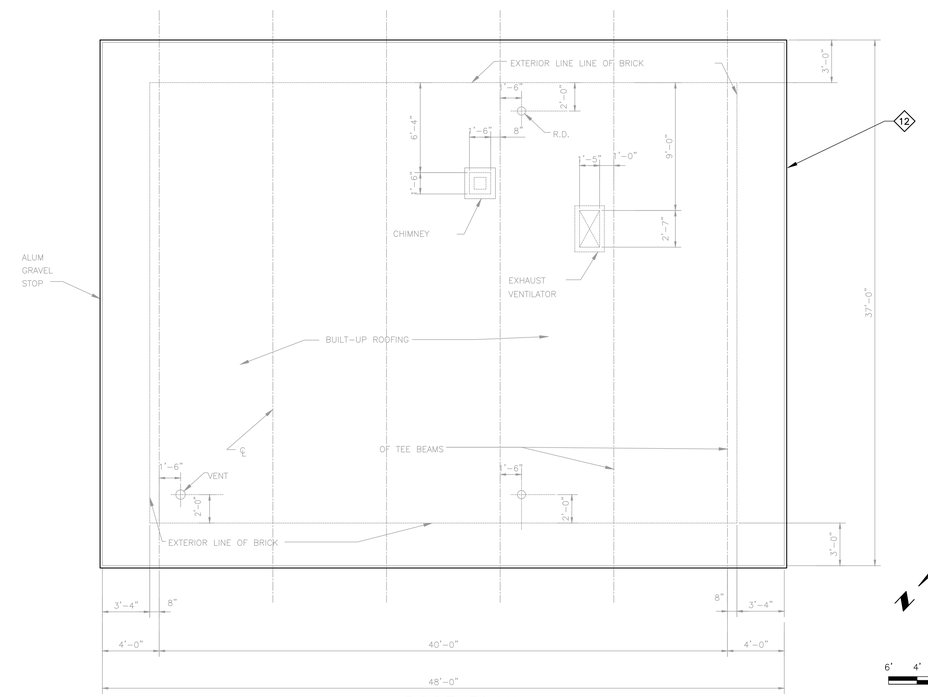
INTERMEDIATE FLOOR PLAN
SCALE: 3/16" = 1'-0"

KEY NOTES

1. DEMOLISH AND DISPOSE OF ALL EXISTING ALUMINUM RAILINGS. PROVIDE NEW ALUMINUM RAILINGS, 3-RAIL SYSTEM WITH KICKPLATE, MINIMUM HEIGHT 42 INCHES.
2. DEMOLISH AND REMOVE EXISTING PLYWOOD. PROVIDE NEW ALUMINUM GRATING TO MATCH EXISTING OPENING.
3. SANDBLAST AND REMOVE EXISTING PAINT THROUGHOUT THE STATION. PERFORM WORK AND DISPOSE OF DEMOLITION DEBRIS AS REQUIRED FOR MATERIALS WITH PCB CONCENTRATIONS. PROVIDE NEW TWO-COAT EPOXY SYSTEM TO SEAL ALL EXISTING CONCRETE AND INTERIOR MASONRY AFTER REMOVAL OF EXISTING PAINT. REFER TO THE HAZARDOUS MATERIALS REPORT FOR ADDITIONAL INFORMATION.
4. REPAIR ALL LOOSE STAIR TREADS.
5. DEMOLISH ALL EXISTING FRP GRATING AND REPLACE WITH NEW ALUMINUM GRATING, 1 ½ DEPTH. COORDINATE GRATING ASSEMBLY WITH EXISTING PENETRATIONS AND PROVIDE BANDING AND/OR REINFORCEMENT AS NECESSARY TO ACCOMMODATE EXISTING OPENINGS.
6. DEMOLISH ALL EXISTING DOORS. REMOVE EXISTING CAULKING/SEALANT AND DISPOSE OF AS REQUIRED FOR PCB MATERIALS. REFER TO THE HAZARDOUS MATERIALS REPORT FOR ADDITIONAL INFORMATION. PROVIDE NEW DOORS WITH STAINLESS STEEL HARDWARE TO MATCH EXISTING DOORS.
7. DEMOLISH EXISTING ROLL-UP DOOR AND PROVIDE NEW ROLL-UP DOOR.
8. PROVIDE TEMPORARY SUPPORT AT EXISTING MONORAIL. DEMOLISH EXISTING CONCRETE SUPPORT BEAM. SAWCUT AND REPAIR EXISTING CRACK WITH MORTAR. PROVIDE NEW BENT PLATE A LONGER VERTICAL DIMENSION, TOP ANGLE LEG BOLTS TO BE LOCATED 6" HIGHER THAN THE EXISTING BOLTS.
9. PROVIDE NEW 4' X 10' PLATFORM TO ACCESS STILLING WELL. PLATFORM TO BE SUPPORTED BY XX NEW XX BEAMS BELOW. PROVIDE EXPANSION ANCHORS DRILLED INTO EXISTING CONCRETE TO SUPPORT BEAMS AT END PLATE. PROVIDE NEW ALUMINUM GRATING FASTENED TO BEAM.
10. PROVIDE MASONRY REPAIRS AS REQUIRED. REFER TO STRUCTURAL EVALUATION FOR ADDITIONAL DETAILS.
11. DEMOLISH AND REMOVE EXISTING FLOOR PENETRATION COVER PLATE. PROVIDE NEW HINGED COVER RATED FOR 300 PSF LOAD AT EXISTING PENETRATION.
12. DEMOLISH EXISTING ROOFING SYSTEM IN IT'S ENTIRELY. THE NEW ROOFING SYSTEM WILL INCLUDE: TAPERED RIGID INSULATION WITH MINIMUM 4" THICKNESS AND ¼" PER FOOT SLOPE; FULLY-ADHERED 60 MIL EPDM ROOFING; NEW PT BLOCKING AT PERIMETER; MINIMUM 0.05" THICK COLOR-COATED ALUMINUM EDGE FLASHING AT PERIMETER; MEMBRANE FLASHING FOR ALL PIPES, CURBS, AND MASONRY CHIMNEY; TWO NEW ROOF DRAINS AND ASSOCIATED DRAINAGE PIPING TO REPLACE EXISTING.
13. DEMOLISH EXISTING STAIR AND REPLACE WITH NEW ALTERNATING TREAD STAIR.



FIRST FLOOR PLAN
SCALE: 3/16" = 1'-0"



ROOF PLAN
SCALE: 3/16" = 1'-0"

BAR SCALE
3/16" = 1'-0"
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PUMP STATION ARCHITECTURAL FLOOR PLANS

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 5 OF 24

A-101

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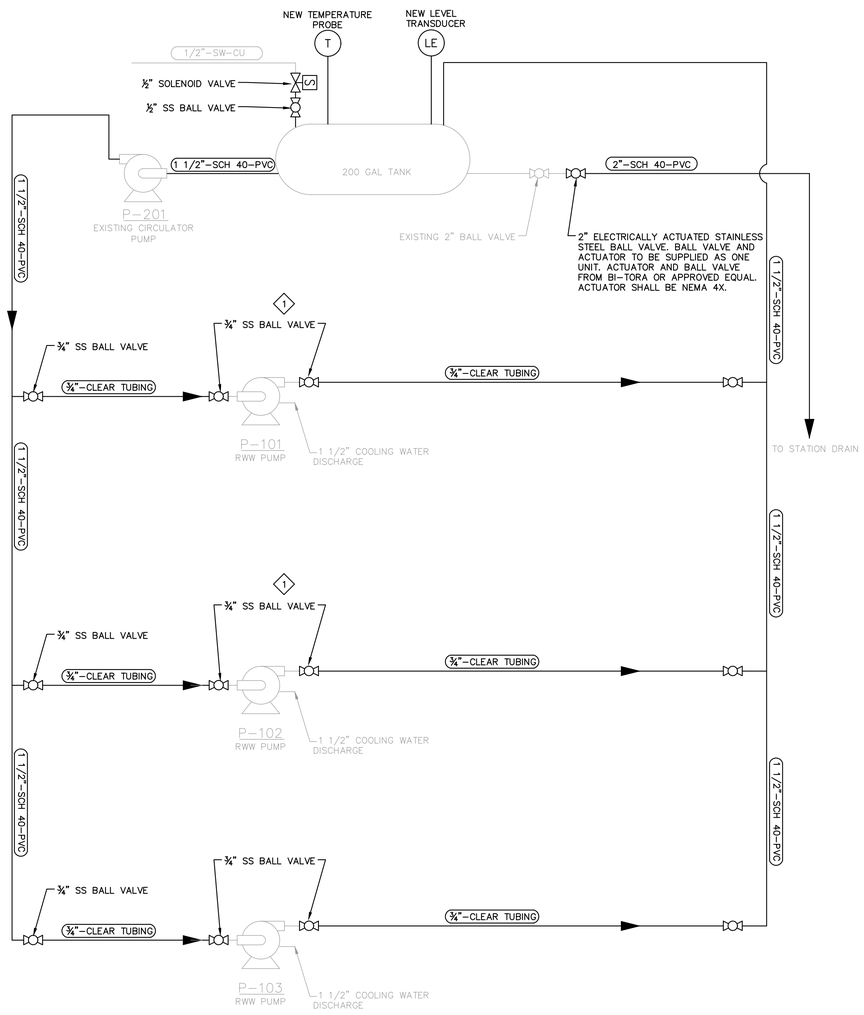
22x34 SHEET
1:1

KEYED NOTES

1. CLEAR TUBING TO CONNECT TO ¾" BALL VALVE. ¾" BALL VALVE TO ATTACH TO EXISTING COPPER PIPING AT PUMP JACKET (TYP OF 6).

DEMOLITION GENERAL NOTES

1. NEW PIPING TO BE RUN IN LOCATION OF EXISTING PIPING.
2. VALVES SHALL LOCATED IN AREAS EASILY ACCESSIBLE AND NO GREATER THAN 6' ABOVE FINISHED FLOOR.
3. SUPPORT PIPING ACCORDING TO MANUFACTURERS RECOMMENDATION.
4. PIPES SHALL BE SUPPORTED ON EACH SIDE OF VALVES.
5. PIPING SHALL NOT OBSTRUCT ACCESS TO PUMPS OR OTHER EQUIPMENT.
6. COORDINATE PIPING AND VALVE LOCATION WITH OWNER AND ENGINEER PRIOR TO CONSTRUCTION.



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PROCESS INSTRUMENTATION DIAGRAM

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: NONE
SHEET: 6 OF 24

R-101

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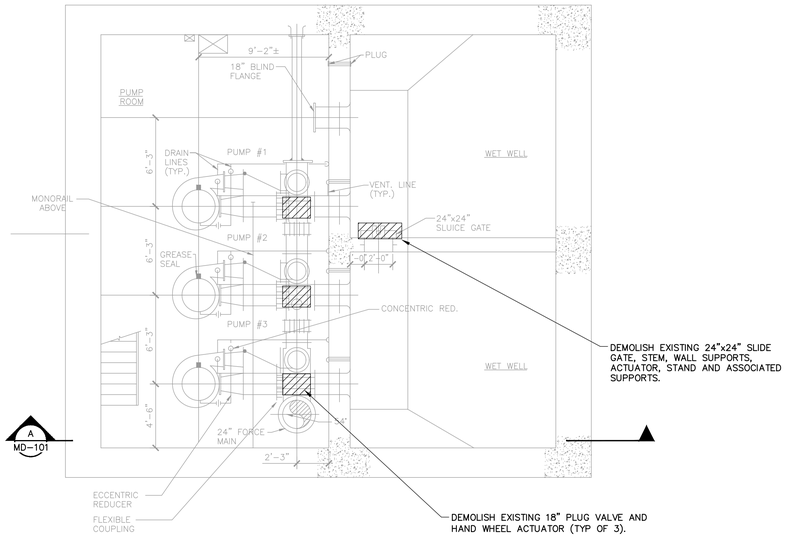
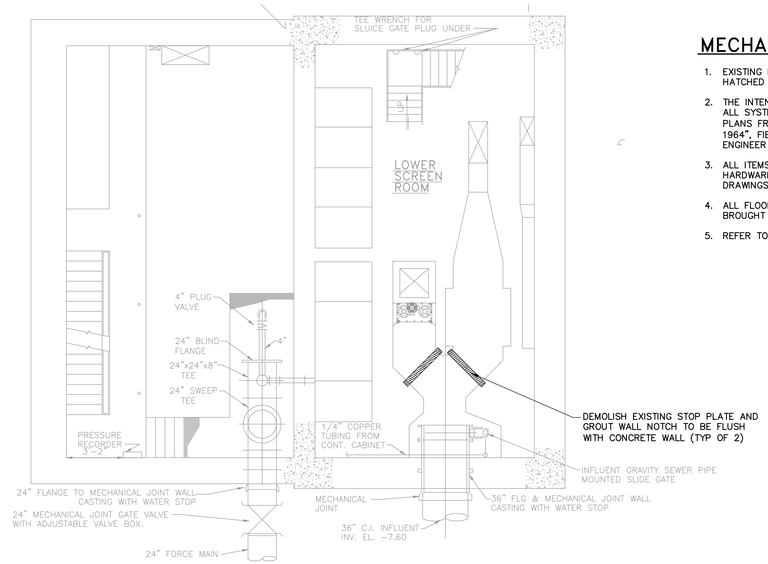


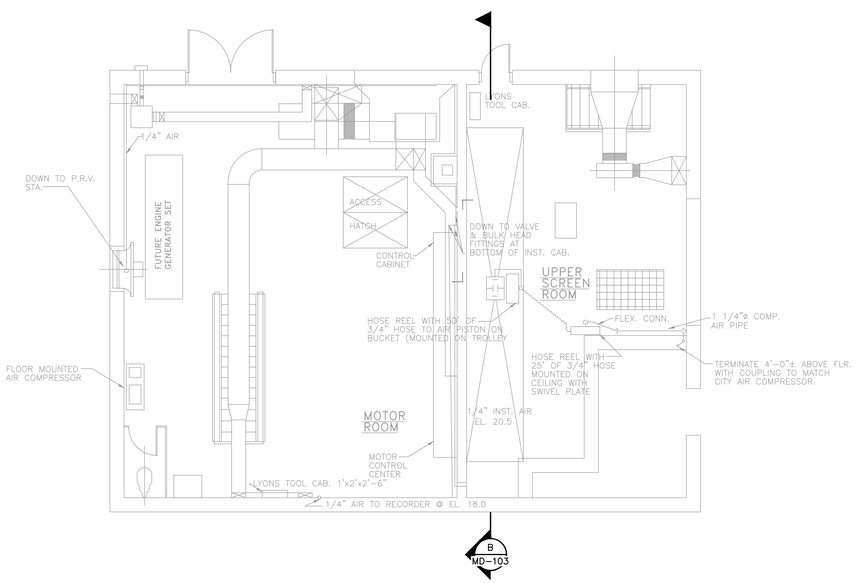
BASEMENT FLOOR PLAN
SCALE: 3/16" = 1'-0"



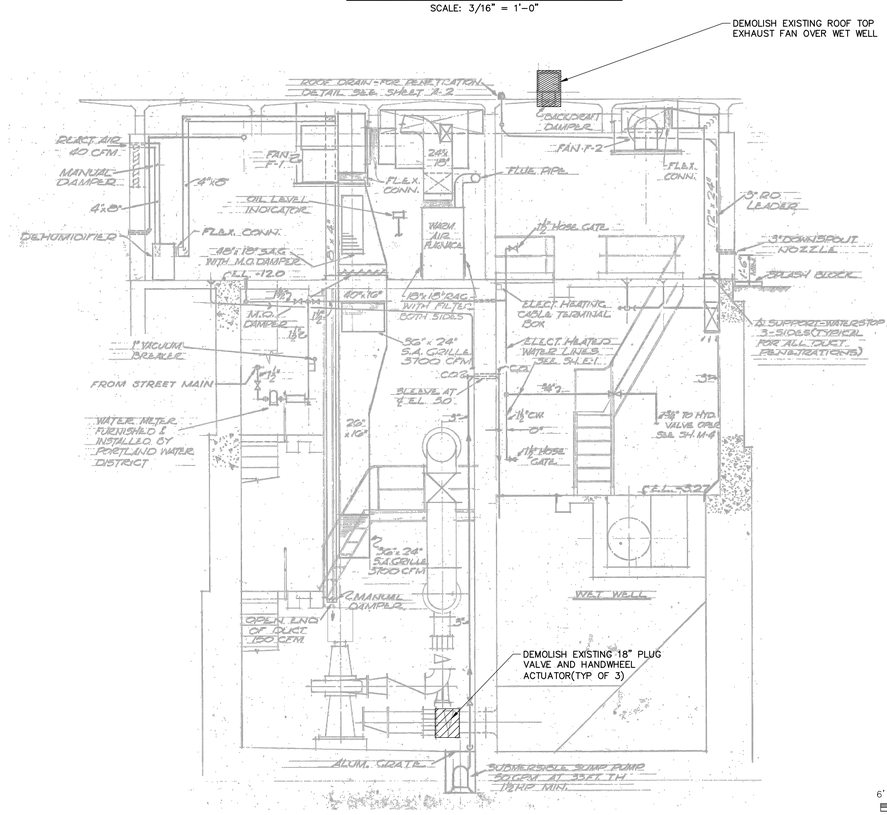
INTERMEDIATE FLOOR PLAN
SCALE: 3/16" = 1'-0"

MECHANICAL DEMOLITION GENERAL NOTES

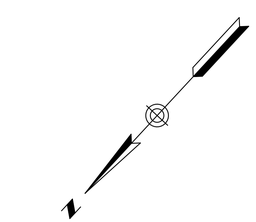
1. EXISTING PIPING, EQUIPMENT, ETC. TO BE DEMOLISHED AS SHOWN AS BOLD OR HATCHED OVER.
2. THE INTENT OF THE DEMOLITION PLANS IS TO IDENTIFY EXISTING CONDITIONS. HOWEVER, ALL SYSTEMS MAY NOT NECESSARILY BE AS INDICATED ON THE DRAWINGS. BASE PLANS FROM "FRANKLIN STREET SEWAGE PUMP STATION CONTRACT DRAWINGS DATED 1964", FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND. NOTIFY ENGINEER OF ALL CONDITIONS THAT DIFFER FROM THE DRAWINGS.
3. ALL ITEMS INDICATED FOR DEMOLITION SHALL BE DEMOLISHED WITH ALL ASSOCIATED HARDWARE AND ACCESSORIES COMPLETE BACK TO SOURCE OR AS INDICATED ON THE DRAWINGS.
4. ALL FLOOR AND WALL PENETRATIONS NOT TO BE REUSED SHALL BE IN-FILLED AND BROUGHT BACK TO A FINISHED APPEARANCE.
5. REFER TO ELECTRICAL SHEETS FOR DEMOLITION OF ELECTRICAL EQUIPMENT.



FIRST FLOOR PLAN
SCALE: 3/16" = 1'-0"



SECTION A
SCALE: 3/16" = 1'-0" MD-101



6' 4' 2' 0 4' 8'
BAR SCALE
3/16" = 1'-0"
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PUMP STATION DEMOLITION PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 7 OF 24

MD-101

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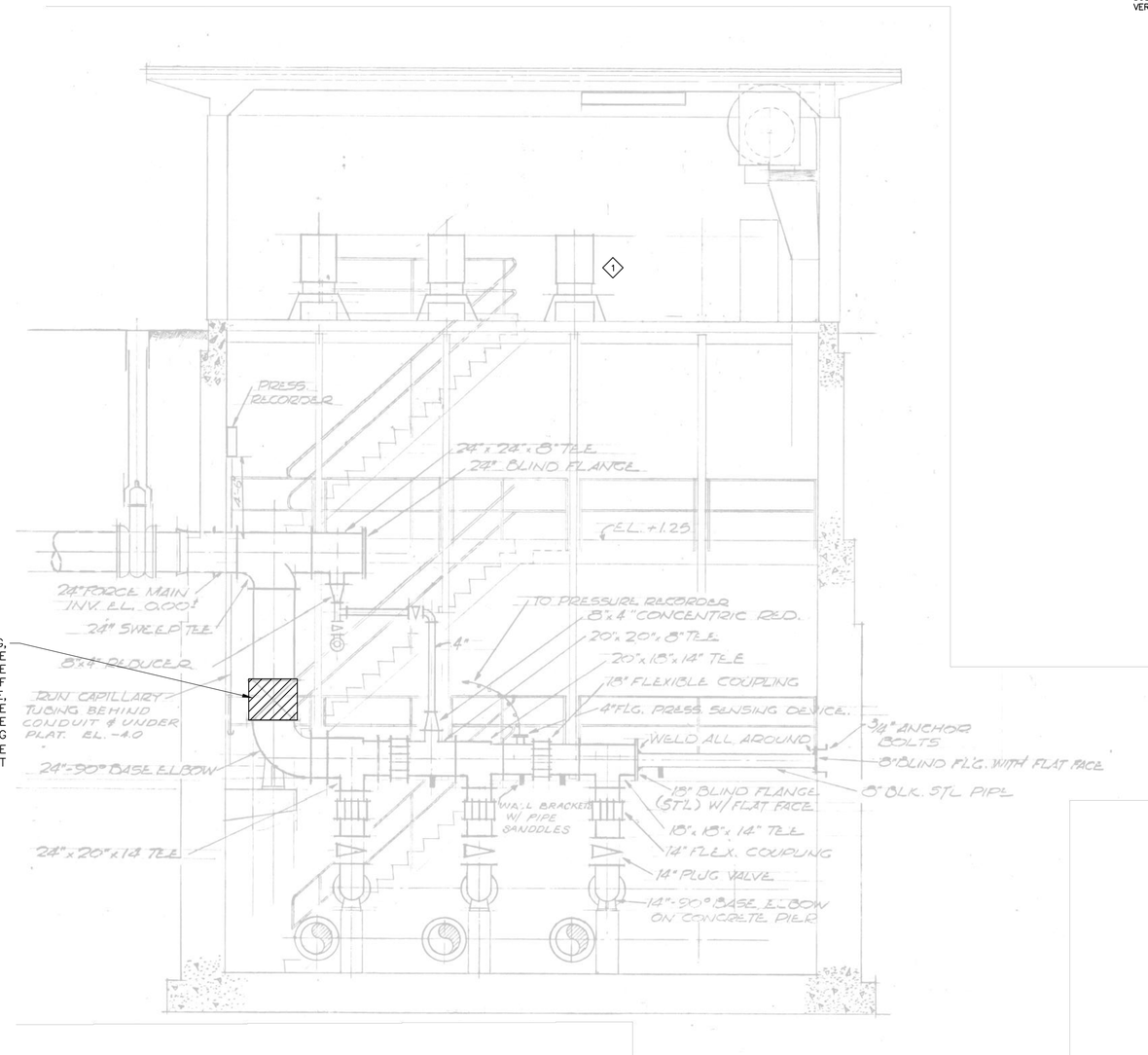
22x34 SHEET
1:1

KEY NOTES

1. BACKGROUND IMAGE TAKEN FROM FRANKLIN STREET SEWAGE PUMPING STATION CONTRACT DRAWINGS DATED 1964 BY METCALF AND EDDY ENGINEERS. EXTENDED SHAFT PUMPS HAVE BEEN REPLACED WITH DRY PIT SUBMERSIBLE PUMPS (TYP OF 3). CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS.

DURING BYPASS PUMPING, CONTRACTOR SHALL INVESTIGATE CONDITION OF EXISTING VALVE INTERNAL. REMOVE AND DISPOSE OF EXISTING OPERATOR. IF FEASIBLE, REHABILITATE EXISTING VALVE INTERNALS. IF VALVE CANNOT BE REHABILITATED, DEMOLISH EXISTING 24" ELECTRONICALLY ACTUATED GATE VALVE AND ALL RELATED EQUIPMENT



SECTION B / MD-101
SCALE: 1/4"=1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
1/4" = 1'-0"
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PUMP STATION DEMOLITION SECTION

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 8 OF 24

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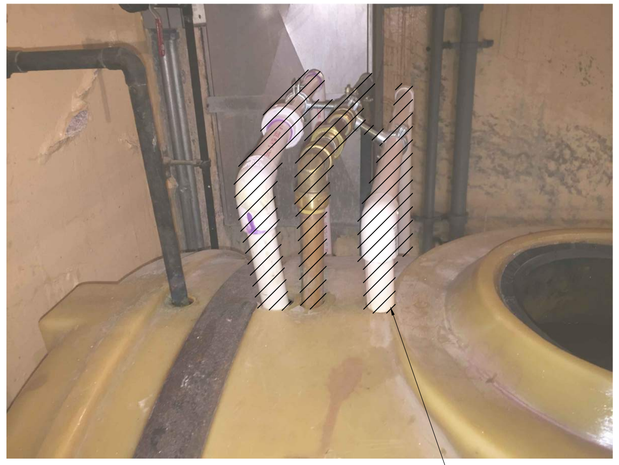


DEMOLISH EXISTING COOLING WATER RETURN LINES FROM PUMP JACKETS TO STORAGE TANK INCLUDING ALL VALVES, PIPE SUPPORTS AND COUPLINGS.

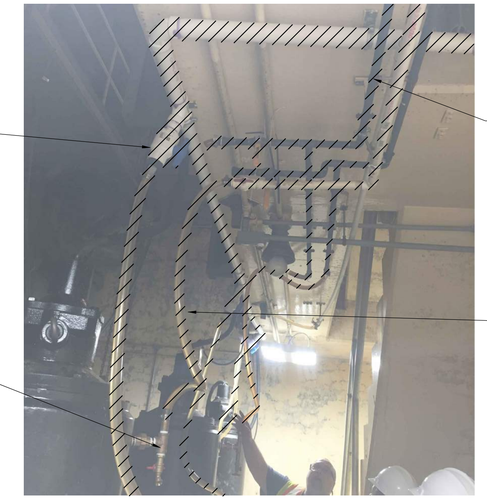
IMAGE 1

EXISTING DRAIN VALVE TO REMAIN

DEMOLISH EXISTING COOLING WATER SUPPLY ISOLATION VALVES AND INDIVIDUAL PUMP SUPPLY HOSE TO BRASS FITTINGS ON PUMP JACKET (TYP OF 3)

DEMOLISH EXISTING COOLING WATER TANK DRAIN LINE FROM CONNECTION TO EXISTING TANK DRAIN VALVE TO DRY WELL SUMP.

IMAGE 2



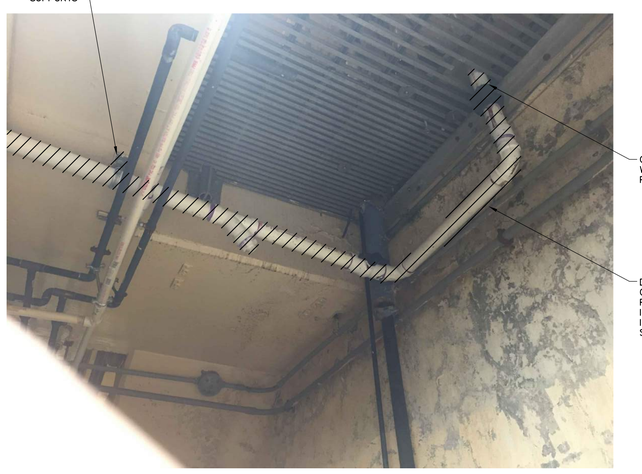
DEMOLISH ALL EXISTING UNUSED COOLING WATER COPPER PIPING INCLUDING VALVES, SUPPORTS AND COUPLINGS.

DEMOLISH EXISTING PUMP COOLING WATER RETURN LINE FROM PUMP JACKET TO COOLING WATER STORAGE TANK. DEMOLISH PIPING INCLUDING VALVES, SUPPORTS AND COUPLINGS (TYP OF 3)

BRASS FITTINGS TO REMAIN (TYP OF 6)

IMAGE 3

DEMOLISH EXISTING PIPE SUPPORTS



GRATING PENETRATION TO BE REUSED WITH NEW COOLING WATER SUPPLY PIPING.

DEMOLISH EXISTING 1 ½" PVC COOLING WATER SUPPLY PIPING FROM PUMP DISCHARGE TO PUMP SUPPLY ISOLATION VALVES. DEMOLISH PIPING INCLUDING ALL VALVES, PIPE SUPPORTS, AND CLEAN-OUTS.

IMAGE 4

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PUMP STATION DEMOLITION PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
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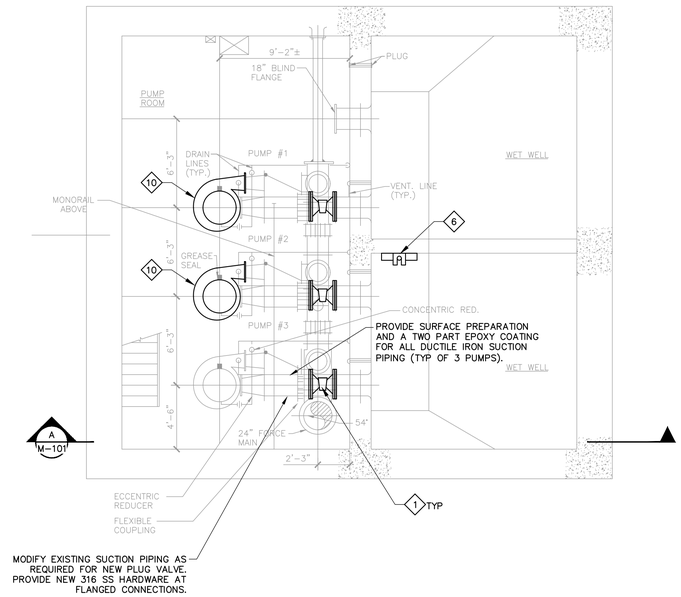
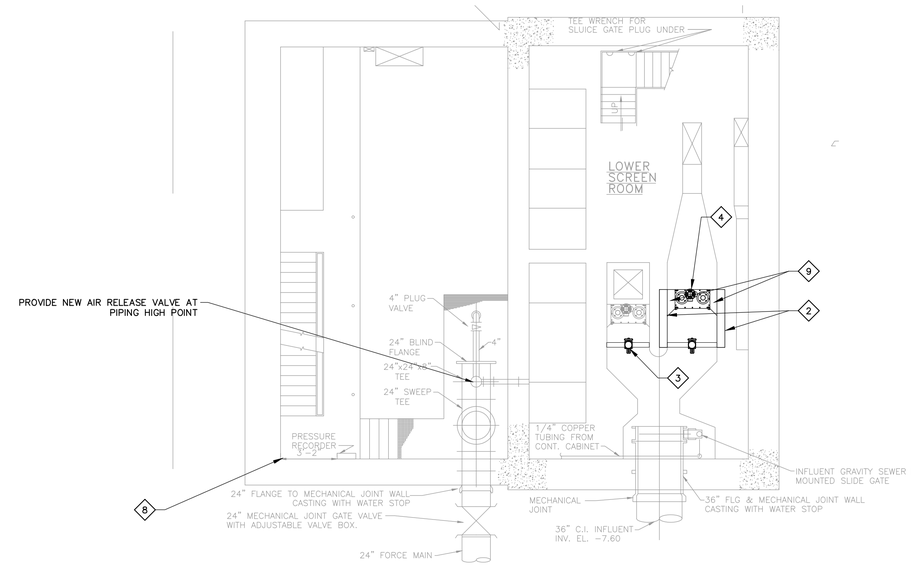
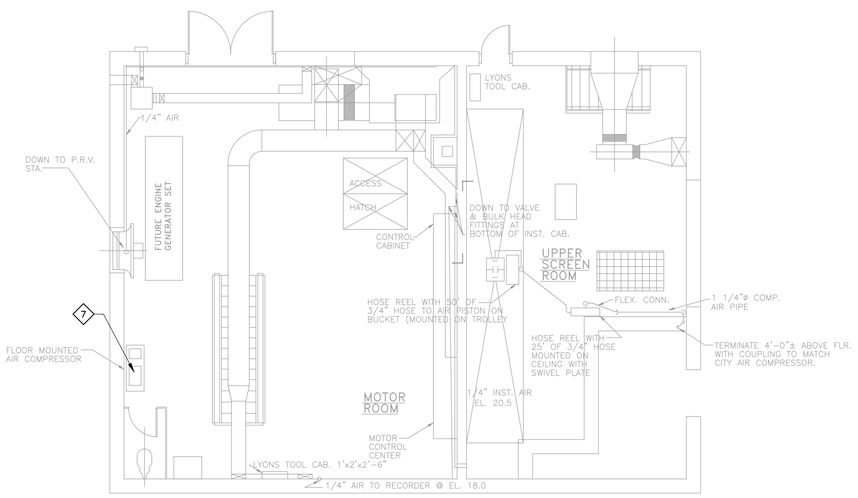


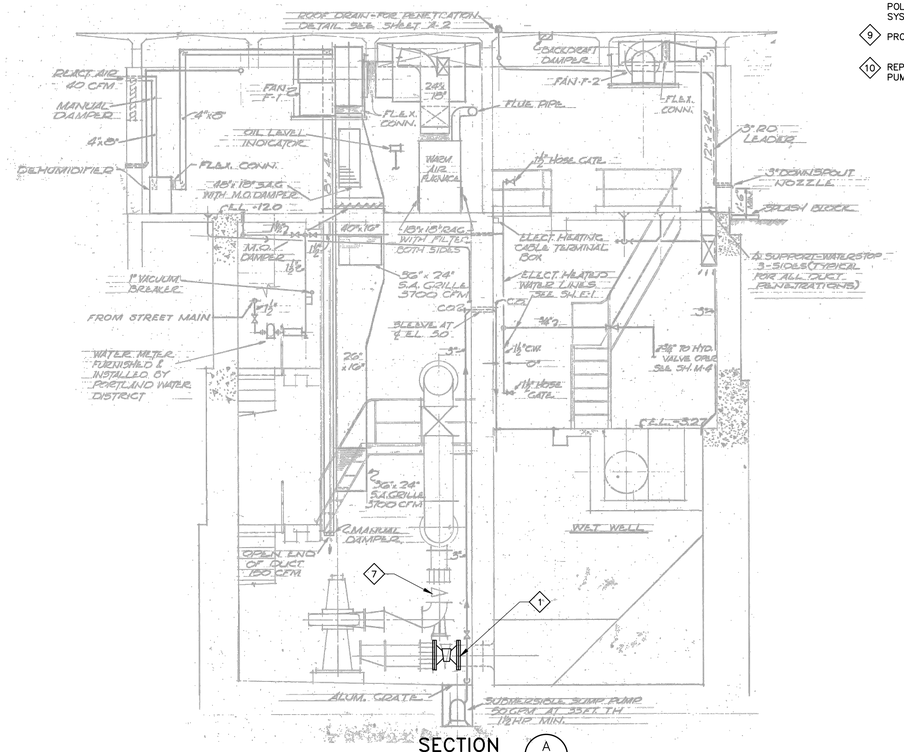
BASEMENT FLOOR PLAN
SCALE: 3/16" = 1'-0"



INTERMEDIATE FLOOR PLAN
SCALE: 3/16" = 1'-0"



FIRST FLOOR PLAN
SCALE: 3/16" = 1'-0"



SECTION A M-101
SCALE: 3/16" = 1'-0"

MECHANICAL GENERAL NOTES

1. PROVIDE COMPLETE DRAINING OF THE ENTIRE INFLUENT CHANNELS AND WET WELLS PRIOR TO CONDUCTING ANY WORK. PROVIDE PUMPING, HOSE, TANK TRUCKS, PIPING, AND ALL RELATED APPURTENANCES FOR COMPLETE DRAINING AND LAWFUL DISPOSAL OF ALL RESIDUAL WASTEWATER, SLUDGE AND GRIT.
2. PROVIDE A COMPLETE DRAINING OF ALL EXISTING PIPE CONNECTIONS PRIOR TO CONDUCTING ANY WORK. PROVIDE PUMPING, HOSE, TANK TRUCKS, PIPING, AND ALL RELATED APPURTENANCES FOR COMPLETE DRAINING AND LAWFUL DISPOSAL OF RESIDUAL WASTEWATER.
3. PROVIDE A COMPLETE CLEANING AND HIGH PRESSURE WASH OF THE EXISTING INFLUENT CHANNELS AND WET WELLS PRIOR TO CONDUCTING ANY WORK. PROVIDE EQUIPMENT, HOSE, TANK TRUCKS, WATER AND ALL RELATED APPURTENANCES FOR COMPLETE PRESSURE WASHING AND DISPOSAL OF WASH WATER.
4. PROVIDE TEMPORARY SEWAGE BYPASS PUMPING TO ALLOW DEMOLITION OF PUMP STATION COMPONENTS AND ALL NEW WORK. TEMPORARY BYPASS PUMPING MAY BE INITIATED FROM THE EXISTING WET WELL OR MANHOLE JUST UPSTREAM OF THE WET WELL WITH A DISCHARGE INTO THE EXISTING FORCE MAIN BY UTILIZING THE EXISTING 8" BYPASS CONNECTION INSIDE PUMP STATION DRY WELL AND VALVES.

MECHANICAL KEY NOTES

1. 18" PLUG VALVE WITH NEMA 4X ELECTRIC ACTUATOR. ACTUATOR SHALL BE DESIGNED FOR OPEN/CLOSE FUNCTIONALITY PLUG VALVE MUST CONFORM TO AWWA C517 STANDARDS. ACTUATOR SHALL HAVE A CLEAR POSITION INDICATOR, AND A MANUAL HANDWHEEL FOR OPERATION. VALVE SHALL BE CAST IRON AND HAVE A PRESSURE RATING OF NO LESS THAN 150 PSI. VALVE SHALL BE DEZURIK OR APPROVED EQUAL (TYP OF 3). ROTATE PLUG VALVES AS NEEDED TO AVOID INTERFERENCE WITH EXISTING PIPING, VALVES AND PUMPS.
2. FILL EXISTING BYPASS CHANNEL WALL CUTOUTS WITH CONCRETE TO BE FLUSH WITH UPSTREAM AND DOWNSTREAM WALLS.
3. 40" WIDE BY 60" TALL 304 SS SELF CONTAINED SLIDE GATE TO BE INSTALLED IN EXISTING CHANNEL. SLIDE GATE TO BE ELECTRICALLY ACTUATED WITH NEMA 7X ACTUATOR. ACTUATOR SHALL BE DESIGNED FOR OPEN/CLOSE FUNCTIONALITY. ACTUATOR SHALL HAVE A POSITION INDICATOR AND HANDWHEEL FOR MANUAL OPERATION AT GATE. SLIDE GATE SHALL BE WHIPPS OR APPROVED EQUAL. ACTUATOR SHALL BE AUMA OR APPROVED EQUAL.
4. CHANNEL GRINDER TO BE INSTALLED IN EXISTING BYPASS CHANNEL. GRINDER TO BE ELECTRIC WITH NEMA 7X COMPONENTS INCLUDING MOTOR. GRINDER SHALL BE JWC MODEL CDD3210-XDS2.0 OR APPROVED EQUAL.
5. POUR CONCRETE FILLETS AS NECESSARY FOR GRINDER INSTALLATION.
6. 24"x24" 304 SS SLIDE GATE TO BE INSTALLED ON OPPOSITE SIDE OF WET WELL DIVIDING WALL OF EXISTING SLIDE GATE. GATE SHALL INCLUDE A MANUAL ACTUATOR AND RISING STEM. GATE SHALL BE WHIPSS OR APPROVED EQUAL.
7. PROVIDE NEW ½ SS AIR PIPING FROM COMPRESSOR TO THREE (3) EXISTING KNIFE GATE VALVES. FIELD ROUTE PIPING AS REQUIRED TO AVOID CONFLICTS AND SUPPORT NEW AIR PIPING.
8. REPLACE ALL EXISTING COPPER SERVICE WATER IN PUMP STATION, INCLUDING BACKFLOW PREVENTER AND VALVES. PROVIDE NEW POLYETHYLENE TUBING AND SHUTOFF VALVES TO REPLACE EXISTING SYSTEM IN KIND.
9. PROVIDE CONCRETE FILLETS AS REQUIRED FOR GRINDER INSTALLATION.
10. REPLACE IMPELLER, VOLUTE WEAR RING AND IMPELLER SPACER PLATES AT PUMPS #1 AND #2 ONLY.

6' 4' 2' 0 4' 8'
BAR SCALE
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PUMP STATION MECHANICAL PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 10 OF 24

M-101

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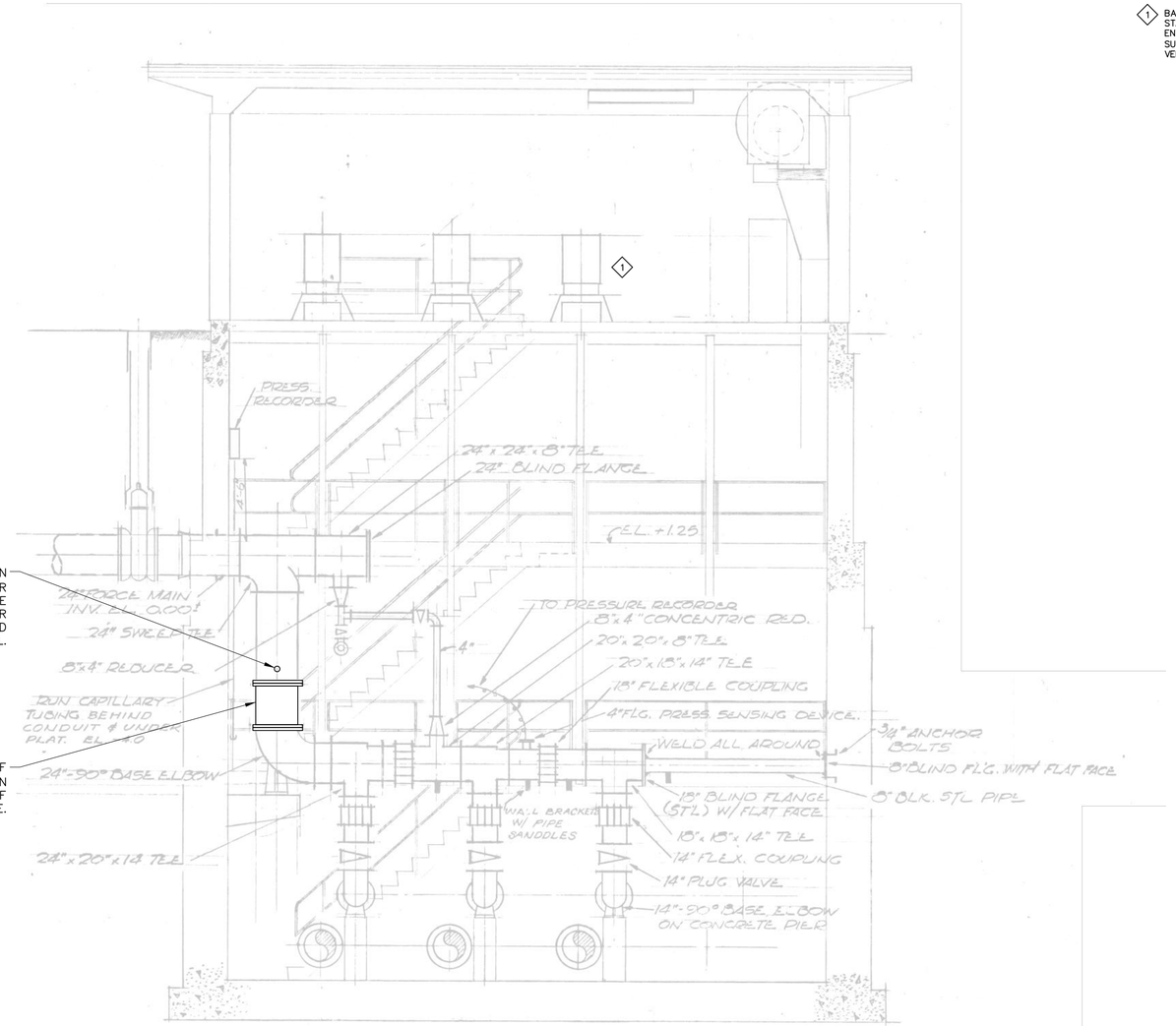
22x34 SHEET
1:1

KEY NOTES

1. BACKGROUND IMAGE TAKEN FROM FRANKLIN STREET SEWAGE PUMPING STATION CONTRACT DRAWINGS DATED 1964 BY METCALF AND EDDY ENGINEERS. EXTENDED SHAFT PUMPS HAVE BEEN REPLACED WITH DRY PIT SUBMERSIBLE PUMPS (TYP OF 3). CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS.



SECTION B / MD-101
SCALE: 1/4"=1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
1/4" = 1'-0"
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PUMP STATION MECHANICAL SECTION

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 11 OF 24

M-102

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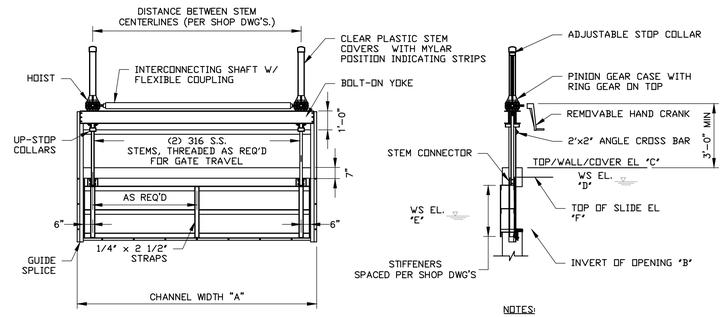
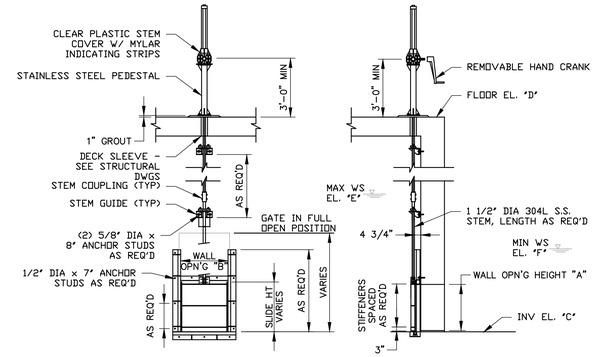


NOTES:

1. DUAL HOIST GATE SHOWN ALTHOUGH NOT REQUIRED FOR ALL APPLICATIONS.

SLIDE GATE SELF CONTAINED



SLIDE GATE NON-SELF CONTAINED

NOTES:

1. THREAD GATE FOR TRAVEL AS REQUIRED.
2. FULL WALL OPENING SHALL BE UNOBSTRUCTED WITH GATE IN FULL OPEN POSITION.

1 / M-101 GATE DETAIL

SCALE: N.T.S.

SLIDE GATE SCHEDULE (SELF CONTAINED)																
TAG NUMBER	SHEET REF.	LOCATION	TYPE	FRAME MOUNTING	CHANNEL WIDTH "A"	INV OF OPENING EL "B"	TOP OF WALL OR COVER EL "C"	WS EL UPSTREAM "D"	WS EL DOWNSTREAM "E"	TOP OF SLIDE EL "F"	ACTUATOR	DIRECTION TO CLOSE	CLOSURE TYPE	MATERIAL	RISING/NON-RISING STEM	NOTES
SG-1	M-101	WETWELL #X CHANNEL	SLIDE GATE	FACE MOUNTED	3'-0"	-8.2	-3.2	-3.2	-8.2	-3.2	ELECTRIC	DOWNWARD	FLUSH BOTTOM	STAINLESS STEEL	RISING	1, 2, 3
SG-2	M-101	WETWELL #X CHANNEL	SLIDE GATE	FACE MOUNTED	3'- 1 8"	-8.2	-3.2	-3.2	-8.2	-3.2	ELECTRIC	DOWNWARD	FLUSH BOTTOM	STAINLESS STEEL	RISING	1, 2, 3,

NOTES:

1. PROVIDE REMOVABLE HAND CRANK ACTUATOR.
2. PROVIDE DOUBLE PINION GEAR CASE FOR WIDE GATE. PROVIDE PROTECTIVE COVER & GUARD ON ROTATING INTERCONNECTING SHAFT.
3. CONTRACTOR TO FIELD VERIFY CHANNEL DIMENSIONS PRIOR TO ORDERING GATES.
4. DUAL HOISTS TO BE PROVIDED FOR WIDE GATE APPLICATIONS. DUAL HOISTS ARE NOT NECESSARY FOR ALL APPLICATIONS OF SELF CONTAINED GATES.

SLIDE GATE SCHEDULE (NON-SELF CONTAINED)																
TAG NUMBER	SHEET REF.	LOCATION	TYPE	FRAME MOUNTING	WALL OPENING HEIGHT "A"	WALL OPENING WIDTH "B"	INV EL "C"	OPERATING FLOOR EL "D"	WS EL UPSTREAM "E"	MIN WS EL DOWNSTREAM "F"	ACTUATOR	DIRECTION TO CLOSE	CLOSURE TYPE	MATERIAL	RISING/NON-RISING STEM	NOTES
SG-3	M-101	WETWELL #X	SLIDE GATE	FACE MOUNTED	2'-0"	2'-0"	-20.15 ±	-3.2	-.3 ±	-20.15 ±	REMOVABLE HAND CRANK	DOWNWARD	FLUSH BOTTOM	STAINLESS STEEL	RISING	1, 2, 3,

NOTES:

1. PROVIDE MANUAL ACTUATORS FOR EACH GATE.
2. PROVIDE 304 S.S. OFFSET FLOOR STAND SUPPORT & MOUNTING BRACKET FOR EACH GATE.
3. PROVIDE TOP, BOTTOM AND SIDE GATE SEALS.
4. CONTRACTOR TO FIELD VERIFY ELEVATIONS PRIOR TO ORDERING GATE.

60% GMP SUBMISSION-NOT FOR CONSTRUCTION

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MECHANICAL DETAILS

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 12 OF 24

M-201

22x34 SHEET
1:1

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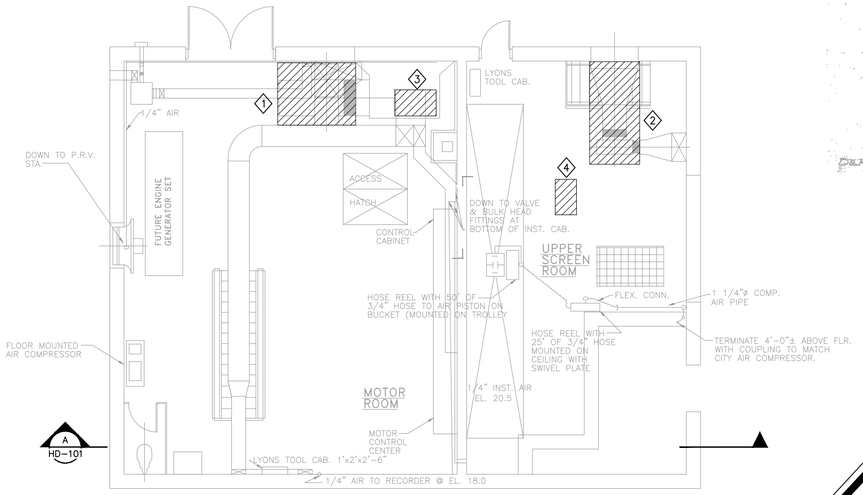
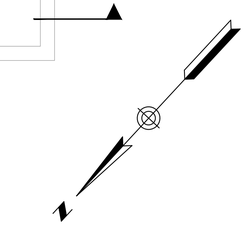


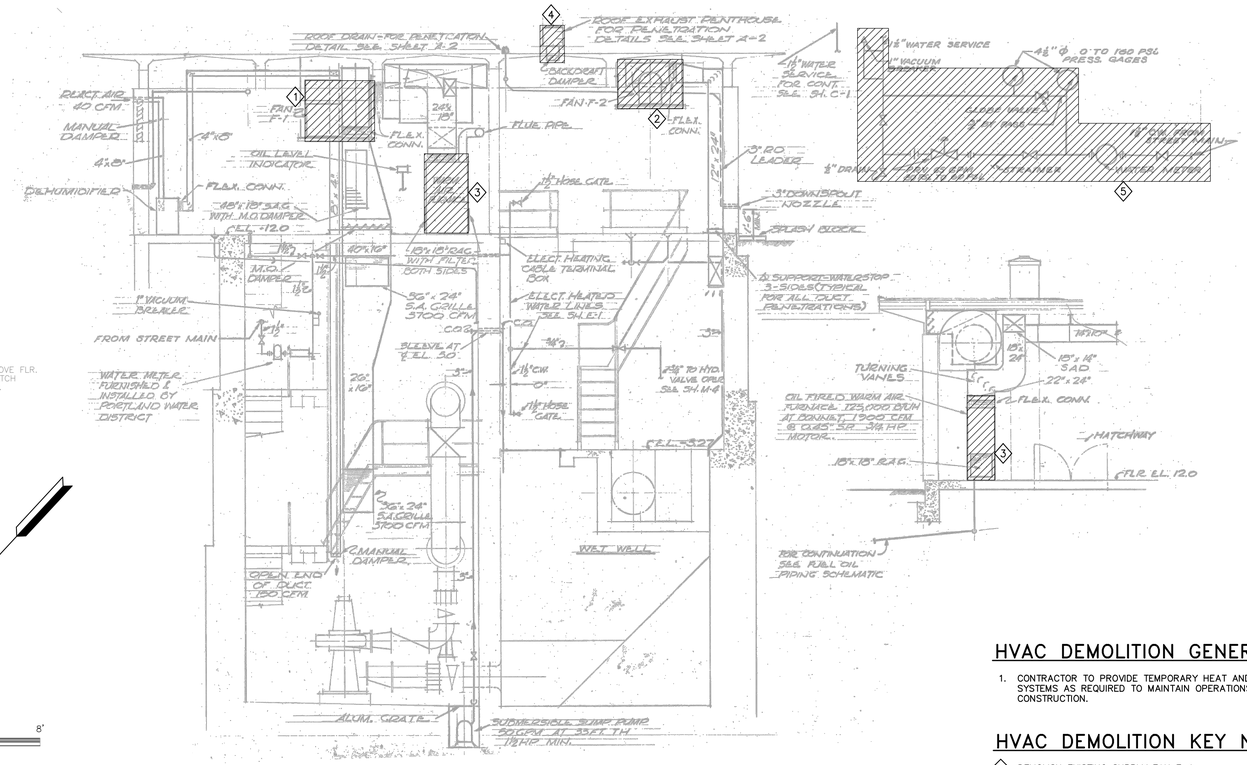
FIRST FLOOR PLAN

SCALE: 3/16" = 1'-0"



6' 4' 2' 0 4' 8'

BAR SCALE
3/16" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING



SECTION

SCALE: 3/16" = 1'-0"

A
HD-101

HVAC DEMOLITION GENERAL NOTES

1. CONTRACTOR TO PROVIDE TEMPORARY HEAT AND VENTILATION SYSTEMS AS REQUIRED TO MAINTAIN OPERATIONS DURING CONSTRUCTION.

HVAC DEMOLITION KEY NOTES

1. DEMOLISH EXISTING SUPPLY FAN F-1
2. DEMOLISH EXISTING SUPPLY FAN F-2
3. DEMOLISH EXISTING FURNACE, INCLUDING FUEL OIL LINES, FUEL OIL TANK AND ELECTRICAL CONNECTIONS.
4. DEMOLISH EXISTING ROOF EXHAUST PENTHOUSE FAN.
5. DEMOLISH EXISTING WATER SERVICE, PRESSURE REGULATOR, BACKFLOW PREVENTER AND METER.

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PUMP STATION HVAC DEMOLITION PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 13 OF 24

D-101

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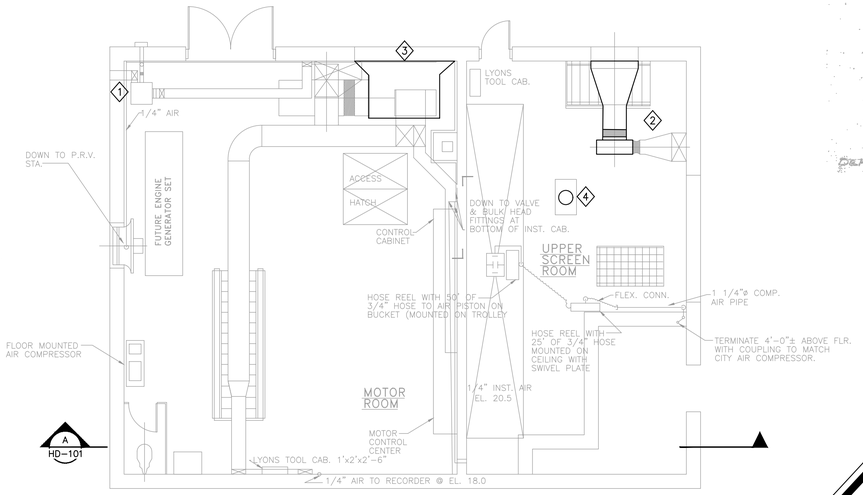
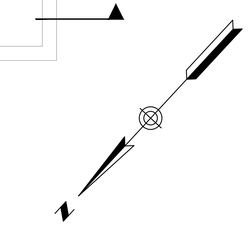


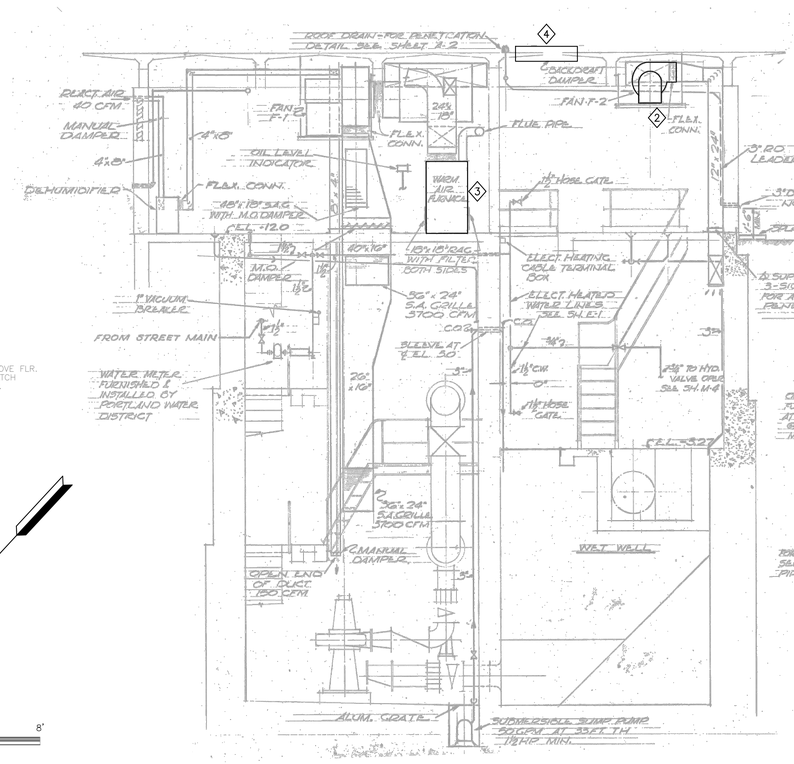
FIRST FLOOR PLAN

SCALE: 3/16" = 1'-0"



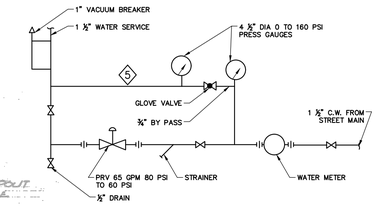
6' 4' 2' 0 4' 8'

BAR SCALE
3/16" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING



SECTION A HD-101

SCALE: 3/16" = 1'-0"



DOMESTIC WATER PRV DETAIL

NOT TO SCALE

HVAC GENERAL NOTES

1. NEW HVAC SYSTEM WILL PROVIDE SIX AIR CHANGES PER HOUR TO MAKE THE DRYWELL SPACE UNCLASSIFIED BY NFPA 820.
2. ALL FANS OVER 2,000 CFM REQUIRE DUCT SMOKE DETECTORS AND FIRE/SMOKE DAMPERS.
3. PROVIDE AIR FLOW PROVING SWITCHES ON EACH FAN. ALARM ON LOSS OF FLOW.
4. PROVIDE ALARM INDICATING FAILURE OF VENTILATION POWER.
5. WETWELL SPACE IS RATED CLASS I, DIVISION I BY NFPA 820

HVAC KEY NOTES

1. PROVIDE NEW FUEL SUPPLY FOR HVAC EQUIPMENT. FINAL FUEL TYPE TO BE DETERMINED DURING FINAL DESIGN.
2. PROVIDE NEW SUPPLY FAN RATED FOR 2,400 CFM. SUPPLY FAN TO MANUFACTURED BY GREENHECK (OR EQUAL). FAN AND MOTOR SHALL BE RATED FOR SERVICE IN A CLASS I DIVISION I ENVIRONMENT.
3. PROVIDE NEW ENERGY RECOVERY VENTILATOR SYSTEM, CONSISTING OF A CORE-TYPE ENERGY RECOVERY HEAT EXCHANGER. UNIT SHALL BE SUPPLIED WITH SEPARATE SUPPLY AND EXHAUST FANS. SUPPLY AIR SHALL BE DUCTED TO A DUCT FURNACE TO TREAT OUTSIDE AIR PRIOR TO VENTILATION. PROVIDE ERV UNIT MANUFACTURED BY RENEWAIRE (TRANE) OR EQUAL.
4. PROVIDE NEW EXHAUST FAN RATED FOR 2,400 CFM. EXHAUST FAN TO MANUFACTURED BY GREENHECK (OR EQUAL). FAN AND MOTOR SHALL BE RATED FOR SERVICE IN A CLASS I DIVISION I ENVIRONMENT.
5. REPLACE EXISTING CITY WATER SERVICE, PRESSURE REGULATING VALVE, BACKFLOW PREVENTER, VALVES, GAUGES AND APPURTENANCES IN KIND TO PROVIDE A COMPLETE SYSTEM REPLACEMENT.

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PUMP STATION HVAC MODIFICATIONS PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 14 OF 24

H-101

22x34 SHEET
1:1

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22x34 SHEET
1:1

GENERAL

P1–## — HOME RUN. ARROWS INDICATE NUMBER OF CIRCUITS, CROSS LINES INDICATE NUMBER OF WIRES, OTHER THAN TWO (2) PLUS BOND, WIRE SIZE NOT SHOWN INDICATES #12AWG MIN.
INDICATES CIRCUIT NUMBER
PANEL DESIGNATION
WIRING IN RACEWAY
WIRING IN RACEWAY CONCEALED UNDERGROUND OR UNDERSLAB, MINIMUM 3/4"C
3/C #nn W/GND EquipNo–P — CONDUIT AND CABLE ID TAG
CONDUIT TURNING UP
CONDUIT TURNING DOWN
CONDUIT STUB
EY CONDUIT SEAL
FLEXIBLE NON–METALLIC CONDUIT
PANELBOARD
CONTROL PANEL
ATC — AUTOMATIC TEMPERATURE CONTROL PANEL
ISBP — INTRINSIC SAFETY BARRIER PANEL
POWER COMPANY METER
HS H/O/A — LOCAL SELECTOR SWITCH
H/O/A – HAND/OFF/AUTO
H/O/R – HAND/OFF/REMOTE
L/O/R – LOCAL/OFF/REMOTE
PUSHBUTTON STATION, WITH "EM" EMERGENCY
J — JUNCTION BOX
MD — MOTORIZED DAMPER
T — THERMOSTAT
R — RELAY
B T — DOOR BELL/BUZZER AND TRANSFORMER – MTD CL UP 7'–0" AFF
X–# / EQUIP# — EQUIPMENT TAGS
X — KEYED NOTE TAG
X — REVISION TRIANGLE
BRACKET

POWER

NON–FUSED SAFETY SWITCH
F — FUSED SAFETY SWITCH
NON–FUSED DISCONNECT/MAGNETIC MOTOR STARTER
M — MANUAL MOTOR SWITCH (MOTOR RATED SWITCH), TOGGLE OPERATED, SINGLE PHASE. 1 OR 2 POLE AS REQUIRED
CB 100A — ENCLOSED CIRCUIT BREAKER W/AMPERE RATING
M — ELECTRIC MOTOR, NUMBER INDICATES HORSEPOWER RATING, "F" INDICATES FRACTIONAL LESS THAN 1/20HP OR 100W
T — TRANSFORMER
P — POWER POLE
DUPLEX RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED."WP" WEATHER PROOF, "G" PROTECTED BY GFCI RECEPTACLE OR BREAKER UPSTREAM, "H" MOUNTED 0'–6" BELOW CEILING, "TV" MOUNT 7'–6" UP
DOUBLE DUPLEX RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED
SINGLE RECEPTACLE, NEMA 5–20R – MTD CL UP 24" OR AS NOTED
GFCI DUPLEX RECEPTACLE, NEMA 5–20R – MOUNTED CL UP 48" OR 6" ABOVE COUNTER
DOUBLE DUPLEX GFCI RECEPTACLE, NEMA 5–20R – MOUNTED CL UP 48" OR 6" ABOVE COUNTER
FLUSH FLOOR OUTLET, DUPLEX RECEPTACLE, NEMA 5–20R
MULTI SERVICE FLUSH FLOOR BOX WITH DUPLEX RECEPTACLE AND PROVISIONS FOR DATA
POWER RECEPTACLE, NEMA CONFIGURATION AS NOTED OR AS REQUIRED FOR EQUIPMENT SERVED.
FLUSH CEILING MTD DEVICE BOXES, ONE W/ DUPLEX RCPT FOR PROJECTOR POWER AND ONE FOR DATA TO SERVE OH PROJECTOR. RUN ONE 1 1/2"C TO JBOX LOCATED AT FRONT OF ROOM FOR PROJECTOR CABLE PATHWAY. VERIFY FINAL LOCATION W/ OWNER PRIOR TO ROUGH IN.
MULITI–OUTLET POWER STRIP, MOUNT 0'–6" ABOVE COUNTERTOP, RECEPTACLE SPACING AS NOTED.

MISCELLANEOUS

B / 80.01 — SECTION # / SHEET # — SECTION CALL OUT
DETAIL TITLE — 1 / X–0X — DETAIL CALL OUT

LIGHTING

2x4 LIGHT FIXTURE
Ab — ASSOCIATED CONTROL DEVICE; FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
1x4 LIGHT FIXTURE
2x2 LIGHT FIXTURE
FIXTURE WITH INTEGRAL EMERGENCY BATTERY PACK
FIXTURE WIRED TO UNSWITCHED EMERGENCY CIRCUIT
DOWN LIGHT
WALL MOUNTED FIXTURES
POLE MOUNTED SITE LIGHTING FIXTURE
ab — FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
FLOOD LIGHT
EXIT SIGN, CEILING MOUNTED. ARROW INDICATES EGRESS DIRECTION. SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED
EXIT SIGN, WALL MOUNTED 7'–6" AFF OR 0'–6" ABOVE DOOR. SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.
BATT — DUAL HEAD EMERGENCY LIGHT BATTERY PACK WITH NUMBER OF HEADS AS INDICATED – WALL MOUNTED MTD 7'–6" AFF. NUMERAL INDICATES BATTERY ID NUMBER.
TANDEM EMERGENCY LIGHT BATTERY PACK & EXIT SIGN – WALL MOUNTED MTD 7'–6" AFF OR 0,–6" ABOVE DOOR. NUMERAL INDICATES BATTERY ID NUMBER.
REMOTE EMERGENCY LIGHTING HEAD – WALL MOUNTED MTD 7'–6" AFF. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.
S — SINGLE POLE TOGGLE SWITCH – MTD CL UP 4'–0" AFF
S_2 — DOUBLE POLE TOGGLE SWITCH – MTD CL UP 4'–0" AFF
S_3 — 3–WAY TOGGLE SWITCH – MTD CL UP 4'–0" AFF
S_4 — 4–WAY TOGGLE SWITCH – MTD CL UP 4'–0" AFF
S_M — WALL MOUNTED OCCUPANCY SENSOR – MTD CL UP 4'–0" AFF
S_P — TOGGLE SWITCH WITH PILOT LIGHT – MTD CL UP 4'–0" AFF
S_D — DIMMER SWITCH – MTD CL UP 4'–0" AFF
S_{LV} — LOW VOLTAGE SWITCH – MTD CL UP 4'–0" AFF
a — OCCUPANCY SENSOR
a. INDICATES CONTROLLED FIXTURE
PC — PHOTOCELL
LC — LIGHTING CONTACTOR
MS — MOTION SENSOR

FIRE ALARM DIAGRAM SYMBOLS

FACP — FIRE ALARM CONTROL PANEL
FAA — FIRE ALARM ANNUNCIATOR
FCPS — FIELD CHARGER POWER SUPPLY
M — FIRE ALARM MASTER BOX
K — KNOX BOX
F — FIRE ALARM MANUAL PULL STATION – WALL MTD CL UP 4'–0"
H L — FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED – WALL MTD BOTTOM UP 80" AFF. "H" HORN, "V" VOICE.
L — FIRE ALARM VISUAL NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED – WALL MTD BOTTOM UP 80" AFF
CEILING MOUNTED SMOKE DETECTOR
CEILING MOUNTED HEAT DETECTOR
DUCT SMOKE DETECTOR S=SUPPLY, R=RETURN
FS — SPRINKLER SYSTEM FLOW SWITCH
TS — SPRINKLER SYSTEM TAMPER SWITCH
PS — SPRINKLER SYSTEM PRESSURE SWITCH
DH — FIRE ALARM SYSTEM MAGNETIC DOOR HOLDER
Z — MONITOR MODULE
C — CONTROL MODULE
R — RELAY MODULE

COMMUNICATIONS

TEL — TELEPHONE BACKBOARD
WX — PROVISIONS FOR TELEPHONE OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE
W–INDICATES WALL MOUNTED AT 60" AFF
P–INDICATES PAYPHONE MOUNTED AT 4'–0" AFF
X–INDCATES NUMBER OF JACKS, SINGLE BOX
PROVISIONS FOR DATA OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.
2D2T — PROVISIONS FOR TELEPHONE & DATA OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.
PROVISIONS FOR SCADA SYSTEM OUTLET. TWO–GANG WALL BOX WITH ONE 1"C STUB TO ABOVE ACCESSIBLE CEILING – MTD CL UP SAME AS ASSOCIATED RECEPTACLE
CEILING MOUNTED TELEPHONE SYSTEM OUTLET
CEILING MOUNTED DATA SYSTEM OUTLET
CEILING MOUNTED VOICE & DATA OUTLET
FLUSH TELEPHONE FLOOR OUTLET
FLUSH DATA FLOOR OUTLET
FLUSH VOICE & DATA FLOOR OUTLET
TV — TELEVISION COAXIAL OUTLET. MOUNTED UP SAME AS ASSOCIATED RECEPTACLE

SECURITY

SEC — SECURITY PANEL
DS — DOOR INTRUSION SWITCH
DE — ELECTRIC DOOR STRIKE
CR — CARD READER
KP — KEY PAD
MOTION DETECTOR
CAM — SECURITY CAMERA
PTZ = PAN/TILT/ZOOM

INTERCOM & PAGING SYSTEM

S — CEILING MOUNTED SPEAKER
PA — PAGING SYSTEM CONTROL PANEL
HS — PAGING SYSTEM HANDSET

INSTRUMENTATION

LS / XX — FIELD MOUNTED INSTRUMENT
INSTRUMENT IDENTIFICATION TYPE
INSTRUMENT LOOP #
FS / XX — VENDER SUPPLIED INSTRUMENT

INSTRUMENT IDENTIFIER:

AE	ANALYSIS ELEMENT
AIT	ANALYSIS INDICATING TRANSMITTER
AT	ANALYSIS TRANSMITTER
DPS	DIFFERENTIAL PRESSURE SWITCH
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FIT	FLOW INDICATING TRANSMITTER
FT	FLOW TRANSMITTER
FS	FLOW SWITCH
LE	LEVEL ELEMENT
LIT	LEVEL INDICATING TRANSMITTER
LT	LEVEL TRANSMITTER
LS	LEVEL SWITCH
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
MOV	MOTOR OPERATED VALVE
PE	PRESSURE ELEMENT
PIT	PRESSURE INDICATING TRANSMITTER
PT	PRESSURE TRANSMITTER
PS	PRESSURE SWITCH
SV	SOLENOID VALVE
TE	TEMPERATURE ELEMENT
TIT	TEMPERATURE INDICATING TRANSMITTER
TT	TEMPERATURE TRANSMITTER
ZS	PROXIMITY SWITCH

MISC TERMINALS

ARROW, SMALL
ARROW, LARGE
ARROW, TRIANGULAR
CONTINUE, SMALL
CONTINUE, LARGE
DOT, SMALL
DOT, MEDIUM
DOT, LARGE
POLARITY SQUARE
SCREW TERMINAL
TERMINAL POINT, SMALL
TERMINAL POINT, LARGE
TERMINAL POINT, SQUARE
SHIELD
SHIELD W/TERMINAL POINT

ONE–LINE DIAGRAM SYMBOLS

52 GCB1 — CB 800A E.O — HV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER ELECTRICALLY OPERATED
52 — MV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER WITH MANUAL CONTROL SWITCH
AT/AF EO — LOW VOLTAGE CIRCUIT BREAKER
AF – AMP FRAME
AT – AMP TRIP
EO – ELECTRICALLY OPERATED
ST — ST – SHUNT TRIP
GF – GROUND FAULT
EO – ELECTRICALLY OPERATED
DISCONNECT, ISOLATION OR SAFETY SWITCH
FUSED DISCONNECT SWITCH
1 — MAGNETIC MOTOR STARTER. NUMERAL INDICATES NEMA SIZE FVNR UNLESS OTHERWISE NOTED.
FVR – FULL VOLTAGE REVERSING
RVAT – REDUCING VOLTAGE AUTO TRANSFORMER
2S – TWO SPEED
YD – WYE DELTA REDUCED VOLTAGE STARTER
CAPACITOR
VFD 11 — VFD = VARIABLE FREQUENCY DRIVE
SS = SOLID STATE STARTER
DC = DC VARIABLE DRIVE
NUMERAL INDICATES AMP RATING
OA — POWER TRANSFORMER
OA – LIQUID TYPE SELF COOLED
AA – DRY TYPE SELF COOLED
FA – FAN COOLED
CONNECTION
2 480/120 — POTENTIAL TRANSFORMER
RATIO
NUMBER REQUIRED
2 600/5 — CURRENT TRANSFORMER
RATIO
PHASE
5 — MOTOR, NUMERAL INDICATES HORSEPOWER
X — GENERAL LOAD, NUMERAL INDICATES LOAD IN KVA
GENERATOR
N E L ATS — ATS – AUTOMATIC TRANSFER SWITCH
MTS – MANUAL TRANSFER SWITCH
A — METER
A – AMMETER
V – VOLTMETER
W – WATTMETER
KWH – KILOWATT HOUR
KVAR – KILOVAR METER
VAR – VAR METER
HZ – FREQUENCY METER
PF – POWER FACTOR METER
3 — LINE OR LOAD REACTOR NUMERAL INDICATES % IMPENDENCE
DPM — DIGITAL POWER MONITOR
AS — METER TRANSFER SWITCH
AS – AMMETER SWITCH
VS – VOLTMETER SWITCH
SPD — SPD = SURGE PROTECTION DEVICE
ENDN = ETHERNET TO DEVICENET LINKING DEVICE
DPS = DEVICENET POWER SUPPLY
MEDIUM VOLTAGE CABLE TERMINATION
DRAWOUT DEVICE
LA — LIGHTNING ARRESTOR
K — KEY INTERLOCK

GROUNDING

BARE COPPER GROUND CABLE. (SIZE 4/0 UNLESS OTHERWISE NOTED)
3/4ø X 10'–0" LONG GROUND ROD. (10'–0" MINIMUM LENGTH)
EQUIPMENT BOLTED CONNECTION OR APPROVED EQUAL.
CADWELD EXOTHERMIC CONNECTION
GROUND

CONTROL DIAGRAM SYMBOLS

NOTE: ALL CONTROL SYMBOLS ARE DRAWN ASSUMING DE–ENERGIZED CIRCUITS, EMPTY TANKS, UNPRESSURIZED LINES, ETC.

OPEN ON INCREASE / CLOSE ON INCREASE
PRESSURE SWITCH
LEVEL SWITCH
FLOW SWITCH
TEMPERATURE SWITCH
NORMALLY CLOSED / NORMALLY OPEN
PUSH BUTTON
INSTANTANEOUS CONTACT
TIMED CLOSE CONTACT
TIMED OPEN CONTACT
LIMIT SWITCH
H O A XOO OOX — SELECTOR SWITCH: QUANTITY OF ARROWS INDICATES NUMBER OF POSITIONS. XOO INDICATES UPPER CONTACT CLOSED IN LEFT POSITION AND OPEN IN CENTER AND RIGHT POSITIONS
INTERNAL WIRING
FIELD WIRING
RELAY COIL

ABBREVIATIONS

A,AMP	AMPERES	V	VOLTS
AC	ALTERNATING CURRENT	VA	VOLT–AMPERES
AFF	ABOVE FINISHED FLOOR	VAR	VOLT–AMPERE REACTIVE
AFG	ABOVE FINISHED GRADE	W	WATT
AHJ	AUTHORITY HAVING JURISDICTION	WM	WATT METER
AIC	AMPERE INTERRUPT CAPACITY	WP	WEATHER PROOF
AWG	AMERICAN WIRE GAUGE	XFMR	TRANSFORMER
BFG	BELOW FINISHED GRADE	XP	EXPLOSION PROOF
CATV	CABLE TELEVISION		
CB	CIRCUIT BREAKER		
CCTV	CLOSED CIRCUIT TELEVISION		
CL	CENTER LINE		
CKT	CIRCUIT		
CP	CONTROL PANEL		
CPT	CONTROL POWER TRANSFORMER		
CT	CURRENT TRANSFORMER		
CU	COPPER		
E.C.	ELECTRICAL CONTRACTOR		
EMT	ELECTRIC METALLIC TUBING		
FAA	FIRE ALARM ANNUNCIATOR		
FACP	FIRE ALARM CONTROL PANEL		
FBO	FURNISHED BY OTHERS		
FWE	FURNISHED WITH EQUIPMENT		
G.C.	GENERAL CONTRACTOR		
GEN	GENERATOR		
GFCI	GROUND FAULT CIRCUIT INTERRUPTER		
G,GND	GROUND		
HP	HORSEPOWER		
HZ	FREQUENCY IN CYCLES/SECOND		
IG	ISOLATED GROUND		
IMT	INTERMEDIATE METALLIC CONDUIT		
JBOX	JUNCTION BOX		
K	KILO		
KCMIL	1000 CIRCULAR MILS		
KVA	KILOVOLT AMPERE		
KVAR	KILOVOLT AMPERE REACTIVE		
KW	KILOWATT		
KWH	KILOWATT HOUR		
MCC	MOTOR CONTROL CENTER		
MCB	MAIN CIRCUIT BREAKER		
MFG	MANUFACTURER		
MH	MANHOLE		
MLO	MAIN LUGS ONLY		
MTD	MOUNTED		
MTR	MOTOR		
MV	MEDIUM VOLTAGE		
NC	NORMALLY CLOSED		
NEC	NATIONAL ELECTRIC CODE		
NEUT	NEUTRAL		
NO	NORMALLY OPEN		
OL	OVERLOAD ELEMENT		
PF	POWER FACTOR		
PH	PHASE		
PRI	PRIMARY		
PT	POTENTIAL TRANSFORMER		
PVC	POLYVINYL CHLORIDE		
RGS	RIGID STEEL CONDUIT		
RTD	RESISTANCE TEMPERATURE DETECTOR		
SEC	SECONDARY		
SS	STAINLESS STEEL		
SV	SOLENOID VALVE		
TEMP	TEMPERATURE		
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR		
TYP	TYPICAL		
UE	UNDERGROUND ELECTRIC		
UG	UNDERGROUND		
UPS	UNINTERRUPTED POWER SUPPLY		

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DRAWN BY: SAA
CHECKED BY: AJF
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ELECTRICAL LEGEND

CITY OF PORTLAND, ME
FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 15 OF 24

E00.01

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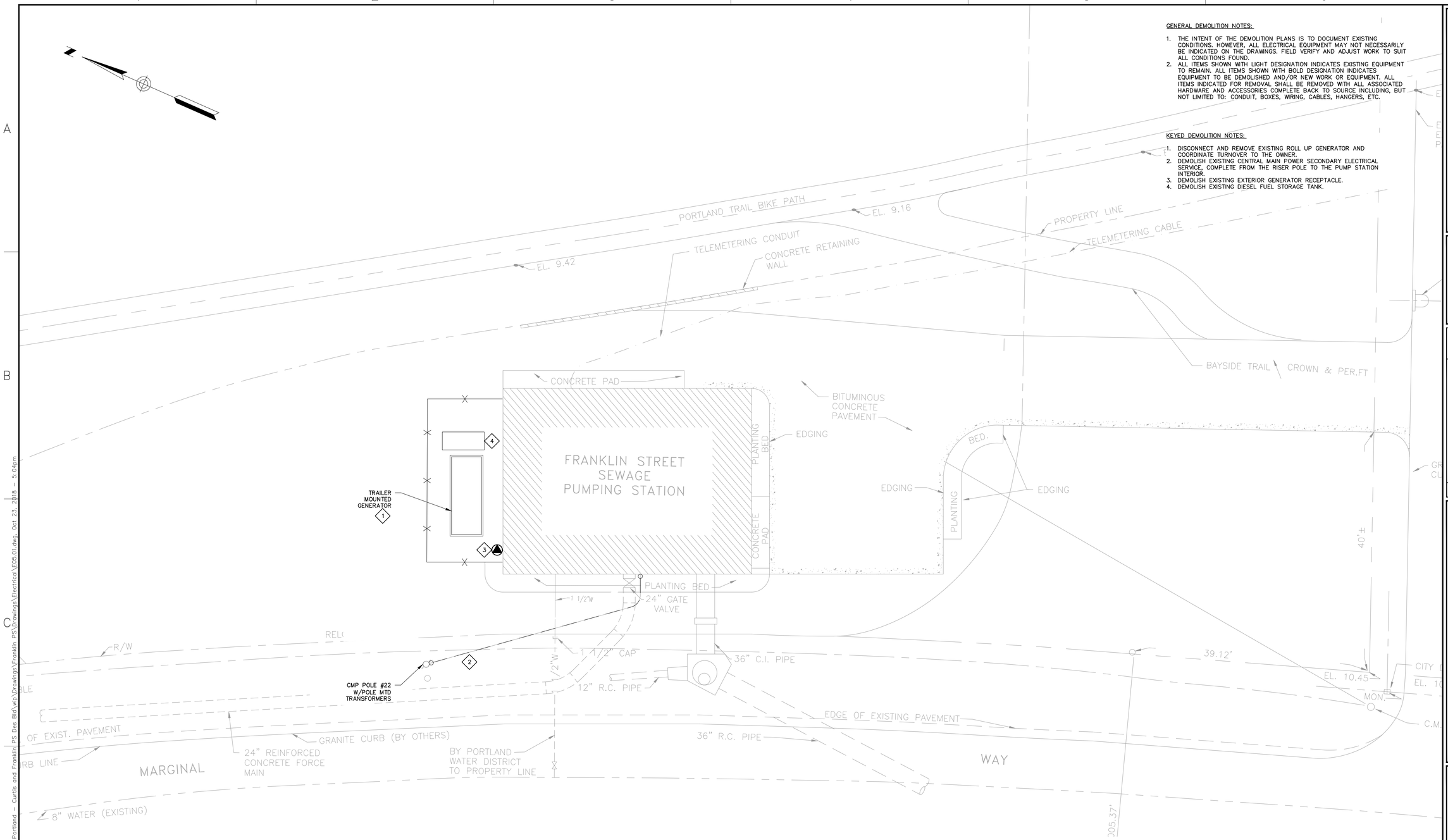
22x34 SHEET
1:1

GENERAL DEMOLITION NOTES:

1. THE INTENT OF THE DEMOLITION PLANS IS TO DOCUMENT EXISTING CONDITIONS. HOWEVER, ALL ELECTRICAL EQUIPMENT MAY NOT NECESSARILY BE INDICATED ON THE DRAWINGS. FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND.
2. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING EQUIPMENT TO REMAIN. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES EQUIPMENT TO BE DEMOLISHED AND/OR NEW WORK OR EQUIPMENT. ALL ITEMS INDICATED FOR REMOVAL SHALL BE REMOVED WITH ALL ASSOCIATED HARDWARE AND ACCESSORIES COMPLETE BACK TO SOURCE INCLUDING, BUT NOT LIMITED TO: CONDUIT, BOXES, WIRING, CABLES, HANGERS, ETC.

KEYED DEMOLITION NOTES:

1. DISCONNECT AND REMOVE EXISTING ROLL UP GENERATOR AND COORDINATE TURNOVER TO THE OWNER.
2. DEMOLISH EXISTING CENTRAL MAIN POWER SECONDARY ELECTRICAL SERVICE, COMPLETE FROM THE RISER POLE TO THE PUMP STATION INTERIOR.
3. DEMOLISH EXISTING EXTERIOR GENERATOR RECEPTACLE.
4. DEMOLISH EXISTING DIESEL FUEL STORAGE TANK.



PROPOSED ELECTRICAL SITE DEMOLITION

SCALE: 1" = 8'

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EXISTING ELECTRICAL SITE PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 16 OF 24

E05.01

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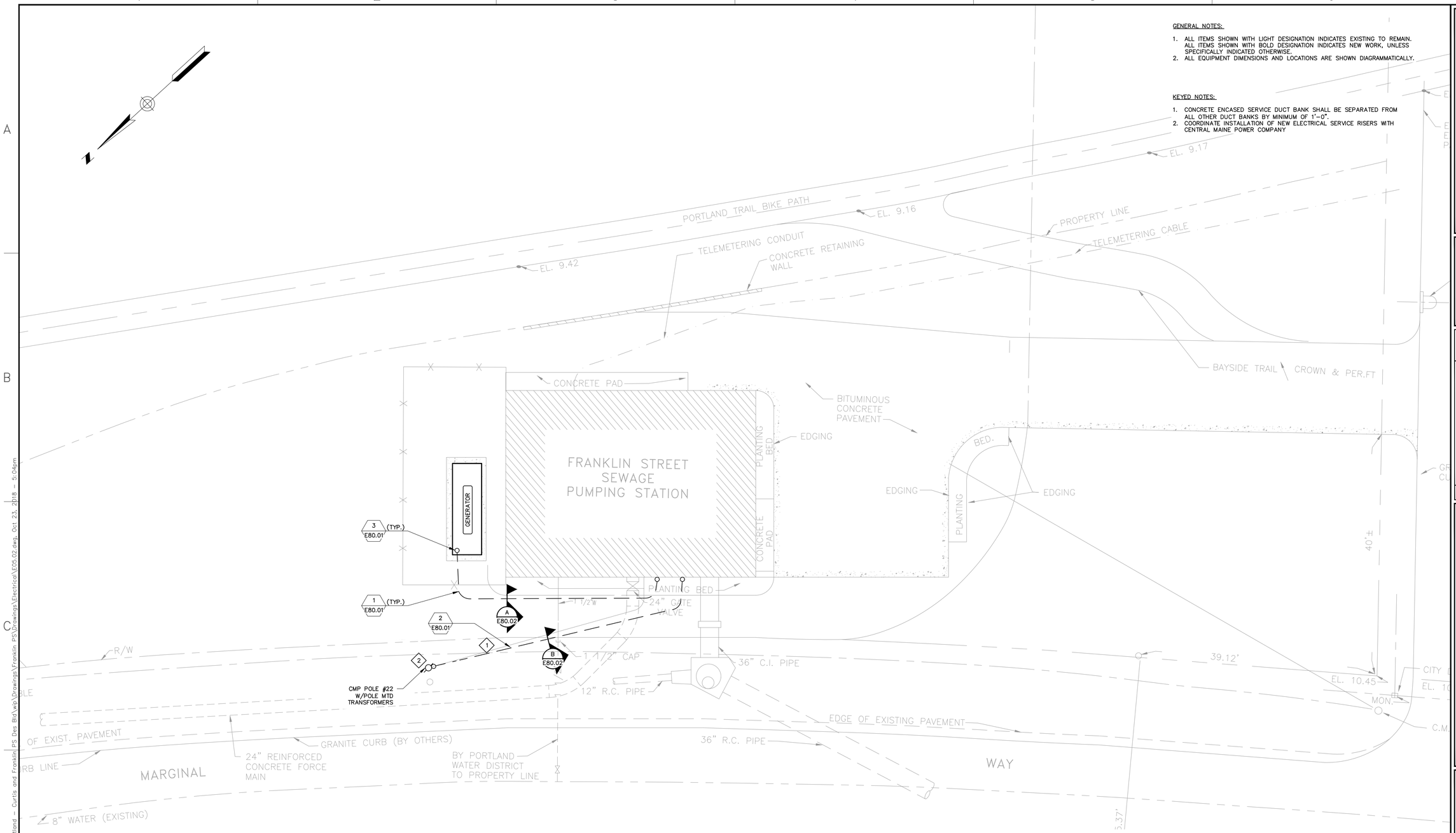
GENERAL NOTES:

1. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING TO REMAIN. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES NEW WORK, UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. ALL EQUIPMENT DIMENSIONS AND LOCATIONS ARE SHOWN DIAGRAMMATICALLY.

KEYED NOTES:

1. CONCRETE ENCASED SERVICE DUCT BANK SHALL BE SEPARATED FROM ALL OTHER DUCT BANKS BY MINIMUM OF 1'-0".
2. COORDINATE INSTALLATION OF NEW ELECTRICAL SERVICE RISERS WITH CENTRAL MAINE POWER COMPANY



PROPOSED ELECTRICAL SITE PLAN

SCALE: 1" = 8'

8' 0 8' 16'
BAR SCALE
1" = 8'
CHECK GRAPHIC SCALE BEFORE USING

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PROPOSED ELECTRICAL SITE PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 17 OF 24

E05.02

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GENERAL DEMOLITION NOTES:

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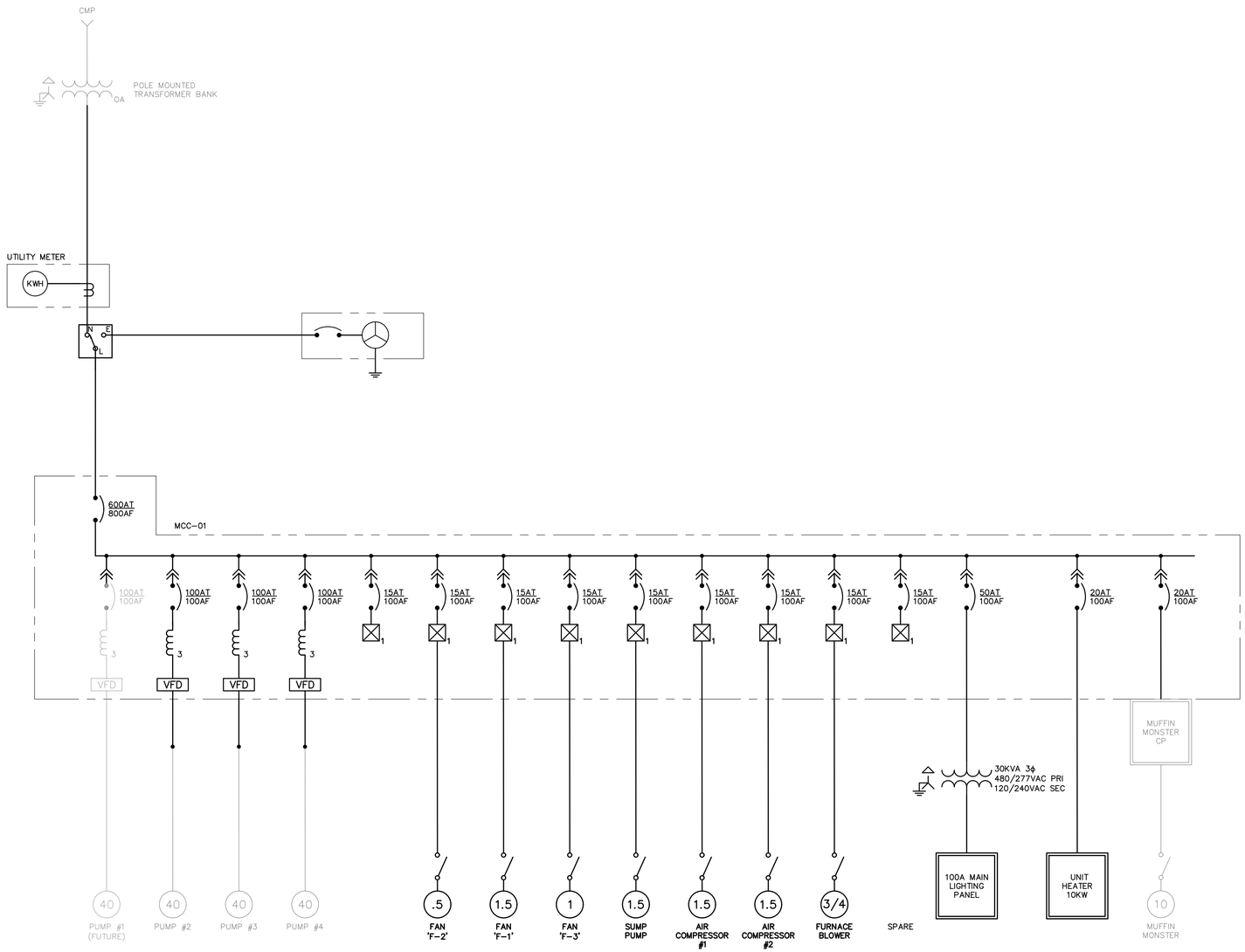

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RAN LIN ONE-LINE DEMOLITION

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 18 OF 24

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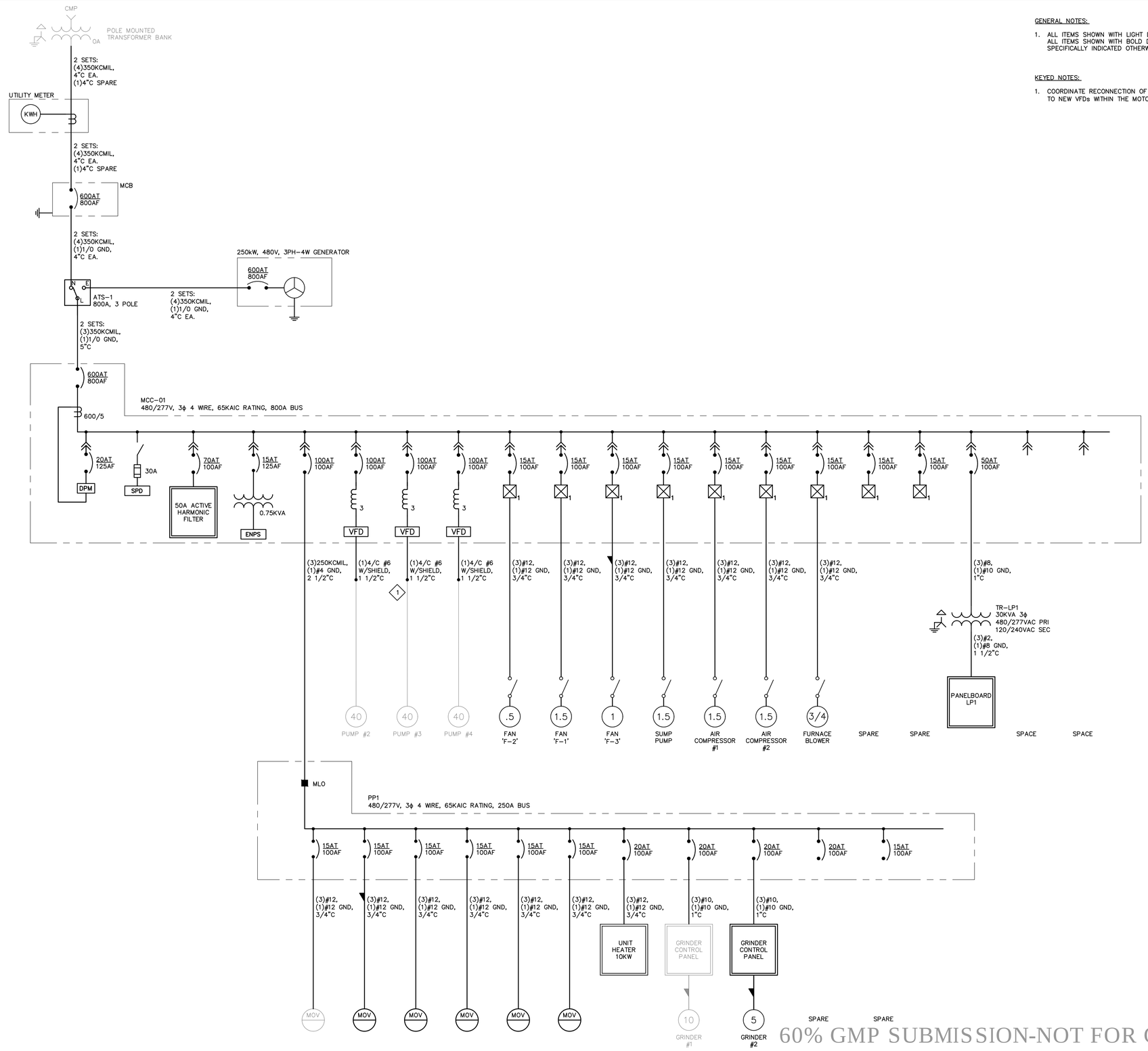
1:1

GENERAL NOTES:

1. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING TO REMAIN. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES NEW WORK, UNLESS SPECIFICALLY INDICATED OTHERWISE.

KEYED NOTES:

1. COORDINATE RECONNECTION OF EXISTING WASTEWATER PUMP CABLES TO NEW VFDs WITHIN THE MOTOR CONTROL CENTER. (TYP. FOR 3)



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RANI LIN ONE-LINE NE

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 19 OF 24

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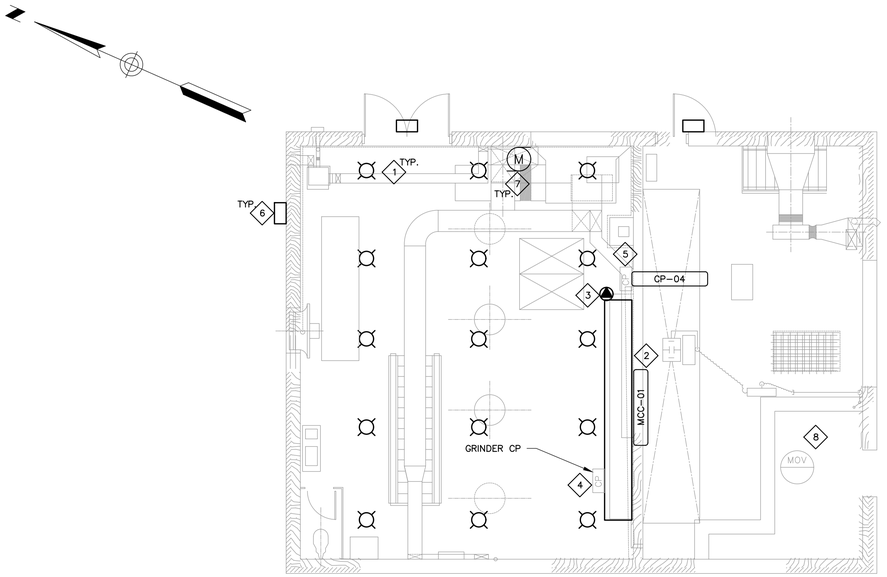

FIRST FLOOR
SCALE: 3/16" = 1'-0"

GENERAL DEMOLITION NOTES:

1. THE INTENT OF THE DEMOLITION PLANS IS TO DOCUMENT EXISTING CONDITIONS. HOWEVER, ALL ELECTRICAL EQUIPMENT MAY NOT NECESSARILY BE INDICATED ON THE DRAWINGS. FIELD VERIFY AND ADJUST WORK TO SUIT ALL CONDITIONS FOUND.
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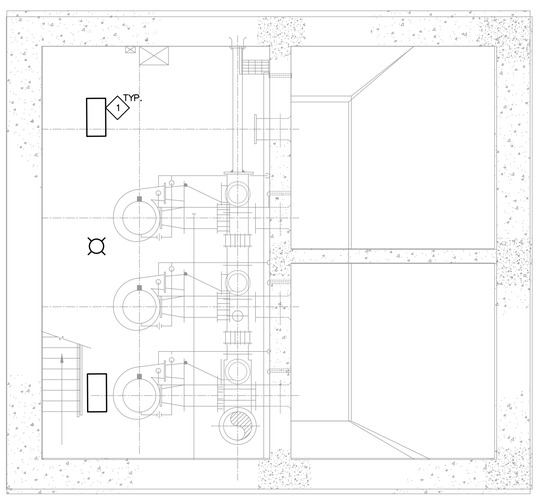
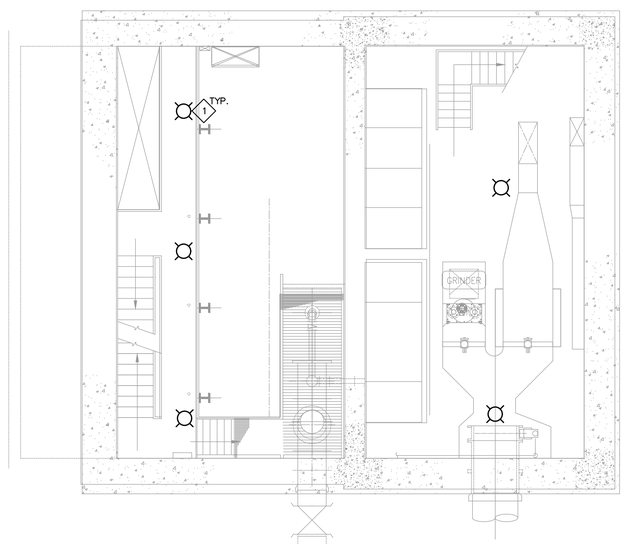
KEYED DEMOLITION NOTES:

1. DEMOLISH ALL EXISTING LIGHTING AND ASSOCIATED SWITCHES, INCLUDING THOSE NOT EXPLICITLY DEPICTED IN THE DRAWING. (TYP.)
2. DEMOLISH MOTOR CONTROL CENTER. REFERENCE DEMOLITION ONE-LINE E10.01 FOR FURTHER DETAILS.
3. DEMOLISH EXISTING HOIST RECEPTACLE.
4. EXISTING GRINDER CP TO BE RETAINED AND RELOCATED. SPLICE, EXTEND AND RECONNECT ALL ASSOCIATED WIRING.
5. EXISTING SCADA CONTROL PANEL TO REMAIN.
6. DEMOLISH EXISTING EXTERIOR LIGHTING. (TYP.)
7. DEMOLISH ALL ELECTRICAL ASSOCIATED WITH EXISTING HVAC SYSTEM INCLUDING, BUT NOT LIMITED TO FANS, ELECTRIC DAMPERS, THERMOSTATS, ETC.
8. EXISTING SLIDE GATE ELECTRIC ACTUATOR TO REMAIN FOR RECONNECTION.



BASEMENT FLOOR
SCALE: 3/16" = 1'-0"



INTERMEDIATE FLOOR
SCALE: 3/16" = 1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
3/16" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING

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DEMOLITION POWER PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 20 OF 24

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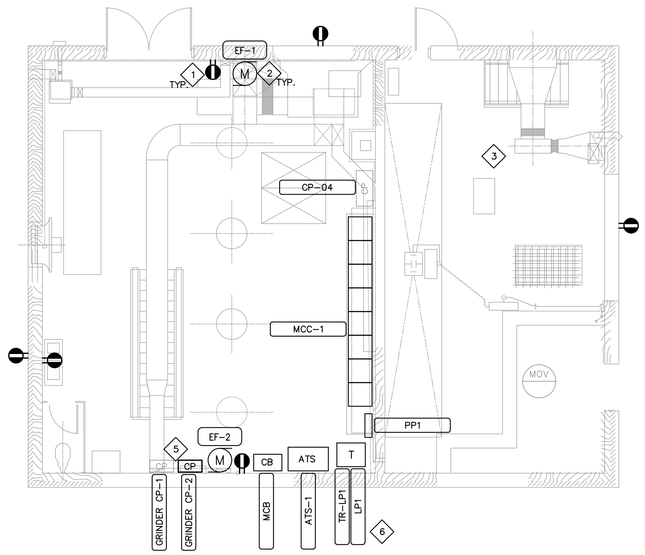

FIRST FLOOR
SCALE: 3/16" = 1'-0"

GENERAL NOTES:

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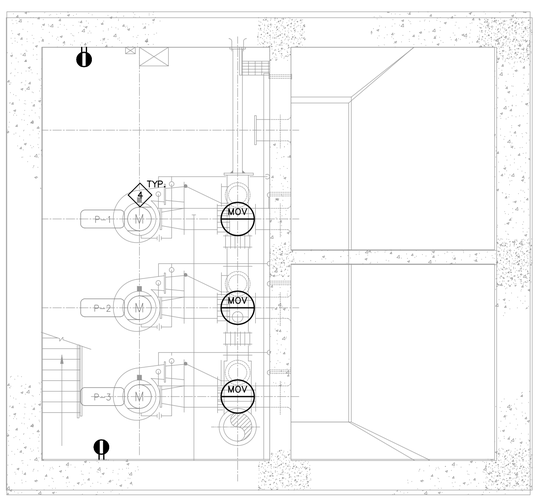
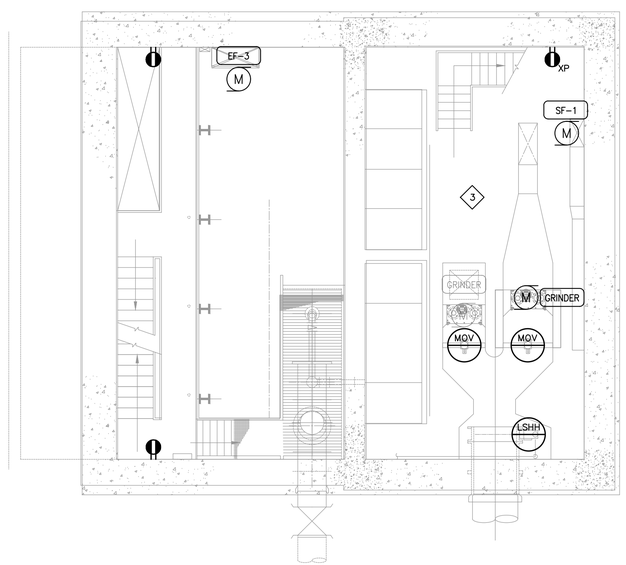
2. ALL EQUIPMENT DIMENSIONS AND LOCATIONS ARE SHOWN DIAGRAMMATICALLY.

KEYED NOTES:

1. RECEPTACLE LOCATIONS AND QUANTITIES TO BE FINALIZED. THE INTENT, AT A MINIMUM, IS TO REPLACE ALL EXISTING RECEPTACLES.
2. ALL HVAC EQUIPMENT LOCATION SHOWN IS DIAGRAMMATIC AND DOES NOT NECESSARILY DEPICT APPROPRIATE QUANTITIES OR LOCATIONS. THE GENERAL INTENT OF THE PROJECT IS TO REPLACE THE HVAC SYSTEM AND ALL ASSOCIATED ELECTRICAL IN ITS ENTIRETY.
3. THE WET WELL IS A CLASS 1 DIVISION 1 HAZARDOUS LOCATION, ALL ELECTRICAL SHALL BE INSTALLED ACCORDINGLY INCLUDING, BUT NOT LIMITED TO, CONDUIT SEALS, NEMA 7/ EXPLOSIONPROOF ENCLOSURE, BOXES, AND FITTINGS.
4. EXISTING WASTEWATER PUMP TO REMAIN IN PLACE FOR RECONNECTION TO THE NEW MOTOR CONTROL CENTER. (TYP.)
5. NEW AND EXISTING GRINDER CONTROL PANELS 1 AND 2 LOCATIONS TO BE FINALIZED.
6. PROVIDE WALL MOUNT BRACKET TO ALLOW FOR INSTALLATION OF TR-LP1 ABOVE LP1



BASEMENT FLOOR
SCALE: 3/16" = 1'-0"



INTERMEDIATE FLOOR
SCALE: 3/16" = 1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
3/16" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING

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ELECTRICAL POWER PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 21 OF 24

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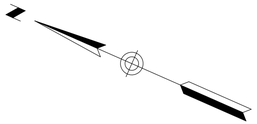

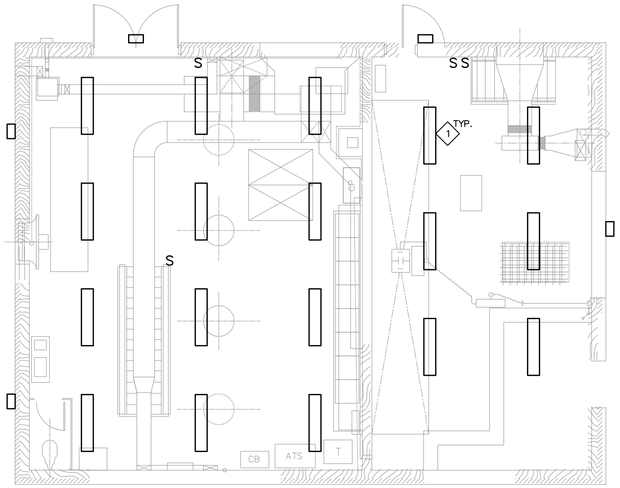

FIRST FLOOR
SCALE: 3/16" = 1'-0"

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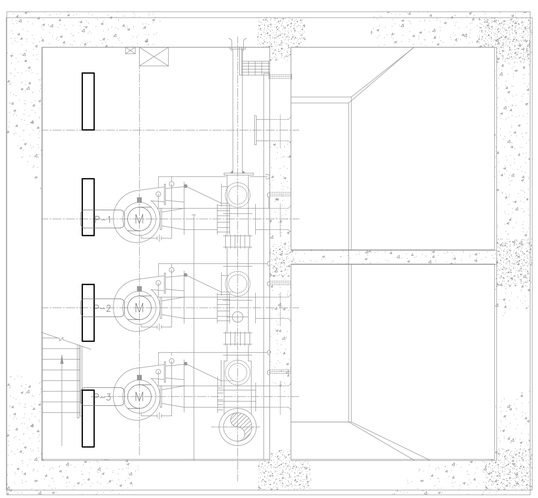
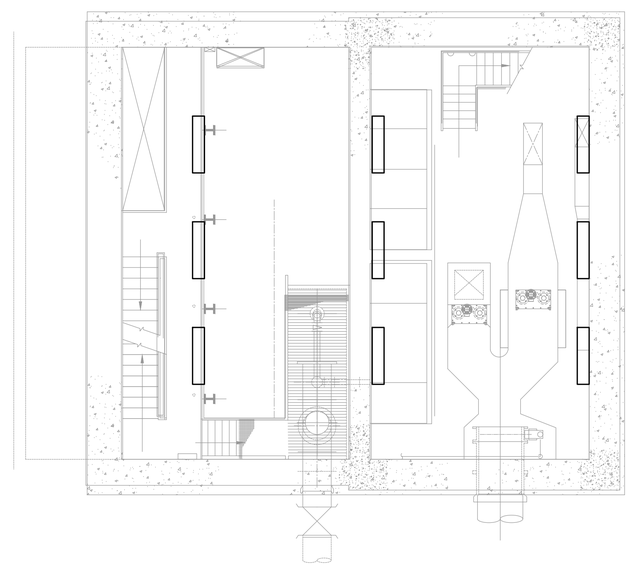
KEYED DEMOLITION NOTES:

1. FIXTURES AND SWITCHES LOCATED WITHIN THE WET WELL SHALL BE NEMA 7 EXPLOSION-PROOF, SUITABLE FOR CLASS 1 DIVISION 1 LOCATIONS.



BASEMENT FLOOR
SCALE: 3/16" = 1'-0"



INTERMEDIATE FLOOR
SCALE: 3/16" = 1'-0"

6' 4' 2' 0 4' 8'
BAR SCALE
3/16" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING

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ELECTRICAL LIGHTING PLAN

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 22 OF 24

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22x34 SHEET
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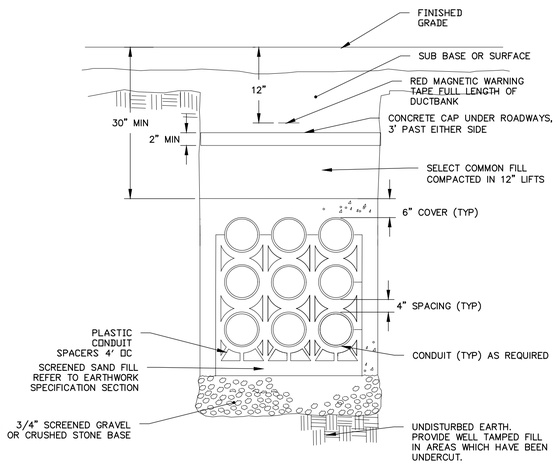
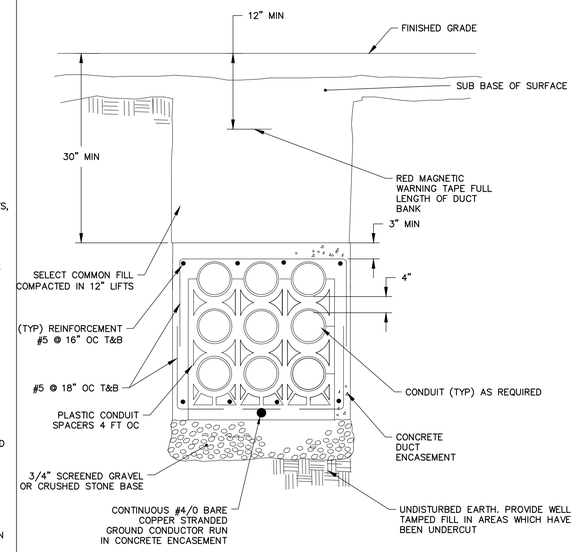


1 E05.02 TYPICAL SAND ENCASED/ CONCRETE CAPPED UNDERGROUND DUCT BANK DETAIL

SCALE: N.T.S.

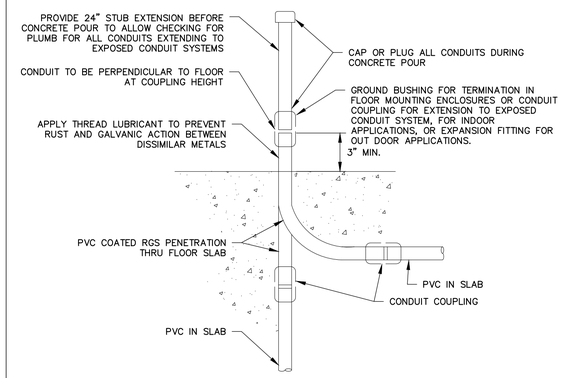


2 E05.02 TYPICAL REINFORCED CONCRETE ENCASED UNDERGROUND DUCT BANK DETAIL

SCALE: N.T.S.

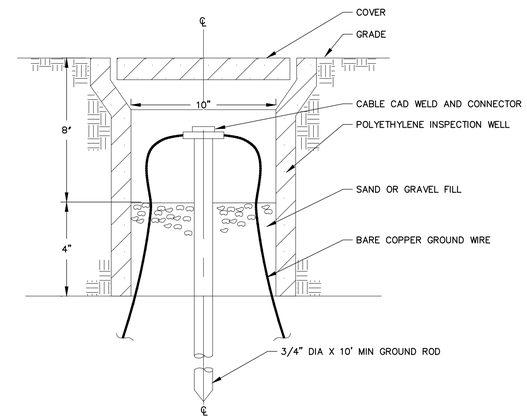
NOTES:

1. APPLICABLE IN ALL AREA UNLESS NOTED OTHERWISE



3 E05.02 CONDUIT STUB-UP/UNDERGROUND PENETRATION DETAIL

SCALE: N.T.S.

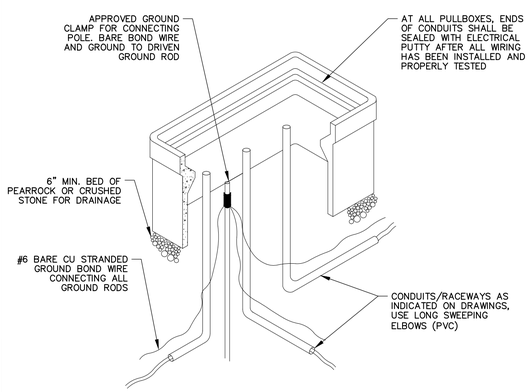


4 XX-XXX TYPICAL GROUND WELL DETAIL

SCALE: N.T.S.

GENERAL NOTES:

1. FINAL DIMENSIONS OF PULL BOXES SHALL BE AS VERIFIED IN THE FIELD AND SHALL BE IN ACCORDANCE WITH NEC.
2. PULLBOX COVERS SHALL BE CAST IRON. PROVIDE EXTENSION AS REQUIRED.
3. PULLBOXES SHALL BE PRECAST EQUAL TO: GEORGE ROBERTS, BROOKS, OR A.C. MILLER.
4. REFER TO SPECIFICATIONS FOR FURTHER REQUIREMENTS.



5 XX-XXX PULL BOX/HANDHOLE DETAIL

SCALE: N.T.S.

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ELECTRICAL DETAILS SHEET 1

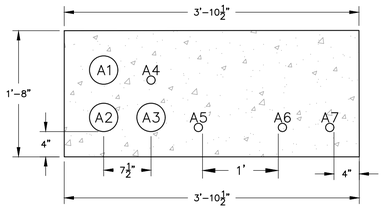
CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 23 OF 24

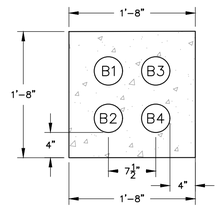
E80.01

\\woodardcurran.net\shared\Projects\023\265.00 Portland - Curtis and Franklin PS Des Bid\wip\Drawings\Franklin PS\Drawings\Electrical\E80.01.dwg, Oct 23, 2018 - 5:06pm



SECTION A E05.02

SCALE: N.T.S.



SECTION B E05.02

SCALE: N.T.S.

FRANKLIN PUMP STATION DUCTBANK SCHEDULE								
DUCTBANK	CONDUIT ID	SIZE	USE	FROM	TO	DUCT BANK TYPE	DESCRIPTION	NOTES
A	A1	4"	POWER	ATS	EMERGENCY GENERATOR	1	GENERATOR POWER	
	A2	4"	POWER	ATS	EMERGENCY GENERATOR		GENERATOR POWER	
	A3	4"	POWER	ATS	EMERGENCY GENERATOR		SPARE POWER	
	A4	1"	POWER	ATS	EMERGENCY GENERATOR		GENERATOR CP POWER	
	A5	1"	POWER	ATS	EMERGENCY GENERATOR		GENERATOR BLOCK HTR POWER	
	A6	1"	CONTROLS	ATS	EMERGENCY GENERATOR (CP)		GENERATOR CONTROLS	
	A7	1"	CONTROLS	ATS	EMERGENCY GENERATOR (CP)		SPARE CONTROLS	
B	B1	4"	POWER	UTILITY XFMR	MAIN BREAKER	2	PRIMARY ELECTRICAL SERVICE	
	B2	4"	POWER	UTILITY XFMR	MAIN BREAKER		PRIMARY ELECTRICAL SERVICE	
	B3	4"	POWER	UTILITY XFMR	MAIN BREAKER		PRIMARY ELECTRICAL SERVICE	
	B4	4"	POWER	UTILITY XFMR	MAIN BREAKER		PRIMARY ELECTRICAL SERVICE	

DUCTBANK SCHEDULE

60% GMP SUBMISSION-NOT FOR CONSTRUCTION

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
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REV	DESCRIPTION	DATE

DESIGNED BY: SEH
DRAWN BY: SAA
CHECKED BY: AJF
E80.02.dwg

ELECTRICAL DETAILS SHEET 2

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: OCTOBER 24, 2018
SCALE: AS NOTED
SHEET: 24 OF 24

E80.02

\\woodardcurran.net\shared\Projects\023\265.00 Portland - Curtis and Franklin PS Des Bid\wip\Drawings\Franklin PS\Drawings\Electrical\E80.02.dwg, Oct 23, 2018 - 5:06pm

22x34 SHEET
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CITY OF PORTLAND
PUBLIC WORKS DEPARTMENT

CONTRACT DRAWINGS

FRANKLIN ST. PUMP STATION
WET WELL STAIR REPLACEMENT

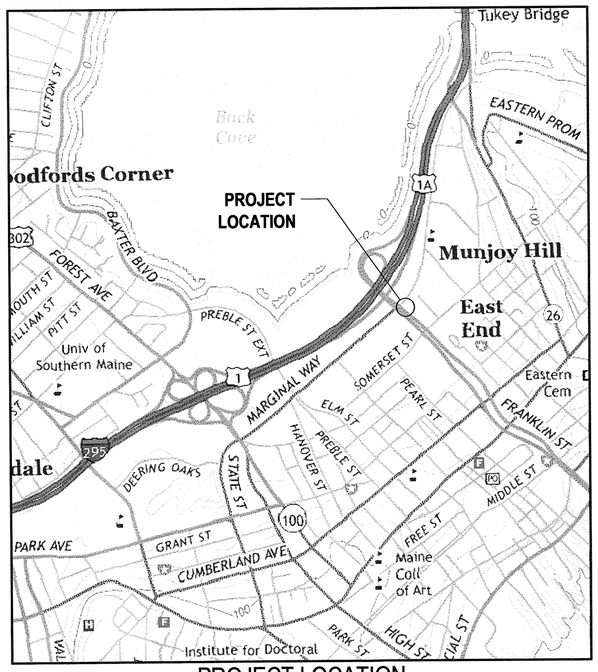
BID NO.: XXXX

CONSTRUCTION PLANS
MAY 2018

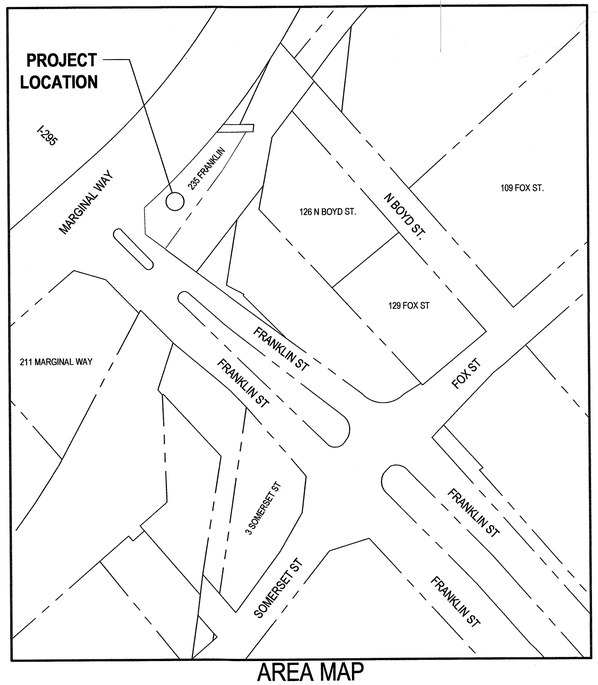
YEAR APPROVED
20XX

GERARD T. REMSEN III, P.E. DATE
PROJECT ENGINEER

KEITH GRAY, P.E. DATE
CITY ENGINEER



PROJECT LOCATION



AREA MAP

INDEX OF PLANS

SHEET NO.	SHEET TITLE
S-1	GENERAL NOTES
S-2	SITE OVERVIEW & PROPOSED STAIR PLAN
S-3	FRAMING PLAN
S-4	PLAN ELEVATIONS
S-5	SECTIONS & DETAILS

S:\WATER RESOURCES - ENGINEERING\PUMP STATIONS 2016\FRANKLIN PS STAIRS\2018\5005_FRANKLINST-PUMPSTATION_COVERSHEET.DWG COVERSHEET 5/29/2018

GENERAL NOTES

1. ALL BUILDING DIMENSIONS SHOWN ARE TAKEN FROM ORIGINAL CONSTRUCTION PLANS ENTILTIED "CITY OF PORTLAND, MAINE FRANKLIN STREET SEWAGE PUMPING STATION SHEETS A-2 SECTIONS AND DETAILS ARCHITECTURAL AND SHEET S-1 PLANS AND BEAM SCHEDULE AND C-1 GENERAL PLNS AND EXTERIOR PIPING AS PREPARED BY METCALF & EDDY ENGINEERS SIGNED FEBRUARY 17, 1964;

2. COMPLY WITH INTERNATIONAL BUILDING CODE (IBC), 2015 EDITION AND INTERNATIONAL EXISTING BUIDLING CODE (IEBC), 2015 EDITION AS ADOPTED BY MAINE AND ALL OTHER GOVERNING AGENCIES

3. THE CONTRACTOR SHALL DO THE FOLLOWING:
   A. VERIFY ALL EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO LOCATION OF EXISTING STRUCTURAL, ARCHITECTURAL, MECHCANICAL ELEMENTS AND DIMENSIONS OF EXISTING CONSTRUCTION, DIMENSIONS SHOWN ARE PER OBTAINED FROM ORIGNAL STRUCTURAL DRAWINGS OR FIELD MEASURED.

   B. LOCATION OF REINFORCING STEEL IS TO BE CONSIDERED AS PER ORIGINAL 1964 CONSTRUCTION PLANS LISTED ABOVE IN NOTE 1.

   C. SUBMIT TO THE ENGINEER OF RECORD FOR REVEW A WRITTEN REPORT INDICATING ACTUAL FIELD CONDITIONS WHICH MAY VARY FROM INFORMATION INDICATED ON THE DRAWINGS, ANY DISCREPANCES SHALL BE REPORTED TO THE ENGINEER OF RECORD BEFORE PROCEEDING.

   D. COORDINATE THE EXISTING STRUCTURE WITH NEW STRUCTURAL ELEMENTS PRIOR TO DEMOLITION, FABRICATION AND CONSTRUCTION

   E. PROVIDE TEMPORARY ACCESS SYSTEM FOR PUMP STATION OPERATING STAFF TO ACCESS ALL AREAS OF PUMP STATION IMPACTED BY CONSTRUCTION. THE NEED TO ACCESS ALL PARTS OF PUMP STATION SHALL BE CONSIDERED AS 24 HOURS A DAY WITHOUT CONTRACTOR'S ASSISTANCE TO USE ACCESS SYSTEM. ERCTION OF FALL PROTECTION EQUIPMENT TO USE ACCESS WILL NOT BE CONSIDERED A MEANS OF TEMPORARY ACCESS FOR OPERATING STAFF.

   F. REQUEST CLARIFICATIONS REGARDING DISCPRENANCIES FOUND IN THE CONSTRUCTION DOCUMENTS IN ANY CASE OF CONFLICT BETWEEN THE NOTES, DETAILS AND SPECIFICATIONS, THE MOST RIGID REQUIREMENTS SHALL GOVERN.

   G. HIRE A PROFESSIONAL ENGINEER REGISRED IN THE STATE OF MAINE FOR THE DESIGN OF ALL SHORING, BRACING, TEMPORARY ACCESS SYSEM, AND OTHER ELEMENTS USED TO SUPPORT THE STRUCTURE DURING CONSTRUCTION AND MAINTAIN OPERATION.

   H. FURNISH ALL LABOR, MATERIALS AND EQUIPMENT AS REQUIRED TO COMPLETE THE WORK

   I. SECURE AND PAY FOR PERMITS, GOVERNEMENT FEES, LICENSES AS REQUIRED BY AUTHORITIES HAVING JURISDICATION PIOR TO THE START OF WORK

4. SUBMIT TO ENGINEER TWO COPIES EACH OF MATERIALS SPECIFICATIONS, ERECTION AND DETAIL DRAWINGS ETC., OFF ALL STRUCTURAL MATERIALS AND CONNECTIONS SUFFICIENTLY IN ADVANCE OF CONSTRUCTION TO PERMIT ADEQUATE TIME FOR REVIEW.

5. THE OWNER AND ENGINEER ARE NOT RESPONSIBLE FOR ACCURACY OF THE EXISTING CONDITIONS INFORMATION. EXISTING CONSTRUCTION AT AREAS WHERE NEW WORK IS NOT CONTEMPLATED MAY NOT BE COMPLETELY SHOWN

6. PATCH AND REPAIR EXISTING CONDITIONS DAMAGED DURING THE COURSE OF DEMOLITION AND CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.

7. CONTRACTOR TO MAKE ANY INSPECTIONS OR PREFORM ANY ANALYSES NECESSARY TO VERIFY THAT EXISTING BUILDING ELEMENTS HAVE ADEQUATE LOAD CAPACITY TO SUPPORT ANY REQUIRED FORCES (RIGGING, SHORING, STORAGE, LADDERS ETC.) TO BE IMPOSED UPON THEM.

8. TEMPORARY BRACING SHORING SHALL BE PROVIDED WHEREVER REQUIRED TO SUPPORT LOADS MAY BE IMPOSED UPON THE EXISTING STRUCTURE DURING CONSTRUCTION. PROVIDE TEMPORARY SHORING WHEREVER REQUIRED DUE TO CONSTRUCTION SEQUENCING FOR THE SUPPORT OF THE STRUCTURE PRIOR TO INSTALLATION OF THE NEW STAIRS AND PLATFORM. SUCH BRACING OR SHORING SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL REMAIN IN PLACE AS LONG AS REQUIRED TO MAINTAIN SAFETY AND PUMP STATION OPERATION.

9. THE CONTRACTOR IS TO IMPLEMENT CONSTRUCTION MEANS AND METHODS THAT WILL NOT DAMAGE THE EXISTING STRUCTURE TO REMAIN. REPAIR ANY EXISTING CONDITIONS DAMAGED DURING THE COURSE OF DEMOLITION AND CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.

STAIRS, LADDER & RAILING NOTES

1. ALL LADDERS, RAILINGS AND MISCELLANEOUS STEEL SHALL BE DESIGNED AND DETAILED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MAINE HIRED BY THE CONTRACTOR.

2. THE LADDER/RAILING FABRICATOR/CONTRACTOR SHALL DESIGN AND PROVIDE ALL LADDER AND RAILING CONNECTIONS TO THE EXISTING CONSTRUCTION AND TO THE NEW STAIRS AND PLATFORM STEEL SUPPLIED BY THE STRUCTURAL STEEL CONTRACTOR.

3. THE LADDER/RAILING FABRICATOR/CONTRACTOR SHALL SUBMIT TO THE ENGINEER OF RECORD, FOR REVIEW, ENGINEERED AND CHECKED DRAWINGS SHOWING SHOP FABRICATION DETAILS, FIELD ASSEMBLY DETAILS, ERECTION DIAGRAMS AND CALCULATIONS. ALL LADDER STAIR AND RAILING STEEL SHOP DRAWINGS AND DESIGN CALCULATIONS SHALL BEAR THE SEAL AND SIGNATURE OF THE CONTRACTOR'S ENGINEER.

4. FOR COMPLETE LADDER, STAIR AND RAILING LAYOUT AND DETAILS COORDINATE THE INFORMATION SHOWN ON THE STRUCTURAL DRAWINGS WITH THE EXISTING CONSTRUCTION. VERIFY ALL EXISTING CONDITIONS AS REQUIRED.

5. LADDER AND STAIR STEEL SHALL BE PRIMED, COLOR OF PAINT TO BE SAFETY YELLOW

6. RAILING STEEL AT PLATFORM, STAIRS AND FLOORS SHALL BE PRIMED, COLOR OF PAINT MATCH PAINT COLOR SAFETY YELLOW

STRUCTURAL DESIGN CRITERIA

1. CODES AND STANDARDS
   A. "INTERNATIONAL BUILDING CODE 2015 EDITION, AS ADOPTED BY THE STATE OF MAINE"
   B. SPECIFICATION FOR STRUTURAL STEEL BUILDINGS, 2010, AMERICAN INSTITUTE OF STEEL CONSTRUCTION

2. DESIGN LOADS:
   A. PLATFORM — 60 PSF
   B. STAIRS — POINT LOAD OF 300 LBS; DISTRUBTED LOAD 60LBS/SF

APPROVED MANUFACTURERS

1. ALTERNATING TREAD STAIRS
   A. VESTIL MANUFACTURING
   B. LAPEYRE STAIR
2. GRATING
   A. MCNICHOLS GCM-1-150
3. ADHESIVE ANCHORS
   A. HILTI HIT HY 200
   B. KELLY

STRUCTURAL STEEL NOTES

1. ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" AND AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", LATEST EDITIONS.

2. ALL BOLTING SHALL CONFORM TO RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS "SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A 490 BOLTS", OR LATEST EDITIONS.

3. ALL WELDING SHALL CONFORM TO THE AWS CODE D1.1 "STRUCTURAL WELDING CODE – STEEL", LATEST EDITIONS

4. THE FABRICATOR/ERECTOR SHALL SUBMIT TO THE ENGINEER OF RECORD FOR REVIEW, ENGINEERED AND CHECKED DRAWINGS SHOWING SHOP FABRICATION DETAILS AND ERECTION DIAGRAMS FOR ALL STRUCTURAL STEEL ERECTION DRAWINGS AND JOB STANDARDS DESCRIBING TYPICAL CONNECTIONS DETAILS AND CAPACITIES SHALL BE SUBMITTED AND APPROVED PRIOR TO THE START OF PIECE DETAILING.

5. UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS ALL CONNECTIONS SHALL BE DESIGNED AND DETAILED PER ASD (ALLOWABLE STRESS DESIGN) BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MAINE, HIRED BY THE FABRICATOR, CALCULATIONS SHALL BEAR THE SEAL AND SIGNATURE OF THIS ENGINEER, DETAILING SHALL BE PERFORMED USING RATIONAL ENGINEERING DESIGN AND STANDARD PRACTICES, PREFORMED IN ACCORDANCE WITH CONTRACT DOCUMENTS. THE CONCEPTUAL DETAILS SHOWN ON DRAWINGS DO NOT INDICATE THE REQUIRED NUMBER OF BOLTS OR WELD SIZES UNLESS SPECIFICALLY NOTED.

6. ALL STRUCTURAL STEEL SHALL COMPLY WITH THE FOLLOWING UNLESS OTHERWISE NOTED:

WIDE FLANGES	ASTM A992 GR 50
SQUARE OR ROUND TUBE	ASTM A500-GR B, FY=46 KSI
PIPE	ASTM A53, FY=35 KSI
ANGLE, PLATE, CHANNEL	ASTM A36
STAINLESS STEEL	ANSI 304 OR ANSI 316
ANCHOR BOLTS/RODS	ASTM F1554
HIGH STRENGTH BOLTS	ASTM A325 OR A490 (MIN ¾" DIA. UNO)
HARDENED WASHERS	ASTM F436
DTI WASHERS	ASTM F959
STEEL SHIMS	ASTM A36
ALUMINUM SHAPES	ASTM B 221, B 429 6063-T6
ALUMINUM GRATING	6063-T6
ALUMINUM HANDRAILS	ASTM B 221, B 429 6063-T6

7. THE FOLLOWING CONNECTIONS SHALL USE SLIP-CRITICAL BOLTS
   BEAM TO BEAM MOMENT CONNECTIONS
   BOLTED BRACE CONNECTIONS
   ALL OTHER CONNECTION SHALL BE SIMPLE SHEAR CONNECTIONS UTILIZING FULLY PRETENSIONED HIGH STRENGTH BOLTS IN BEARING-TYPE CONNECTIONS WITH THREADS INCLUDED IN THE SHEAR PLANE, UNLESS NOTED OTHERWISE.

8. ALL BOLTS IN SLIP CRITICAL CONNECTIONS SHALL UTILIZE DIRECT TENSION INDICATOR WASHER AND HARDENED WASHERS, DIRECT TENSION INDICATOR WASHERS SHALL COMPLY W/ASTM F959 AND BE AS MANUFACTURED BY TURNS SURE LLC INSTALL PER RCSC AND MANUFACTURER'S RECOMMENDATIONS.

9. FOR PRETENSIONED AND SLIP CRITICAL JOINTS, PREFORM PRE-INSTALLATION VERIFICATION WITH TENSION CALIBRATOR (SKIMORE-WILHELM) AS REQUIRED BY RCSC SECTION 7.

10. MINIMUM SHEAR CONNECTION CAPACITIES SHALL BE AS SHOWN BELOW, UNLESS NOTED OTHERWISE. THE MINIMUM NUMBER OF BOLTS PER CONNECTION SHALL BE TWO (2).
    MINIMUM SHEAR CAPACITIES (SERVICE LOADS)

W4	6 KIPS	W8	10 KIPS
W5	6 KIPS	W10	10 KIPS
W6	6 KIPS	W12	10 KIPS

    DESIGN CHANNEL AND TUBE MEMBERS FOR THE SAME LOAD AS THE SAME DEPTH OF W SHAPE, BEAM REACTIONS EXCEEDING THE ABOVE MINIMUM SHEAR CAPACITIES ARE NOTED ON THE DRAWINGS AND BOXED THIS [--K) AT EACH END OF THE BEAM DESIGN CONNECTIONS FOR AXIAL FORCES ARE DENOTED (--A), CONNECTION FORCES GIVEN ON PLAN ARE UNFACTORED AND IN KIPS THE CONNECTION PATTERN SHALL ENGAGE AT LEAST ½ DEPTH OF THE BEAM.

11. MOMENT CONNECTIONS SHALL DEVELOP THE FULL BENDING CAPACITY OF THE BEAM = 0.66*FY*SX AND SHALL HAVE A SHEAR CAPACITY OF (0.66*FY*SX)*2/BEAM LENGTH PLUS THE SHEAR CAPACITY REQUIRED PER STEEL NOTE #10 UNLESS OTHERWISE NOTED

    ALL BRACE CONNECTIONS SHALL DEVELOP THE FULL TENSION CAPACITY OF THE MEMBER=0.66*FY*A UNO.

12. ALL WELDING SHALL BE PERFORMED BY LICENSED AND CERTIFIED WELDERS.

13. ALL WELDING TO COMPLY WITH OWNER RULES AND REGULATIONS, INCLUDING WELDING AND CUTTING FIRE WATCH POLICIES

14. MINIMUM FILLET WELD SIZE SHALL COMPLY WITH AISC BUT SHALL NOT BE LESS THAN ¼ INCH UNLESS NOTED OTHERWISE.

15. WELDING ELECTRODES SHALL BE E70XX LOW HYDROGEN SHOP WELDING ELECTRODES SHALL BE E70XX LOW HYDROGEN OR E70T-9 GRADE D. ALL FILLER METALS SHALL HAVE A MINIMUM CHARPY V-NOTCH (CW) TOUGHNESS OF 20 FT.-LBS. AT MINUS 20° F.

16. SHOP AND FIELD TESTING OF WELDS AND BOTS SHALL BE AS FOLLOWS:
    A. ALL WELDS SHALL BE VISUALLY INSPECTED 15% AT RANDOM SHALL BE MEASURED
    B. FILLET WELDS FOR BEAMS AND GIRDER SHEAR CONNECTIONS PLATES (15% AT RANDOM) SHALL BE CHECKED BY MAGNETIC PARTICLE FOR FINAL PASS ONLY.
    C. ULTRASONICALLY TEST 100% OF ALL FULL PENETRATION WELDS
    D. CHECK ALL PRETENSIONED BOLTS BY EITHER THE T/C METHOD OR CALIBRATED TORQUE WRENCH, IN EACH SHEAR CONNECTION, CHECK 100% OF BOLTS WHEN USING T/C METHOD AND 25% OF BOLTS WITH OTHER METHOD OF EACH SHEAR CONNECTIONS, BUT NOT LESS THAN 2 BOLTS PER CONNECTION.
    E. CHECK ALL SLIP CRITICAL BOLTS WITH THE "DIRECT TENSION INDICATOR" METHOD. ALL BOLTS SHALL BE VISUALLY INSPECTED MEASURE WITH FEELER GAGES. AT LEAST 15 % OF BOLTS IN EACH CONNECTION, BUT NOT LESS THAN TWO BOLTS PER CONNECTION.
    F. THE OWNER'S SPECIAL INSPECTOR OR TESTING AGENCY SHALL PREFORM ALL SHOP AND FIELD INSPECTION AND TESTING AS OUTLINED ABOVE.

17. FABRICATE SIMPLY SUPPORTED BEAMS WITH NATURAL CHAMBER UP, FABRICATE CANTILEVER BEAMS WITH NATURAL CAMBER DOWN, UNLESS OTHERWISE NOTED

18. GAS OR ARC CUTTING OF NEW OR EXISTING SECTIONS IS NOT ALLOWED, GAS OR ARC CUTTING TO ENLARGE EXISTING OR NEW BOLT HOLES IS NOT ALLOWED, GAS OR ARC CUTTING TO CREATE NEW HOLES IN EXISTING OR NEW STEEL IS NOT ALLOWED.

19. FIELD FABRICATION BEAM SPLICES AND FIELD CUTTING OF STRUCTURAL STEEL MEMBERS ARE NOT ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER OF RECORD

20. ALL NEW HOLES IN EXISTING AND NEW STEEL SHALL BE DRILLED

21. ALL STEEL EXPOSED TO WEATHER OR AS INDICATED SHALL BE HOT DIPPED GALVANIZED PER ASTM A123, 2 OZ. PER SQ. FOOT MINIMUM DEPOSITION INCLUDING PLATFORM STEEL.

SPECIAL INSPECTION NOTES

1. THE FOLLOWING MATERIALS AND METHODS OF CONSTRUCTION SHALL BE SUBJECT TO "SPECIAL INSPECTION" IN ACCORDANCE WITH CHAPTER 17 OF THE "INTERNATIONAL BUILDING CODE, 2015 EDITION" AS ADOPTED BY THE STATE OF MAINE
   A. STRUCTURAL STEEL (1702.5)

2. A SPECIAL INSPECTOR HIRED BY THE OWNER SHALL SUPERVISE THE TESTING AND INSPECTION OF THE ABOVE ITEMS.
3. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE INSPECTOR FOR ALL ITEMS REQUIRING INSPECTION A MINIMUM OF 72 HOURS PRIOR TO COMMENCEMENT OF THAT PORTION OF WORK. FOR ON-GOING INSPECTIONS, THE CONTRACTOR SHALL PROVIDE 24 HOURS-NOTICE ADVANCE NOTICE BEFORE INSPECTION

4. THE CONTRACTOR SHALL PROVIDE SAFE ACCESS AND MEANS TO ALLOW THE ABOVE TESTING AND OR INSPECTION REQUIREMENTS TO BE COMPLETED IN A MANNER CONSISTENT WITH APPLICABLE OSHA, STATE AND LOCAL REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE SCAFFOLDING, PERSONNEL HOISTS OR ANY OTHER EQUIPMENT NECESSARY TO ACCESS AREAS SUBJECT TO INSPECTIONS.

5. INSPECTION DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO PROVIDE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND PROVIDE CONTRACTORS INDEPENDENT QUALITY CONTROL. THE INSPECTOR IS NOT RESPONSIBLE FOR "QUALITY CONTROL" SERVICES FOR THE CONTRACTOR.

6. CONTRACTOR SHALL ENGAGE TESTING FIRM TO INSTALL TWO DRILL ADHESIVE ANCHORS IN COCNCRETE AT PUMP STATION AND CONDUCT PULL OUT TEST TO ENSURE ADEQUATE STRENGTH. TEST SHALL BE AS PER ASTM E488 "STANDARD TEST METHODS FOR STRENGTH OF ANCHORS IN CONCRETE".

SAFETY DURING EXCUTION OF WORK

1. THE CONRTACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CONDITIONS OF PUBLIC AND WORKER SAFETY DURING EXEUCTION OF THE WORK.

2. THE CONTRACTOR SHALL PROVIDE ALLPROTECTION OF EXISTING CONSTRUCTION AND WATERWAY AS REQUIRED.

3. THE CONTRACTOR SHALL BE RESPONSBILE FOR PRPEPARING AND FILING A SITE SAFETY PLAN AND/OR PROVIDING OTHER WRITTEN ASSURANCES OF SAFE OPERATIONS AS MAY BE NECESSARY OR AS REQUIRED BY OWNER.

4. THE CONTRACTOR SHLL BE RESPONSIBLE FOR PROVIDING A SAFE WORKING ENVIRONMENT FOR ALL WORKERS. THIS SHALL INCLUDE COMPLAINCE WITH ALL OSHA, STATE AND LOCAL LABOR LAWS WHICH MAY GOVERN THIS TYPE OF WORK

5. THE CONTRACTOR SHALL PROVIDE REGULAR PERODIIC INSPECTION OF CONSTRUCTION OPERATIONS AS REQUIRED ONGOING MAINTENANCE OF ALL SAFETY OPERATIONS AND EQUIPMENT, such INPSECTIONS SHALL BE UNDETAKEN BY AN AGENT OF THE CONTRACTOR.

REV	SUBMISSION	DATE

PROJECT NAME:
FRANKLIN STREET
PUMP STATION
STAIR REPLACEMENT

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
WATER RESOURCE DIVISION
55 PORTLAND STREET, PORTLAND, ME 04101
PHONE (207) 874-8846 FAX (207) 874-8852

DESIGN BY: GTR3
DRAWN BY: GTR3
CHECKED BY: XXX
SHEET NAME: GENERAL NOTES
DATE: MAY 2018
PAGE 1 OF 5
SHEET NO.: S-1
REV.:
VAULT #:

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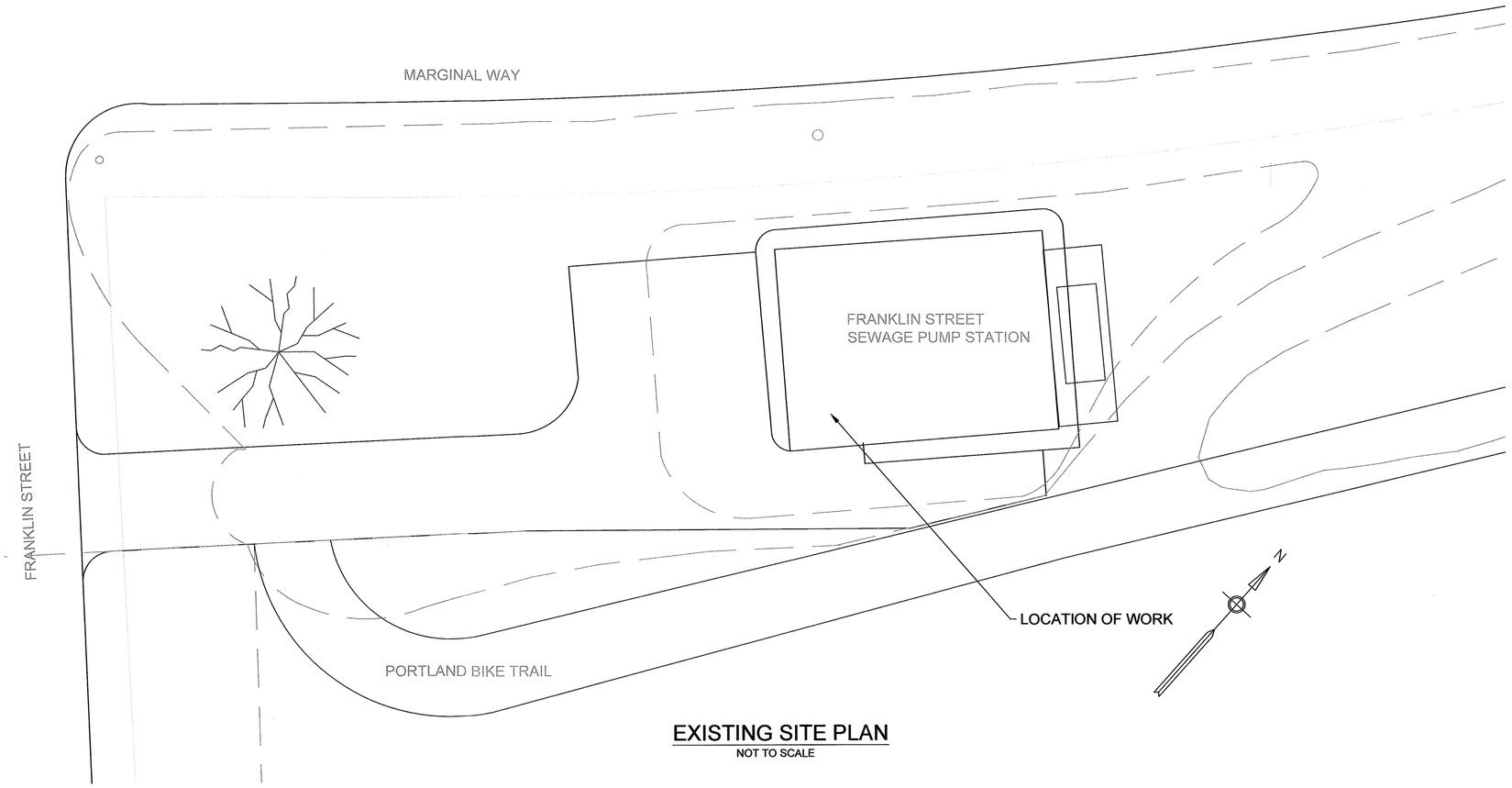

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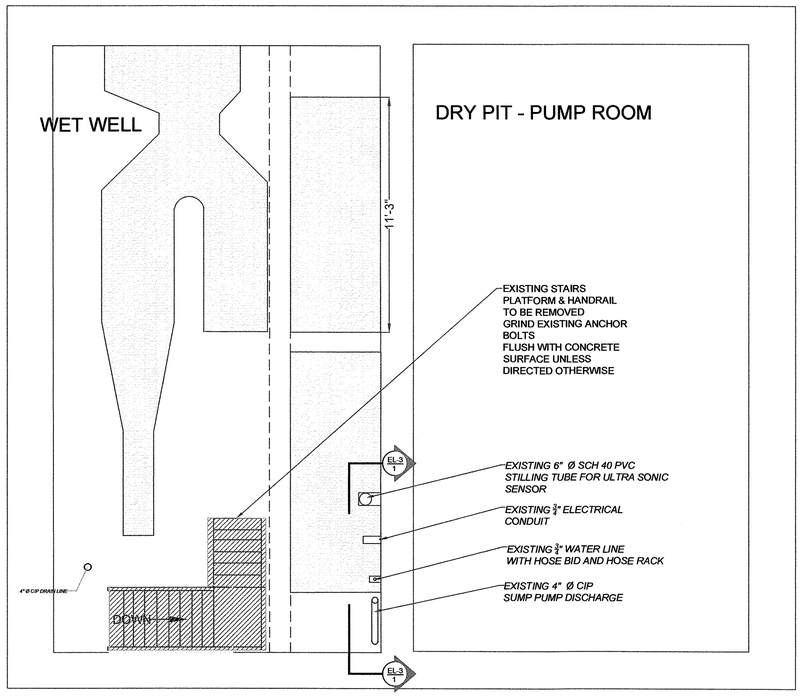

EXISTING CONDITIONS & DEMOLITION PLAN
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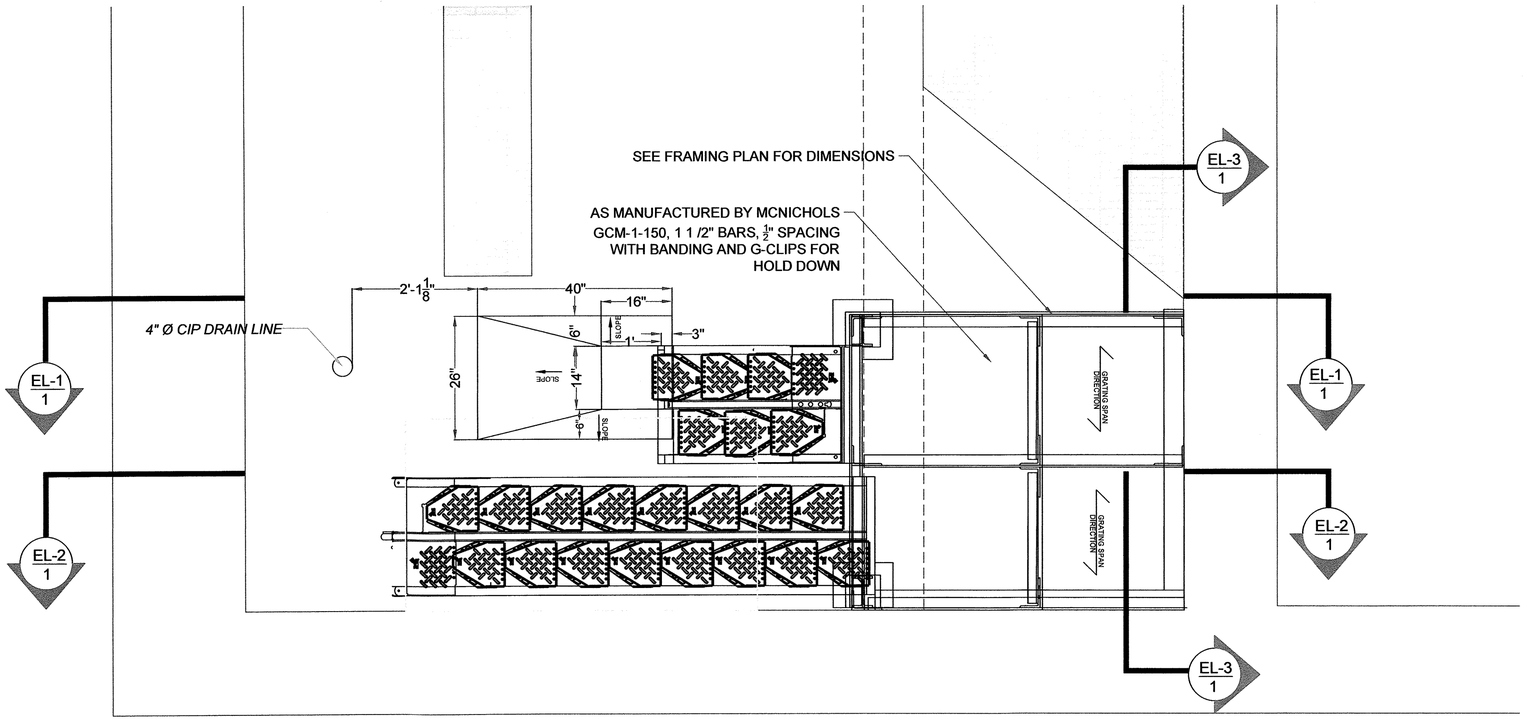

ENLARGED PROPOSED STAIR PLAN
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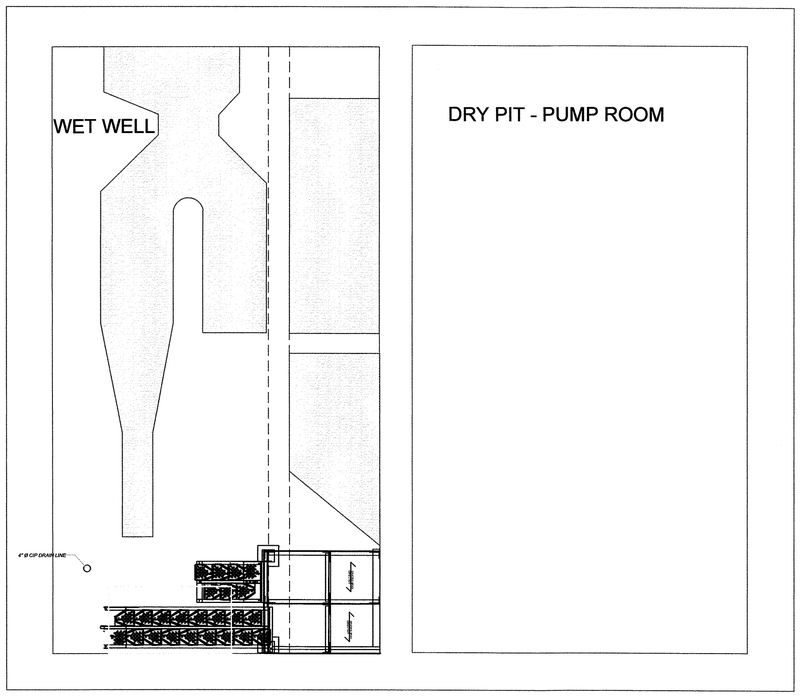

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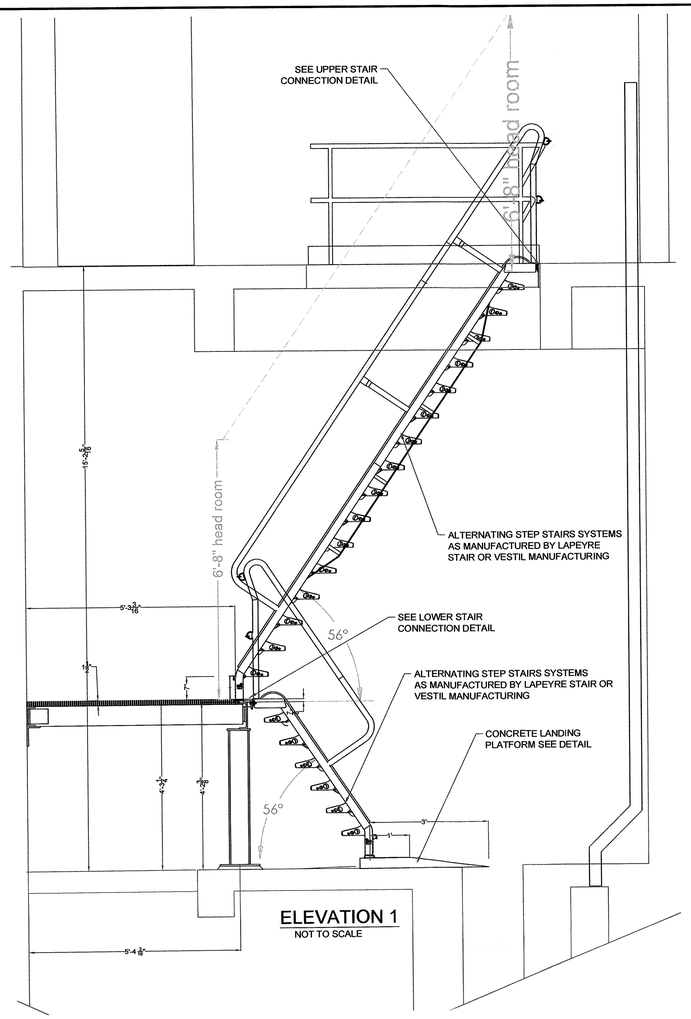

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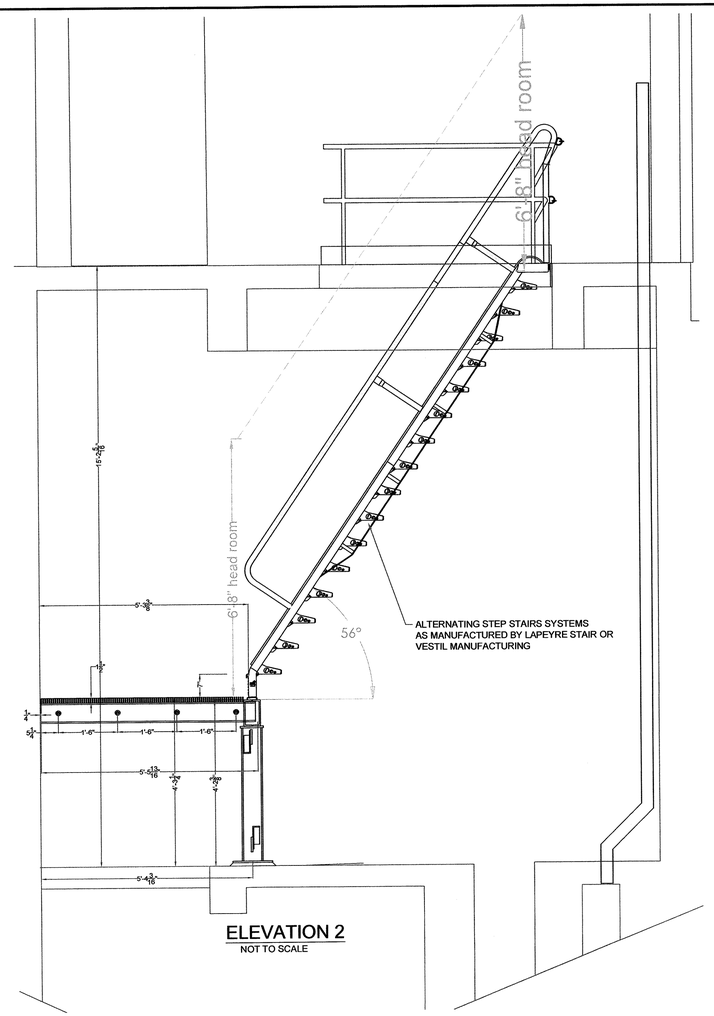

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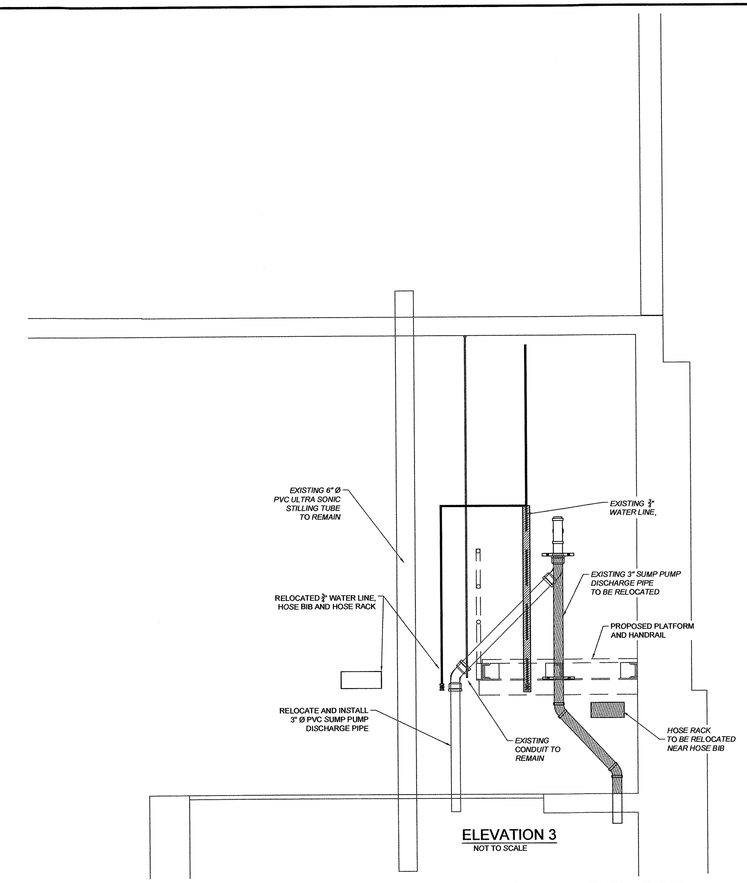
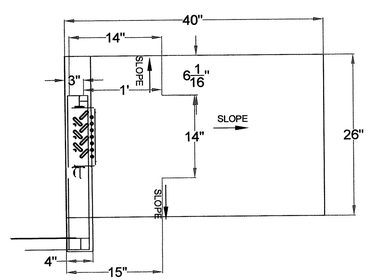
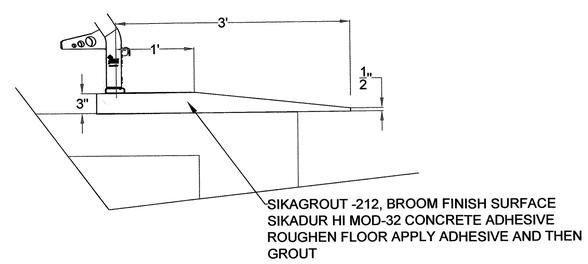


ELEVATION 3
NOT TO SCALE

PIPING RELOCATION PLAN/ELEVATION





STAIR LANDING PAD DETAIL
NO TO SCALE

REV	SUBMISSION	DATE

PROJECT NAME:
FRANKLIN STREET
PUMP STATION
STAIR REPLACEMENT

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
WATER RESOURCE DIVISION
55 ROBERTS STREET, P.O. BOX 3553
PORTLAND, MAINE 04104-3553
PHONE (207) 874-8808 FAX (207) 874-8852

DESIGN BY: GTR3
DRAWN BY: GTR3
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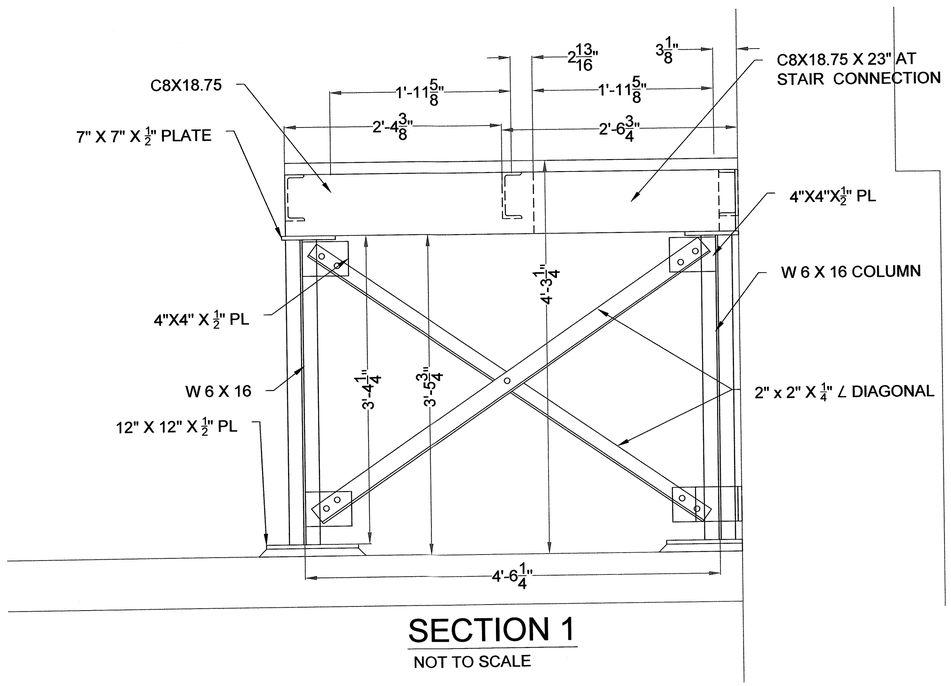

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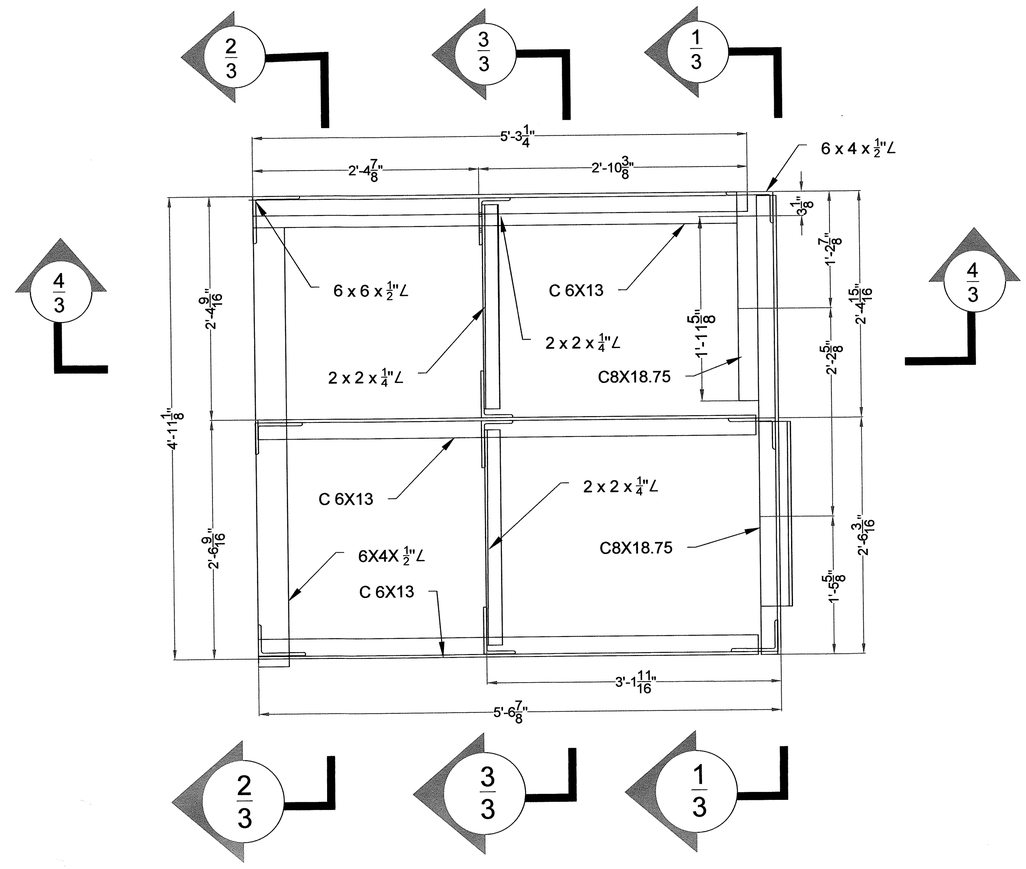

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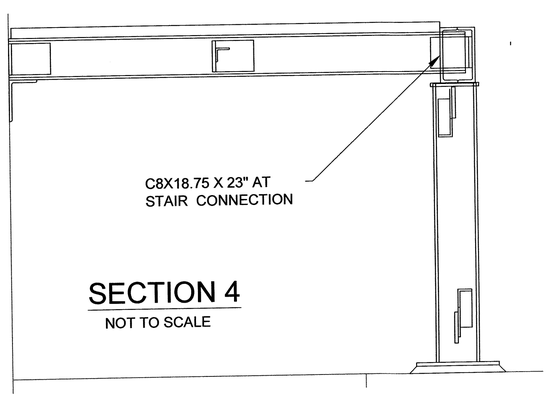

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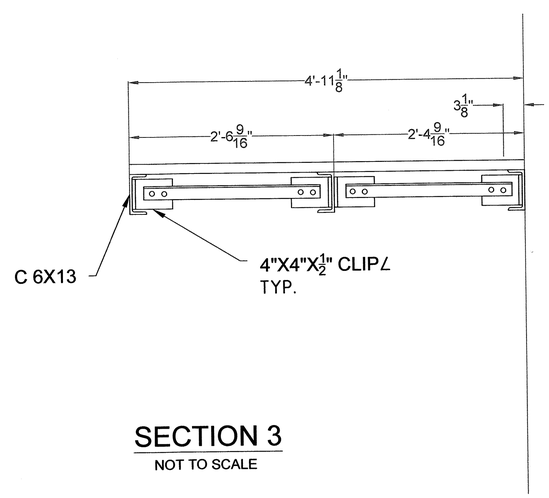

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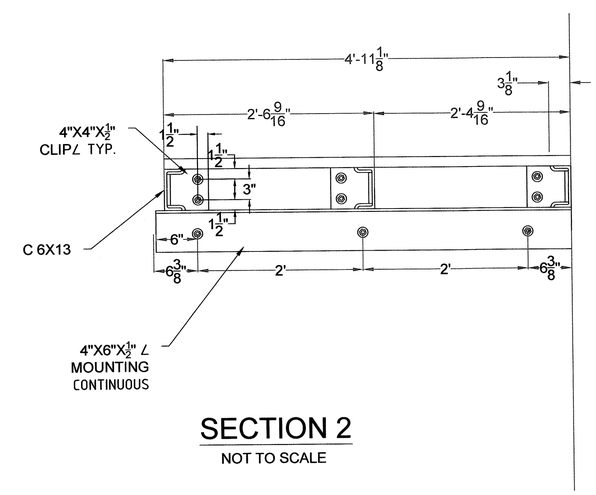

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REV	SUBMISSION	DATE

PROJECT NAME:

FRANKLIN STREET
PUMP STATION
STAIR REPLACEMENT

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
WATER RESOURCES DIVISION
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DATE:	MAY 2018
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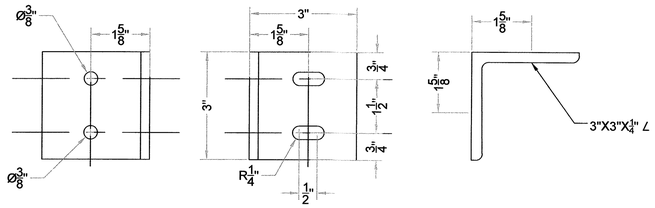

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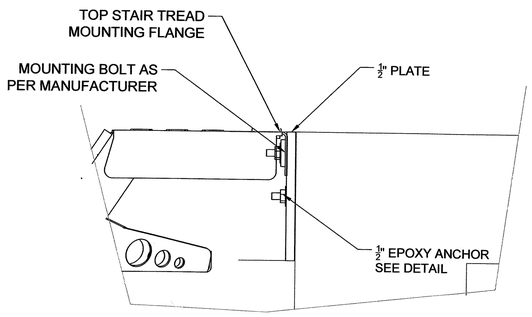

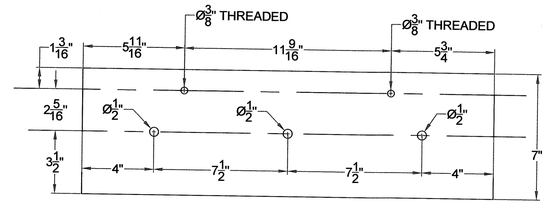

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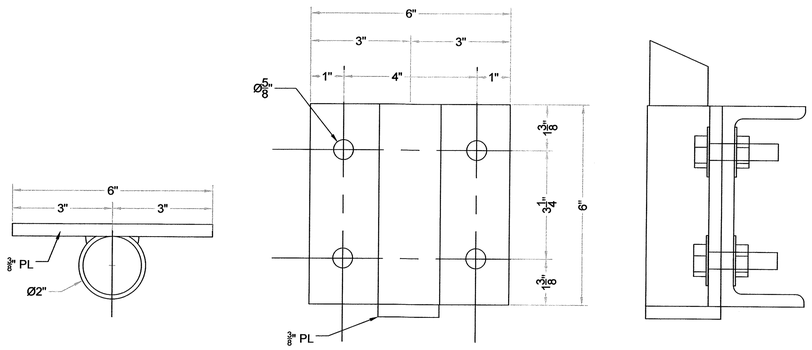

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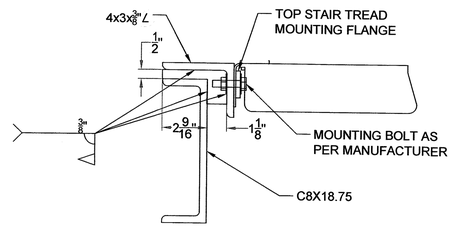

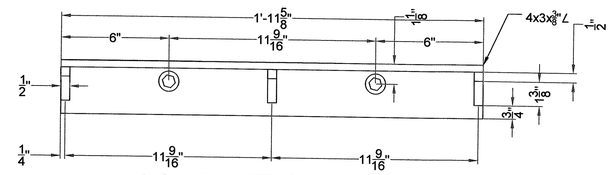

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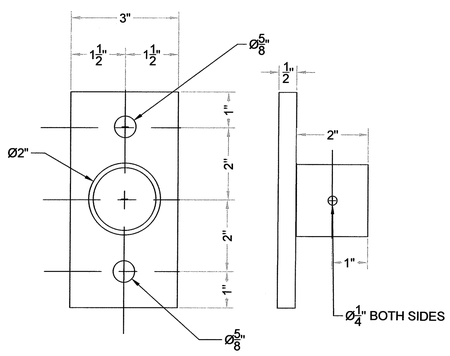

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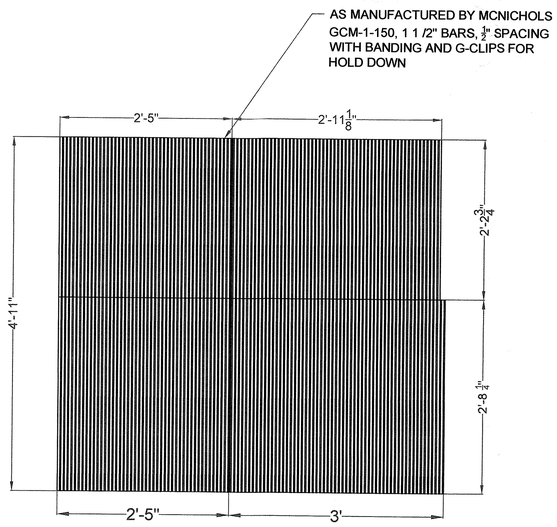

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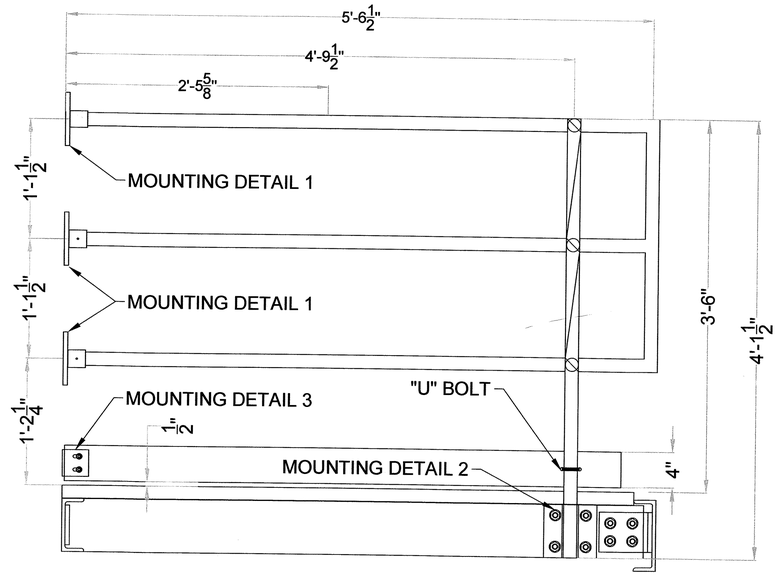

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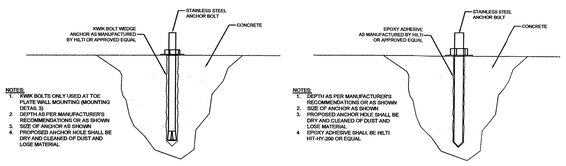

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REV	SUBMISSION	DATE

PROJECT NAME: FRANKLIN STREET PUMP STATION STAIR REPLACEMENT

CITY OF PORTLAND, MAINE
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WATER RESOURCE DIVISION
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DATE:	MAY 2018
	PAGE 5 OF 5
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REV.:	
VAULT #:	

DESIGN BASIS MEMO

City of Portland, ME
Franklin Street
Pump Station Upgrade

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Portland, Maine 04102
800.426.4262

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

231265
City of Portland
September 2018

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1. INTRODUCTION

1.1 Background

The City of Portland Department of Public Works (DPW) owns and operates the Franklin Street Pump Station, a dry pit submersible custom-built pump station which serves the residential and commercial users in and around the Bayside Area of the City. In 2013 Woodard & Curran was retained to complete a Capacity Management, Operations & Maintenance (CMOM) evaluation of the City of Portland's wastewater infrastructure. As part of this report the Franklin St. Pump Station was evaluated. The report determined that some of the station components are at risk of failure and need to be addressed including process equipment, electrical systems, and building envelope.

The original contract drawings for the station indicate it was constructed in the early 1960's. Some upgrades have been done to the pumping equipment since it was constructed including replacing the original extended shaft pumps with dry pit submersible style pumps. Pumps #1 and #2 were replaced approximately 10 years ago and Pump #3 was recently replaced in the last few years. Wastewater from the pump station discharges into a 24-inch diameter force main in Marginal Way that discharges into gravity sewer just upstream of the Portland Water District's Main pump station located at the East End Wastewater Treatment Facility.

The City has contracted with Woodard & Curran to upgrade various electrical, process, architectural and structural components throughout the station. The original scope of the project was to replace the existing motor control center (MCC) as well as improve the cooling/seal water system for the wastewater pumps. During the April 24th, 2018 and July 24th, 2018 site visits, and with changes to the City's combined sewer overflow (CSO) abatement approach that would keep the pump station in place for an extended period, operations staff indicated additional items they would like included in the upgrade. Subsequently, the City decided to include many of the additional scope items into the upgrade of the Franklin St. Pump Station. All items currently included in the project have been included in this report and costs have been developed for planning purposes.

1.2 Purpose of Report

This Design Basis Memo is intended to service the following purposes:

- Describe existing conditions at the Franklin Street Pump Station,
- Establish the design criteria for the upgrades of the pump station,
- Provide a summary of the recommended improvements and obtain consensus from all stakeholders as to the final scope of the upgrade, and
- Provide an updated construction cost estimate and schedule.

2. EXISTING CONDITIONS

2.1 Configuration

The Franklin Street pump station is in the center of Portland's Bayside community located at the intersection of Franklin Street and Marginal Way. The visible portion of the one-story building is approximately 30'X40' and has a brick façade structure. The building's foundation extends underground three stories to the base of the Wetwell and Drywell.

Figure 2-1 Franklin Street Pump Station

A single 36" cast iron gravity sewer pipe enters the Wetwell influent channel from Marginal Way on the Northwest side of the building. The flow goes through a JWC Muffin Monster channel grinder before entering the Wetwell #1. The channel to Wetwell #2 originally was equipped with a mechanical screen, however this equipment has been removed. Currently, this second channel is not operational and is blocked by a piece of plywood. The station contains two wetwells hydraulically connected by a 24"X24" sluice gate. The Wetwell is accessed through a separate outside door from the Drywell and control room. Fixed stairs allow operators to enter the Wetwell to the level of the influent channel for maintenance activities and observation of the Wetwell levels.

The building's control room is located at Franklin Street (ground) level and above the drywell. The control room houses the MCC and all other electrical and controls equipment. The station's HVAC system is also located in the control room of the station. The HVAC equipment is original to the station. The dry pit is accessed via a concrete staircase in the control room. The station's three pumps sit at the lowest level in the Drywell. All three of the station's original pumps

have been replaced with Pentair (Fairbanks Morse) dry pit submersible pumps and run quietly with minimal vibration. The City has indicated that the pumps run well and are able to keep up with the flows seen by the station during normal operations. Each of the pump's suction pipes contain individual pump isolation valves. These 18-inch plug valves are original, are in poor condition, and are considered to be the weak point in the suction piping system (See Figure 2-2). Operations staff have indicated the valves were not exercised for many years but are exercised regularly now.

Figure 2-2 Suction Piping Isolation Valves

The pump discharge lines contain individual 14-inch pneumatically actuated isolation knife gate valves and check valves that are were installed during a recent upgrade. Operations staff indicate these valves in good condition. The

three pump discharges come together to form a 24-inch header that leads to the station's 24-inch force main. A 24-inch plug valve allows for emergency bypass operations by isolating the discharge header. A bypass connection can be achieved through an 8-inch stub onto the discharge pipe inside the Drywell.

The three pumps are sealed by water jackets fed from the station's cooling water system. Operations staff constructed a custom cooling water recirculation system that consists of an approximately 200-gallon plastic tank on the intermediate level of the dry pit, a circulator pump and piping going to and from each pump. The booster pump is a small Dayton transfer pump that runs continuously to keep cool water circulating though the pump jackets, as the water continues to cycle through the system it increases in temperature. Additional details of the pump can be found in Table 2-1 below. The booster pump was recently replaced and appears to be in good working condition. Operations staff have indicated that the water can get hot enough that steam rises from the surface in the holding tank. To keep the water fresh, and at an appropriate temperature to cool the pumps, operations staff must manually drain a portion of the tank periodically and refill it with service (non-potable city) water. The drain for the tank is piped to the sump pit in the dry pit that is then pumped out by the sump pump and into the Wetwell. The existing service water distribution system is copper, including the service entrance within the Franklin Street pump station, and is corroded and at risk of failure.

Table 2-1: Cooling Water Booster Pump and Motor Data

Item	Pump
Pump Manufacturer	Dayton
Model / Serial #	4YKP7
Motor Horsepower	0.75
Motor Speed (RPM)	1,745
Electrical Data (Phase/Cycle/Volts)	1/60/230
Duty	Continuous

2.2 Existing Force Main

Operations staff have indicated that the existing 24-inch force main has had no recent problems. The force main inside the pump station appears to be in adequate condition and is sized appropriately for the flows the station sees.

2.3 Structural Condition Assessment

On July 24th, 2018, Woodard & Curran visited the pump station to assess the condition of the existing structure and other building systems. This inspection included a visual inspection as well as a hammer inspection to scrape and sound-test the concrete to check for general hardness and identify areas of hollow or unsound concrete. A comprehensive report detailing the findings is included as an appendix to this report. The major findings are summarized below.

The existing roofing membrane was found to be in poor condition with major ponding. The existing roof is not sloped to the roof drains, resulting in ponding of water on the roof.

The pump station includes several personnel doors and an overhead roll-up door. These doors show signs of corrosion, and the caulking/sealing around the doors is in poor condition.

The concrete walls inside the pump station were found to be in generally good condition. The paint covering the walls is chipping and flaking, and there are isolated portions of the concrete which exhibit shrinkage cracks and/or rough/pitted concrete.

The monorail beam concrete support has a major crack at the bolted connection for the hanger clip, which likely compromises the load-carrying capacity of the monorail. **The monorail should not be used until this is addressed.** Similarly, there are several lifting hooks located throughout the station which are not posted with a live load rating. **These hooks should not be used until the load capacity of the hooks is determined.**

The wetwell contains a light-duty fiberglass (FRP) grating over existing wastewater channels and penetrations to the pump wetwell below. Several deficiencies were noted in this grating. The original aluminum grating at the station was 1-1/2" thick, however the FRP grating is only 1" thick, creating a tripping hazard. Several holes have been cut into the grating with no reinforcement, which compromises the structural integrity of the grating. At the existing channel grinder, a large opening exists in the grating, creating a safety hazard. At the original screen channel (now bypass channel), the grating spans parallel to the channel rather than perpendicular, which compromises the structural integrity of the grating. Overall, **the existing grating is an immediate safety hazard and should not be considered safe for operators to walk on**.

2.4 Existing Electrical & Controls

The pump station is served by a 480-volt, 3 phase service. This service extends from (3) 50kVA pole mounted transformers located adjacent to the pump station and transitions underground to a Zenith Controls Automatic Transfer Switch (ATS). The ATS feeds a Zenith Engineering Motor Control Center (MCC) which then feeds all electrical loads. The existing MCC includes a 300AT/400AF main circuit breaker. Three wastewater pumps are powered and controlled by Toshiba variable frequency drives that were retrofitted into the existing MCC. Other 480V loads at the station are also powered from the MCC bus. General building loads, including lighting, controls, and receptacles, are fed from a 120/208-volt panelboard located adjacent to the MCC. The ATS emergency source is a trailer-mounted diesel generator located on the exterior, adjacent to the building.

The electrical distribution system, including the service entrance and motor control center, is beyond its useful life and is recommended for replacement. The existing building interior and exterior lighting is also recommended for replacement with LED lighting. The existing trailer-mounted generator, located within a fenced in area adjacent to the station, is recommended to be replaced with a permanent exterior, sound-attenuated generator package. It is also recommended that the existing automatic transfer switch be replaced in conjunction with the remainder of the electrical distribution system to ensure future serviceability. It was indicated by operations staff that the ATS controller had been malfunctioning upon a manually initiated transfer.

The pump station control panel is in excellent condition, based on a recent evaluation, and will be integrated into the overall pump station upgrades. The existing panel is modular and can be expanded to include additional input/output (I/O) modules to monitor and control additional components.

Wetwell levels are monitored via a submersible level transducer.

2.5 Existing Heating, Ventilation and Air Conditioning

The Drywell HVAC is largely original 1964 construction. Few modifications have been made to the original plans. Outdoor air is ducted to a centrifugal utility fan F-1 and distributed to the lower levels and grade level of the drywell via stainless steel ducting. Exhaust air is relieved through a wall mounted propeller fan, F-3. A set of actuated dampers are installed on the discharge side of F-1 which diverts air flow either to lower levels or to the upper floor. The actuator does not appear to be in working order, and the damper linkage was disconnected. Supply grilles generally appeared to be in working order with little observable corrosion issues.

The ventilation is activated by a manual wall switch when maintenance personnel enter the space. A switch adjacent to the door indicated "cooling operation". It is possible the ventilation is also controlled thermostatically, but this could not be confirmed.

The Drywell is heated via a forced hot air furnace fired on fuel oil. The furnace is vented into a masonry chimney adjacent to the unit. The furnace does not bring in any outside air. Supply air is ducted at the ceiling of the grade level with several diffusers and continues down to the intermediate level where it terminates with a grille. Return air is filtered at the furnace. The furnace was in very poor condition. The ductwork was found to be in good condition. Grilles and diffusers were generally corroded and in need of replacement. The furnace is cycled on a thermostat to maintain space temperature.

No Cooling or Dehumidification Systems were present. The original plans indicated a small dehumidifier was ducted in the space. The ductwork and dehumidifier are no longer present.

A small fuel oil tank is installed in the controls area at ground level of the Drywell side of the pump station. The fuel oil serves the oil fired furnace. The fuel oil tank appeared to be in good condition and installed relatively recently. City personnel expressed interest in upgrading to natural gas systems for operating cost savings, ease of operation/maintained, and reduction in hazardous materials.

The Wetwell HVAC is original 1964 construction. Few modifications have been made to the original plans. Outdoor air is ducted to a centrifugal utility fan F-2 and ducted down to the ceiling space of the intermediate level. The original plans showed additional ducting in the intermediate level ceiling space that helped distribute ventilation throughout the space, this ducting has been removed leaving just an open duct for supply air to enter the space. Air is exhausted out of a louvered gravity ventilator unit on the roof. A damper at the gravity ventilator has been partially removed and does not appear to function. A manual outside air damper was present and appears to be heavily corroded. The utility fan F-2 shows excessive corrosion due to the environment. Ventilation is manually switched on when an operator enters the space, which could allow buildup of hydrogen sulfide or other sewer gases when the ventilation is switched off.

3. BASIS OF DESIGN

3.1 Design Wastewater Flows

The Franklin Street pump station does not have a flow meter, so existing flows are unknown. Replacement of the pumps is not part of this project, so an analysis of the existing flows was not performed as part of this design basis memo. Adding a flow meter to the station is included in the project and is discussed later in this report.

3.2 Seal/Cooling Water System Upgrade

As previously noted the cooling water system for the three wastewater pumps is a custom system designed to continuously cool the jackets of the pumps. Operations staff indicate that they like the method of providing cooling for the pumps and want to maintain the intent of the system with more automated controls. The proposed upgrade to the system will consist of three main items; replacement of the supply piping and valves to the pumps from the circulator pump, replacement of the return piping and valve, and modifications to the tank. Currently the original copper supply piping to the pumps remains along with some replacement PVC piping installed by the City. The intent of the design will be to demolish all of the existing cooling water system piping including the PVC piping installed by the City. Replacement of the existing PVC piping will ensure uniform materials are used for the entire job and all of the piping will look consistent. Alternatively, the City installed PVC could be re-used with the updated system to reduce costs should it be found to be in acceptable condition during construction. Replacing all of the piping as part of this project will provide a single point of responsibility for the system, whereas re-use of existing piping creates several interface points between new and existing materials. The isolation valves are currently located too high in the air to allow staff to operate them as the main way to turn cooling water off at the pump, without being on a ladder. New stainless-steel quarter turn isolation ball valves will be relocated to just above the recently replaced brass fittings at the pump jacket entrance to provide a convenient location to turn the cooling water off to a pump should that be necessary. The brass fitting and threaded connection to the pump jackets is in fine condition and will be reused as part of this upgrade. Clear polyethylene tubing will be used to connect a PVC header pipe and PVC ball valve to the new quarter turn stainless-steel isolating ball valve at the pump jacket. The polyethylene tubing will be secured with stainless steel pipe clamps to easily allow operations staff to replace it in the future, similar to the current configuration. With an isolation valve on both sides of the clear polyethylene tubing the pump jacket will not require draining to change the tubing.

The cooling water return piping system will also be designed in a similar way. All of the existing piping will be demolished, and new piping will be installed to maintain uniformity in the system. Like the supply piping, the return piping will also have a stainless-steel quarter turn valve added to the brass fittings on the return piping at the wastewater pump jacket. Clear polyethylene tubing will be used to connect the fittings at the pump to a PVC return water header and PVC isolation ball valves below the walkway above. Isolation valves on both sides of the clear tubing will not require the pump jacket to be drained should it have to be replaced.

The existing cooling water holding tank is intended to be reused with modifications to help automate the cooling water system. A level transducer will be added to the tank to control the amount of water to be wasted and added daily. Backup float switches will be added to the tank to send an alarm should the tank get to a certain level close to overflowing, or a level too low which would risk running the system dry. An electrically actuated 2-inch ball valve will be added to the tank drain line that will be set on a timer to open and remain open for a period of time daily. A solenoid valve will be added to the influent makeup service water line that will also be set to a timer to refill the tank after the wasted water has been emptied for the day. A temperature probe will be added to the tank, so operations staff can monitor the temperature of the tank. An option for controlling the wasting and refilling of the tank based on a set temperature will also be included in the control scheme. The transducer level will be monitored by the control system to verify that the level in the tank remains sufficient during transfer operations, and the timing of valve operations can be adjusted based on the tank level.

3.3 Electrical and Controls Design

A new underground 480-volt, 3 phase secondary electrical service will be provided from the existing utility riser pole to the building including a new exterior metering cabinet and main service breaker. A new ATS will also be provided in conjunction with the service upgrades. All upgrades will be coordinated with Central Maine Power (electrical provider) to ensure suitability of existing pole mounted transformers.

The existing MCC will be replaced with an Allen-Bradley IntelliCenter Motor Control Center. A single ethernet communications drop to the SCADA CP will be provided in lieu of hard-wired controls. The new MCC will include the following components:

- Main Circuit Breaker;
- Digital Power Monitor;
- Surge Protective Device;
- Active Harmonic Filter;
- Variable Frequency Drives;
- Motor Starters;
- 480V Feeders and Branch Circuits; and
- Ethernet Power Supply and Network Switch.

The existing trailer-mounted diesel generator will be replaced with a permanent generator package. The generator will include a weatherproof, sound-attenuated enclosure. Generator status will be connected and integrated into the existing SCADA control system. Diesel and Natural Gas will be evaluated as possible fuel sources; however, it is expected that, cost-wise, diesel will be a more feasible solution in the required 250kW – 300kW generator output rating necessary to operate three wastewater pumps and all remaining pump station loads. The final selection on fuel choice will be confirmed with the City and will also consider feedback received from the natural gas utility company (Unitil).

3.4 Environmental Considerations

The pump station will remain online during a portion of the anticipated construction and equipment replacement will be sequenced to allow full operation of the station. However, during some of the work described in this section such as replacement of the pump suction piping and installation of the new flowmeter, bypass pumping will be utilized to move the continuous wastewater flow coming to the station. The bypass suction will be pulled from the gravity manhole directly upstream of the Wetwell and discharged directly into the force main at a location in the street via a temporary connection. The existing bypass connection in the drywell may be used for some of the work, but the installation of the new flow meter and air release valve will require the bypass to be connected downstream of the pump station. No excavation is intended; however, erosion and runoff control measures will be implemented as required for the work.

3.4.1 Hazardous Materials Assessment

Based on the increase in the scope of the work, significant amounts of demolition debris will be generated as part of the project. Due to the year of construction of the pump station, a hazardous materials survey was performed at the pump station which tested materials likely to be impacted by construction for presence of lead, PCBs, and asbestos. The field sampling was performed for Woodard & Curran by Credere Associates, LLC. A full version of their report is included as an appendix to this report.

Hazardous materials were identified in the roofing material (asbestos), as well as the wall paint (PCBs) and various joint sealants around the pump station (PCBs). These materials will require special handling and disposal to comply with local and federal regulations regarding this material.

Lead paint was detected in only one sample, at the support base for the wastewater pumps. Because these pumps have been recently replaced, this paint will not require remediation to support this work.

For the asbestos material located at the roof, these materials will be demolished and disposed of during the replacement of the roof, by a firm licensed to handle and dispose of asbestos-containing materials.

The PCBs detected in the existing wall paint exceed the threshold for bulk waste disposal. Additionally, based on the concentrations of PCBs detected and the porous nature of concrete, it is likely that the PCBs have migrated into the surface of the concrete. The City desires to replace the wall coatings in the pump station. It is recommended that a licensed contractor sandblast the walls to remove the existing paint, and the demolition debris disposed of at a regulated landfill licensed to accept PCB-contaminated waste. Due to the fact that the existing concrete is likely to now contain PCBs, regulations require that this material either be removed or encapsulated. A new epoxy paint coating for the existing walls will provide a sufficient system to encapsulate the concrete and satisfy requirements for the regulated materials.

3.5 Influent Channel Grinders and Isolation Gates

Flow entering the pump station through the 36" influent gravity sewer can be directed through two separate channels before entering the Wetwell. Flow can be diverted to either Wetwell by sending the flow through the different channels as one channel, closest to the Drywell, leads to Wetwell #1 and the channel closest to Franklin St. leads to Wetwell #2. The original pump station design called for the channel leading to Wetwell #2 to be the main flow path and was provided with a mechanical bar screen. The original mechanical bar screen has since failed and was demolished several years ago. The influent channel which leads to Wetwell #1 was designed to be a bypass channel for when the screen was down for maintenance and contained a manual bar rack. The city has since replaced the bar rack with a JWC Channel Grinder in the original bypass channel. The two influent channels are currently configured to send all flow through the grinder and entering Wetwell #1. The original screening channel is only used under peak flow conditions and when the grinder must be taken out of service, and is currently blocked off using a temporary lumber bulkhead. No manual bar rack has been installed in this channel resulting in unscreened wastewater entering the Wetwells when this channel is used. The original station was designed with two manual stop plates that could be used to isolate influent from entering either channel.

Under peak flows seen at the station the grinder channel can become overwhelmed forcing flow to overtop the channel and enter the bypass channel leading to Wetwell #2. The City would like to reduce the spills of wastewater resulting from flow overtopping the grinder channel as well as ensure all influent flow passes through the grinder prior to entering the Wetwell where it could cause harm to the pumps. To do this a second channel grinder will be installed in the original screening channel which leads to Wetwell #2. Another important component of the upgrades to the influent channels will be adding electrically actuated slide gates to each of the influent channels upstream of the existing and proposed grinders. A submersible level transducer will be located in the influent channel upstream of where it splits into the two channels. When the water level in the channel reaches 4.5' above the bottom of the channel it will send a signal to SCADA calling for both gates to be opened and both grinders to be operational. The level transducer will also be programed to send an alarm to operations staff at a certain level based on operational staff preference. This will allow the full forward flow to be split between the two channels and prevent overtopping of the channels.

Based on Woodard & Curran's design, JWC has provided a proposal for a new channel grinder in the existing grinder bypass channel, which is included in Appendix B of this report. The grinder will be designed for a channel that is 42" wide and 60" deep with a flow rate of up to 7 MGD which will provide more than enough capacity for half of the peak

flows seen by the station. W&C recommends a dual-shafted grinder with a single 5 HP cutter motor and gears to drive the rotating drums. This XDS2.0 grinder will be of similar design and size as the existing grinder which operations staff are already familiar with. JWC has made improvements to the cutter design to prevent the formation of "strip" when nonwoven wipes are encountered, reducing the chances of "re-weaving" of the wipes downstream of the grinder.

Based on Woodard & Curran's design, Whipps has provided a proposal for the new influent channel isolation gates which is included in Appendix B of this report. To replace the existing stop plates, a 304 SS self-contained slide gate will be installed in each of the grinder channels upstream of the grinders for isolation. These gates do not require embedment in the concrete and can be installed quickly, reducing the amount of bypass pumping and concrete work required. The gates arrive in a self-contained frame which will be mounted to the existing concrete channel walls and floor. The proposal included in Appendix B is for gates with an explosion proof electric actuator, to allow automatic operation of the gates. Pneumatic and hydraulic actuators are additional options; however, they would significantly increase the cost and complexity of the gate system. Racking is also more of a concern when using pneumatic gate operators. Woodard & Curran recommends the electrically actuated slide gates for the influent channel isolation gates. A side-mounted manual operator will also be included to manually open and close the slide gates.

3.6 Wetwell Isolation Gate

The station is equipped with a submerged isolation gate to allow the isolation of one of the two Wetwells for cleaning or maintenance. This gate is currently not operational and is to be replaced as part of this project. The new gate will be made of 304 SS and will be face mounted in Wetwell #1. A manual actuator will be mounted to the gate and located above the grating to allow operations staff to isolate flow to one Wetwell. Based on Woodard & Curran's design, Whipps has provided a proposal for this gate which is included in Appendix B of this report.

3.7 Suction Piping and Isolation Valves

As previously stated the discharge piping, check valves and isolation plug valves on the station's three wastewater pumps have recently been replaced. The existing suction piping isolation plug valves are original to the station and are in poor condition. The existing 18" DeZurik plug valves went many years without being exercised and likely do not provide a complete seal when closed. The City has decided to replace the existing suction isolation valves and include electric actuators with the replacement valves. The electric actuators will allow for remote exercising of the valves providing a more convenient way for the operators to provide the necessary maintenance. Some of the suction piping has been replaced in the past with uncoated flanged ductile iron piping. This piping will be modified to provide the required room for the new plug valves. The remaining uncoated piping will be surface prepped and painted to prevent corrosion and deterioration. The existing flange hardware on the suction piping will also be replaced with 316 stainless steel to prevent corrosion. During the July 24 site visit, our structural engineer inspected the existing wall pipe penetration from the Wetwell to the drywell. Based on the visual inspection and a hammer test, the wall pipe appears to be in good condition. Furthermore, to replace this wall pipe would require significant concrete demolition and replacement, and leaks would be possible where new concrete interfaces with the existing. This work could potentially extend the duration of the bypass pumping. For these reasons, we recommend leaving the existing wall pipe in place and limiting demolition to the first flange, approximately 12" from the concrete wall.

3.8 Discharge Force Main Air Release

The three 14" wastewater pump discharges join together as one 24" force main inside the Drywell and exit the station at the third story of the Drywell. Where the force main exits the Drywell is the high point in the force main. It is common practice for wastewater force mains to have automatic air release valves for expelling air trapped in the line. An air release valve will be added on the discharge force main header, near where the 24" force main exits the pump station, likely on the top side of the 42" tee. This valve will automatically release any air entrained in the flow at this high point, reducing the chances of an air pocket which reduces the efficiency of the pumps and restricts flow. This air release

blow-off pipe will be piped back to the Wetwell to discharge the air and any seepage back to the Wetwell area rather than to the drywell.

3.9 Flow Metering

The Franklin Street pump station currently has no way to measure flows being conveyed by the pumps. Due to the piping configuration in the drywell it is not recommended to install a flow meter in the pump station with insufficient straight runs of pipe upstream and downstream of the meter to provide an accurate measure of flow. The City has requested that a direct-bury flow meter manufactured by Siemens be installed on the 24" force main under Marginal Way The location of the meter in Marginal Way will be selected to provide at least five pipe diameters of straight run upstream and three pipe diameters downstream of the meter. The meter will be powered out of the pump station MCC, and control wiring would be provided to communicate to the pump station control panel and the City's SCADA system.

Woodard & Curran recommends the City install the flow meter inside a precast manhole to allow access should it need maintenance and repairs in the future. In addition, compaction around the flow meter will be extremely important to prevent the power and controls conduits from breaking at the entrance to the flow meter. A precast manhole is an inexpensive insurance policy for accessing an important component of the pump station. The flow meter is also rated for submergence should the manhole become filled with water over time.

Based on record drawings of the force main, the pipe material used is reinforced concrete. W&C has requested additional information from the City regarding the type of reinforced concrete pipe, however the specification for this project was not immediately available from the City. Some varieties of reinforced concrete pipe are pre-stressed and cannot be cut in place without reducing the strength of the remaining pipe. Modifying the existing concrete force main to connect to a new ductile iron pipe and flow meter will require special custom-made fittings to connect the two pipe materials. Additionally, this work would introduce two new failure points to the force main, where the transitions from existing concrete to new ductile iron occur.

As design proceeds, we will continue to better define the risks and benefits associated with installation of a flow meter to measure flows discharged from the pump station. Other alternatives to consider include an externally mounted meter which could be installed inside the existing drywell, or an alternative flow measurement device such as a parshall flume installed at the terminus of the force main. We will work with the City to determine the best method for flow measurement for this project. Regardless of what method is chosen, it is recommended that the City review the condition of the existing concrete force main to estimate its remaining life.

3.10 HVAC Improvements

The HVAC equipment which serves the pump station is original to the station and has reached the end of its useful life. The City has requested cost estimates to upgrade the HVAC systems at the station. The City indicated a preference for natural gas fired equipment as part of any upgrades. A mechanical engineer who specializes in HVAC design visited the pump station as part of the July 24th site visit. Based on this site visit and review of the record drawings, the following basis of design has been prepared.

3.10.1 General Requirements

National Fire Protection Association (NFPA) Standard 820 – 2016 is the primary code that is utilized to determine HVAC & safety related considerations. Electrical classification of the space is one of the primary purposes of this code, once the classification has been determined, specific requirements of the HVAC system are prescribed by the code.

Natural gas is the preferred fuel for improved operating costs, maintenance costs, and reduction of hazardous materials. Additionally, natural gas allows for more options of firing HVAC equipment and provides a much more flexible

fueling option than fuel oil. The recommendations presented here assume natural gas is brought to the site. Based on preliminary discussions with the utility company (Unitil), natural gas is available in the project area approximately 250' from the pump station. Prior to the submission of the Guaranteed Maximum Price (GMP), we will contact Unitil for a cost proposal to provide a new natural gas service to the pump station. If natural gas is not a cost-effective option, we will evaluate propane and electric heat for the station.

3.10.2 Drywell HVAC

The Drywell will be ventilated continuously at 6 air changes per hour (ACH), which is approximately 2,200 cfm. This will allow the Drywell to be considered an Unclassified Space according to NFPA 820. If fewer than 6 ACH is provided in a pump station Drywell, the area would be a Class I, Division 2 space. If the space were classified as Class I, Division 2, the electrical equipment would have to be relocated, as the proposed Motor Control Center cannot be installed in a classified space. We recommend providing continuous ventilation at 6 ACH to declassify the space.

Other requirements of NFPA 820 for this area include:

- Requires both supply and exhaust fans.
- Fans over 2,000cfm require duct smoke detectors and Fire/Smoke Dampers (FSDs)
- Requires air flow proving switches on each fan. Alarm on loss of flow
- Space should be kept positively pressurized relative to adjacent Wetwell/ambient to prevent migration of gases
- Primary failure of ventilation power should be alarmed.

Two options are presented for the Drywell HVAC. The options offer a tradeoff between initial costs and operating costs. The requirement to continuously ventilate the space will have a substantial impact on fuel consumption over the course of the year. A simple Makeup Air System can be provided alongside a Heat Recovery Ventilator System that recovers heat from the exhausted air stream. In either case, the existing furnace and associated ductwork are no longer needed and can be demolished. Existing supply fan and outside air louver are to be demolished. The ductwork serving the existing supply fan could potentially be reused to save costs.

Heating and Ventilating Option 1 - Makeup Air System: An indirect fired gas makeup air unit would provide tempered air to the space to meet the required continuous 6 ACH. Ducting will distribute air throughout the Drywell to scavenge possible dead pockets. A wall or roof mounted exhaust fan will operate continuously. The makeup air unit could be designed to be mounted outside (on roof, or at grade) or could be designed to be located indoors (hung, or at grade). The indoor option requires a less expensive casing with the tradeoff of less space within the facility.

Heating and Ventilating Option 2 - Energy Recovery Ventilator (ERV) System: The ERV option consists of a core type energy recovery heat exchanger mounted in a casing with separate supply and exhaust fans. Heat is recovered from the exhaust stream and transferred to the supply air stream. This raises the supply air temperature to approximately 35-40 degrees F on a design heating day. The supply air is then ducted to an indirect gas fired duct furnace to trim the temperature to that required in the space. The exhaust fan is integral to this unit.

Options for indoor and outdoor mounting of the ERV & Duct Furnace units are available similar to the Makeup Air option. The ERV core does not have any moving parts and requires only typical maintenance of

filter change outs. Other technologies such as energy recovery wheels are not recommended for this application due to leakage past the rotating wheel, and additional moving parts.

A preliminary selection and ERV performance is given below. Note the Winter Outside Air Temperature and Winter Supply Air Temperature which represents the heat recovered.

Table 3-1: Heating Details for Drywell HVAC Options

	Sensible		Total	
	Winter	Summer	Winter	Summer
Exchanger Effectiveness (Info)	70 %	70 %	67 %	54 %

	Room Exhaust		Outside Air		Supply Air	
	Winter	Summer	Winter	Summer	Winter	Summer
Dry Bulb (F)	55.0	75.0	-3.0	86.0	37.8	78.3
Wet Bulb (F)	43.2	62.6	-5.0	71.0	30.2	66.7
Relative Humidity (%)	35	50	23	49	37	55
Absolute Humidity (lbH20/lbdryair)	0.0032	0.0092	0.0002	0.0128	0.0018	0.0113
Enthalpy (BTU/lb)	16.7	28.1	-0.5	34.7	11.0	31.2

	Sensible		Latent		Total	
(Info on Loads)	Winter	Summer	Winter	Summer	Winter	Summer
Original Load (BTU/h)	137808	26136	32542	39520	170350	65656
Original Load (Tons)		2.2		3.3		5.5
Load with RenewAire (BTU/h)	40851	7748	15529	22618	56380	30366
Load with RenewAire (Tons)		0.6		1.9		2.5
Savings (BTU/h)	96957	18388	17012	16902	113969	35290
Savings (Tons)		1.5		1.4		2.9
Load Savings Ratio (Info)					67 %	54 %

Table 3-2: Estimated Operating Cost Details for Drywell HVAC Options

Annual Ventilation Load	Heating Season
No Energy Recovery (BTUs)	417,301,632
With RenewAire ERV (BTUs)	125,190,490
RenewAire Savings (BTUs)	292,111,142
Annual Energy Cost/Savings	**Heating Season**
No Energy Recovery	$5,216.27
With RenewAire ERV	$1,564.88
RenewAire Savings	$3,651.39
Total Energy Savings With RenewAire	

Based on projected heating season operation with $1/therm natural gas, the annual cost savings of the Option 2 - ERV System versus Option 1 - Makeup Air System is approximately **$3,600.** The capital cost of the ERV system is anticipated to be approximately $10,000 higher. We recommend installation of the ERV system to save cost on the lifecycle of the equipment and to reduce operating costs.

No dehumidification is proposed for the Drywell.

Cooling is required to support the electrical gear in the space. The existing wall exhaust fan is functional and could likely be repurposed (or replaced in kind if necessary) to be thermostatically controlled on high space temperature. A

new wall louver with motorized damper would be provided to allow higher ACH than possible with the ERV or Makeup Air system.

3.10.3 Wetwell HVAC

The Wetwell will be rated Class 1 Division 1 according to NFPA 820. By using this rating, the space does not require continuous ventilation. Best practice is to provide high ACH fans for intermittent operation, sized for 12ACH or greater, which is approximately 2,400 cfm. Only an exhaust fan is required by NFPA 820, however we recommend a supply fan also be supplied, to provide positive ventilation and reduce the chances of the ventilation system short-circuiting. Similar to the Drywell, all fans over 2,000cfm require duct smoke detectors and Fire/Smoke Dampers (FSDs). Due to the nature of the space, Wetwell fans will be AMCA Spark Resistant Construction Type A or B and the motor will be rated for the Class 1 Division 1 space. Equipment shall be grounded.

The proposed upgrades to the Wetwell side are simpler due to unoccupied nature and intermittent operation of the ventilation system.

Existing supply fan, associated ducting, louvers and gravity relief hood will be demolished due to deterioration. New aluminum outside air louvers and stainless steel or fiberglass ducting are proposed. The odor control system will provide intermittent exhaust operation when the space is occupied at min 12 ACH. The new ducting is routed to each floor and distributed to encourage scavenging of stagnant pockets of air. Motorized dampers could be provided to isolate the ventilation system when the space is unoccupied, however, discussions with City personnel indicated that no dampers may be preferable to allow for excess humidity to escape the space. A manual damper system could be provided if desired.

No Cooling, Heating or dehumidification is proposed within the Wetwell, and no changes are proposed to the Utility Room HVAC

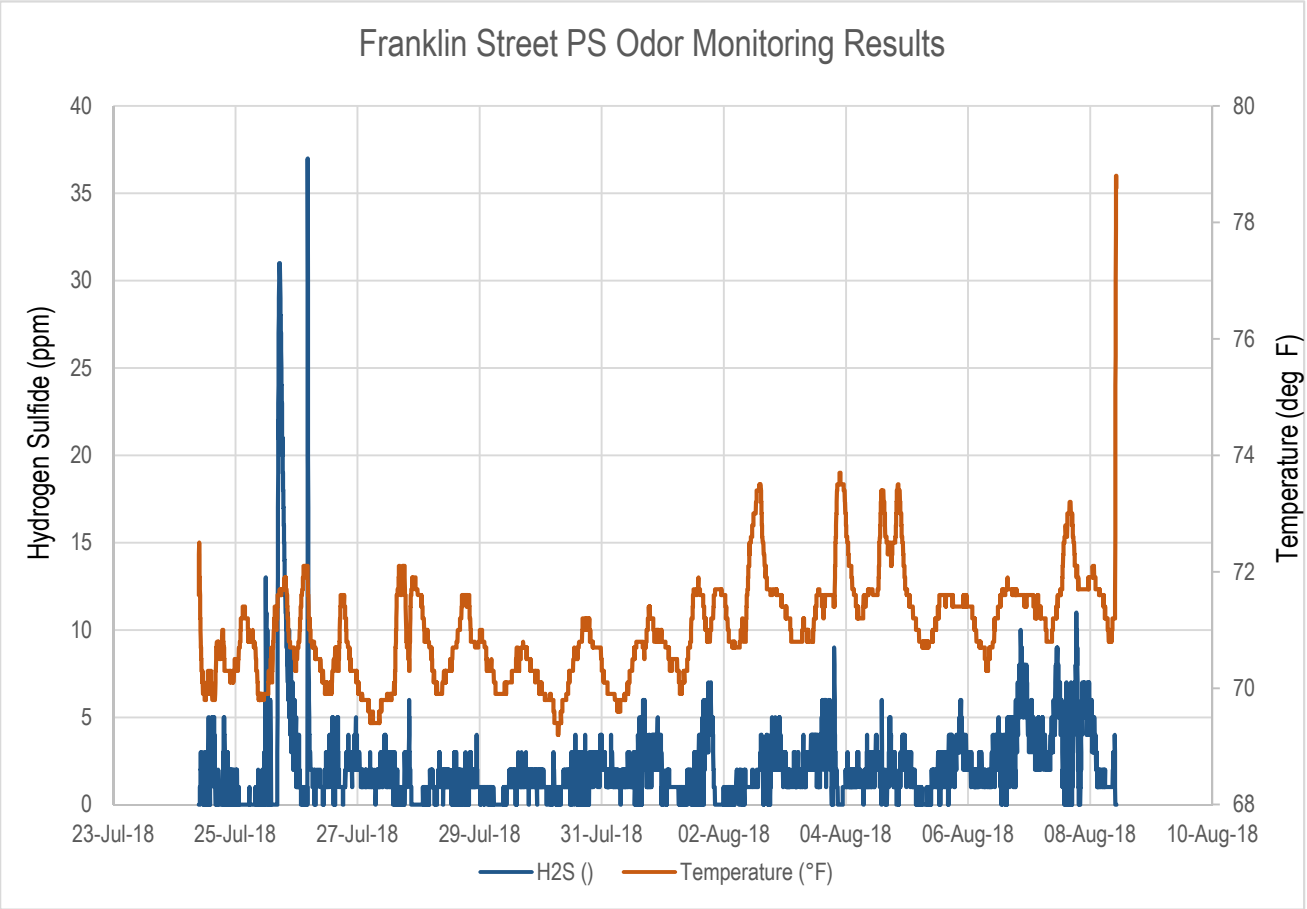
3.11 Odor Control System

The Franklin Pump Station currently has no odor control equipment. Ventilation from the wetwell is discharged untreated to the surrounding area. Although the area is largely commercial, the proximity of the Bayside Trail makes odors a potential concern. The City requested that Woodard & Curran provide an odor control system as part of the upgrades at the pump station.

The most common odor constituent at wastewater pump stations is hydrogen sulfide (H_2S). H_2S is natural product of decaying organic matter, especially in low oxygen concentrations. H_2S has a “rotten egg” smell and is detectable at very low limits, as low as 0.01 parts per million (ppm). The Occupational Safety and Health Administration (OSHA) has established a General Industry Peak Limit Exposure threshold of 50 ppm for no longer than 10 minutes, and a construction 8-hour limit of 10 ppm. The National Institute for Occupational Safety and Health (NIOSH) has a lower exposure limit, recommending no longer than 10 minutes of exposure at a concentration of 10 ppm. NIOSH also classifies concentrations of over 100 ppm to be “immediately dangerous to life or health”.

Several technologies are commonly used for odor control at wastewater pump stations and treatment facilities. To select the proper technology, the concentration of H_2S in the airflow must be known, as some technologies perform better at higher concentrations. To measure H_2S levels, Woodard & Curran rented an OdaLog portable gas detector. This unit was deployed in the wetwell lower level on July 24th and retrieved on August 8th. Results are shown in Figure 3-1 below.

Figure 3-1: Odalog Results



The data shows some spikes in H_2S on July 25th and 26th, where concentrations in the wetwell reached as high as 37 ppm. Generally, concentrations were less than 10 ppm, and the average concentration over the entire study period was 2 ppm. The reasons for the spikes in concentration are not known. There was some precipitation on the morning of the 26th, however similar rainfalls later in the study period did not produce a similar response in H_2S concentrations. Based on discussions with City staff, there were no sewer cleaning or construction activities in the area that might explain the increase in concentrations.

H_2S concentrations are typically at their highest during the summer, due to the increased biological activity due to the heat. Therefore, lower concentrations would be expected on an annual average basis.

The two most common types of odor control systems for wastewater pump stations are activated carbon absorption units and biofilters. Biotrickling filters are used in some parts of the country, however these require special protection against freezing in colder climates and are not typically used in the northeast. Chemical scrubbers are sometimes used at wastewater treatment facilities, however scrubbers require on-site storage of chemicals such as sodium hypochlorite and sodium hydroxide which require special containment systems and other safety features. Due to the space requirements and operational requirements of these systems, a scrubber is not recommended for Franklin Pump Station.

Biofilters treat air by passing it through a media with microorganisms which capture and degrade the hydrogen sulfide. The media can be organic (e.g. wood chips) or inorganic. Carbon units use activated carbon vessels to adsorb the H_2S

in the airstream. Because the H_2S removal process is a physical process, the carbon is consumed based on the concentration of H_2S in the airflow. Higher H_2S concentrations will consume the carbon quicker, resulting in a higher life cycle cost for carbon units. Carbon units are typically smaller in footprint than biofilters, and can operate intermittently. Biofilters require a constant air flow to provide nutrients to the microorganisms.

An alternative emerging technology for odor control at pump stations is on-site generation of ozone to oxidize the atmosphere of the wetwell. The manufacturer of this technology provides on-site units which can be installed in relatively small spaces as compared to other odor control technologies. An on-site system generates ozone (O_3) and combines it with potable water and fresh air to create a "hydroxyl radical fog" which oxidizes the H_2S in the wetwell atmosphere. Although this type of system offers the benefit of reduced footprint, there are two concerns with this system: The fog created to treat the atmosphere alters the oxygen content and has the possibility of creating an oxygen-rich environment. Because the Wetwell at Franklin Pump Station is entered by personnel regularly, we feel that this system is not well-suited for this pump station. This system also reacts with electrical wiring insulation, requiring a special sheathing to be installed to prevent the wires from being stripped by the fog. For these reasons we feel this type of system is better suited for a manhole or junction chamber application rather than a building space.

Based on the design characteristics of Franklin Street, we contacted vendors of carbon and biofilter odor control equipment and discussed the application with other odor control experts. All feedback received was unanimous in recommending activated carbon instead of biofilters or another technology. Carbon is the recommended technology for several reasons:

- The H_2S concentrations found at Franklin Street are relatively low. One vendor noted that biofilters are not competitive at any concentrations lower than 5 ppm.
- There is a relatively small footprint available to install the odor control technology at Franklin Street Pump Station. Carbon units have a smaller footprint than biofilters.
- Carbon units allow intermittent operation. The wetwell is currently not ventilated. Construction of a biofilter would require constant ventilation, which would increase operational costs at the pump station.

We have included vendor information for the carbon odor control unit proposed as an appendix to this report. The unit includes a blower, damper, and carbon adsorber vessel which is proposed to be installed in the existing parking area adjacent to the site. The unit has been sized to match the existing wetwell ventilation rate. It is recommended that control logic be added to allow operation to be based on a repeat-cycle timer. This will allow the unit to operate automatically to reduce the chances of a buildup of H_2S concentrations. This timer can be adjustable, to allow more ventilation in the summer, when H_2S concentrations are typically higher, and less frequent ventilation in the winter to reduce operational costs.

3.12 Roofing

During the site visit to Franklin Street pump station, water damage was noted at some locations near joints in the precast roof planks. It is unknown if the roof has been replaced at this station. As noted in section 2, the roof appears to be completely level, with three roof drains located at non-symmetrical parts of the roof. Typically, roofs slope to drains and the drains are located in a logical symmetrical layout.

It is recommended that the existing roofing system be demolished in its entirety down to the precast roof deck. The existing roofing material will be disposed of according to local and federal regulations. The new roofing system will include: tapered rigid insulation with minimum 4" thickness and 1/4" per foot slope; fully-adhered 60-mil EPDM roofing; new PT blocking at perimeter; minimum 0.05"-thick color-coated aluminum edge flashing at perimeter; membrane flashing for all pipes, curbs, and masonry chimney; two new roof drains and associated drainage piping to replace the existing.

3.13 Monorail Bracing

In March 2018, the City hired a third-party engineer to review the hoisting systems at the Franklin Street pump station. This report concluded that the existing support for the 2-ton rated monorail at Franklin Street is not structurally sufficient and requires additional bracing prior to any load testing of the monorail. Based on our site review, this assessment is valid.

It is recommended that the monorail beam be temporarily supported, and the existing concrete support beam be demolished. The existing cracked section will be sawcut and repaired with mortar. A new bent plate will be provided with a longer vertical dimension, so that the top angle leg bolts are located 6" higher than the existing bolts.

3.14 Additional Electrical Work

In addition to the replacement of the MCC, the City has requested estimated costs associated with a number of electrical improvements at the pump station. These improvements would address the long-term electrical needs at the station and improve the efficiency of the station. The existing lighting panel and associated transformer are beyond their useful life and should be replaced with new equipment; the existing branch circuits would be reconnected. The interior and exterior lights are inefficient, aged and should be replaced with new energy efficient LED fixtures. Lights and switches installed in the Wetwell will need to be explosion proof to meet electrical code. The Wetwell lights would be located in areas more accessible to operators than the existing lights, which are mounted high above the Wetwell. Lights installed in the Drywell and MCC area do not need to be explosion proof to meet electrical code, assuming that the Drywell is continuously ventilated at 6 air exchanges per hour. Emergency lighting at the station will also be updated and provided through the use of wall mounted units with an integral battery pack. Full-cutoff LED exterior wall packs will also be provided.

The receptacles and associated conduit in the Drywell were also requested for replacement as a result of flooding in the past. The replacement receptacles would be GFCI protected with weatherproof covers based on the assumed 6 air exchanges per hour within the Drywell, limiting the electrical classification of this area.

The automatic transfer switch will also be programmed to allow for automatic exercising of the generator.

As part of the HVAC upgrades, all new electrical will be provided to accommodate the new equipment.

3.15 Additional Miscellaneous Improvements

During our site visit to the station, sensors for explosive gases (LEL) and hydrogen sulfide (H_2S) were noted as present in the Wetwell. It is standard practice for pump station like Franklin Street to have a third sensor to monitor oxygen levels for operator safety. We recommend installation of this sensor.

The facility's handrails are approximately 36" high, less than the 42" height required for new handrails. We recommend replacement of these handrails to improve operator safety at the station. The grating on the first level of the Drywell has been removed and replaced with plywood. We recommend the plywood be replaced with a permanent grating fabricated to match the size of the concrete penetration.

We recommend crack repairs and re-sealing of joints in the building's exterior masonry in several locations.

The stair nosings at the concrete stairs in the drywell are loose in places and will be repaired. We understand that the access stairs to the wetwell will be replaced (by others) prior to the start of the work described in this report.

A new platform is recommended in the wetwell to allow operations staff to access the level transducer stilling well. A new aluminum platform will be provided at this location to allow staff to safely access this transducer.

All existing FRP grating in the wetwell will be demolished and replaced with new 1-1/2" deep aluminum I-bar grating. This grating will be custom fabricated to account for existing equipment penetrations, and provided with bands and/or supplemental angle supports at penetrations to maintain structural integrity.

During bypass operations, the existing wetwells will be offline. It is recommended that the condition of the existing concrete be inspected at that time for corrosion. At this time, no costs are included for remediation of the wetwell concrete.

The incoming water service and backflow preventer show signs of corrosion and we recommend replacement. This water service feeds the cooling water system and is critical to the functionality of the pump station.

The City requested that the overhead roll-up door in the Wetwell be replaced, as the existing door shows signs of corrosion and is difficult to open. The existing personnel doors will be replaced where corroded, and new sealant will be provided around existing and new door frames. Panic bar hardware will be installed where required by building code on the doors.

The pump station uses a compressed air system to operate knife gate valves on the pump suction piping. The copper air piping as well as the suction piping itself show signs of corrosion and we recommend replacement to keep the station operating as intended.

4. PROJECT BUDGET

This section presents preliminary project budget for the construction project.

4.1 Project Cost Breakdown

The total project costs for the Upgrades at Franklin Street Pump Station are included in Table 4-1 below.

Table 4-1: Opinion of Probable Costs

Item	Estimated Cost
General Conditions	$139,000
Bypass Pumping During Construction	$130,000
MCC Replacement	$270,000
Seal & Cooling Water Modifications	$11,000
Provide new Permanent Generator	$124,000
Replace Automatic Transfer Switch	$20,000
Add Channel Grinder	$234,000
Replace Wetwell Gates (electric operators)	$40,000
New Flowmeter	$36,000
Replace air piping	$2,000
HVAC Upgrades	$106,000
Repaint Pump Station Interior	$62,000
Replace Grating/Handrail/Door Hardware	$37,000
New Stilling Well Access Platform	$10,000
Roof Replacement	$35,000
Replace Suction Lines/Valves at RWW Pumps	$81,000
New Air Release Valve	$38,000
Replace Lower Level Low Voltage Electrical	$10,000
Replace Pump Station Lighting	$68,000
Hazardous Materials Abatement	$18,000
Structural Bracing at Monorail	$6,000
New Carbon Odor Control System	$94,000
Misc. Structural and Building Repairs	$32,000
Subtotal Construction Cost	**$1,603,000**
Phase 2 Design (6%)	$96,000
Engineering Service During Construction (12%)	$192,000
Subtotal Project Costs	**$1,891,000**
Project Contingency (20%)	$378,000
Project Total	**$2,269,000**

These costs will be further refined as design progresses and will be re-visited to develop the “Guaranteed Maximum Price” to be submitted at the end of Phase 1 of the project.

5. SCHEDULE AND CONSTRUCTION SEQUENCING

The proposed project schedule is summarized in Table 5-1 based upon estimated construction durations for the work described in this report. A fully detailed project schedule will be provided with the submission of the Guaranteed Maximum Price (GMP) cost proposal, as part of the final submittal under Phase 1 of the project.

Table 5-1: Project Milestones

Project Milestone	Timeframe
Submit GMP to City	September 2018
City Approval of GMP/ Authorization to Proceed	October 2018
Execute Purchase Order of MCC, Grinder, and other long lead-time items	November 2018 – December 2018
Fabrication of MCC, Grinder	November 2018 – April 2019
Begin On-site work	March 2019
Set-up Bypass Pumping	April 2019
Complete work in Wetwell, Drywell	April-June 2019
Pump Station finishes	July-August 2019
Substantial Completion	September 2019
Final Completion	October 2019

Due to the long lead time of some of the items, the timing of the execution of the purchase order and release of equipment for Motor Control Center and other long lead time items such as the grinder will be critical to the schedule.

5.1 Design and Procurement Activities

Following review of the Design Basis Report and the project workshop, Woodard & Curran will work the Motor Control Center manufacturer to finalize the cost proposal which will be included in the Guaranteed Maximum Price (GMP) for construction. The GMP will be submitted as part of the final submittal under Phase 1 of the project.

Following acceptance of the GMP, Woodard & Curran will execute a purchase agreement with the vendors for long lead time items, including the motor control center, generator, odor control system, sluice gates, and channel grinder. It will be critical to execute this agreement promptly due to the long lead times of this equipment, in order to meet the overall project schedule. The City's decision to procure this station using a design-build arrangement will shorten the overall project schedule by several months, by allowing final design tasks to occur concurrently with the equipment procurement.

5.2 Construction Sequencing

Several activities will require bypass pumping, including replacement of the MCC, replacement of the wetwell divider gates, and replacement of the pump suction isolation valves. Bypass pumping will be performed using portable diesel-powered pumps and temporary wetwell level monitoring. Once bypass pumping is set up, the incoming power to the pump station can be disconnected, and the MCC replaced. Work in the wetwell can occur concurrently with the MCC replacement. Modifications to the cooling water system can also occur during the bypass pumping operations, however the duration of this work is anticipated to be much shorter than the MCC replacement and other wetwell work.

Based on the additional scope added to the project, we are planning on increasing the estimated duration of bypass pumping from one to three months. For approximately one month, the bypass system will need to discharge to a

temporary connection downstream of the proposed flowmeter location. This will require a temporary connection to the existing force main beneath Marginal Way. As discussed in Section 3, additional information is required on the existing force main to properly design this connection. After the new flowmeter is installed and ready for flow, the discharge of the bypass system can be relocated to the existing bypass connection to reduce the impacts of the bypass on the neighboring area.

APPENDIX A: MOTOR CONTROL CENTER PRICE QUOTATION

Rockwell Automation

Centerline 2100 Motor Control Center – Budgetary

Project Name:	Woodard & Curran PWD Pump Station	Salesperson:	Kirk Fitts
Project Item:	Franklin ST Pump Station	Created By:	Kirk Fitts
Project ID #:	5183678/1	Date:	05/08/18
Attn:	**Seth Harvey**		

MCC Description	Net Price
Franklin ST Pump Station	$112,270.00
Freight prepaid and billed, FOB Factory	
Total Price	**$112,270.00**

Notes:

1. Assumptions are typical Woodard & Curran Specs.
2. Quoted to One Line drawing provided, no unit schematics no specification.
3. Pricing for MCC only. No documentation, software, drawings or services included.

Rockwell Automation

Centerline 2100 Motor Control Center - Basic Structure Information

Motor Control Center Details

This MCC(s) was developed using an available fault current of 50,001 to 65,000 A.
MCC configuration & pricing subject to change, if actual Available Fault Current differs.

Motor Control Center Details

Power System Type: Wye, 3-phase, 4-wire with solidly grounded neutral
Voltage: 480 Volts / 60 Hertz
Available Fault Current: 50,001 to 65,000 A
Master Nameplate: 1 Line(s)
Unit Nameplate Type: Acrylic - Black letters on white
Wiring Type: B-T Control and Power Terminal Blocks
Wiring Diagram Location: Central location
Arc Resistant MCC: No
IntelliCENTER Network: Ethernet
IMC Device Firmware: Upgraded to latest available version (saves up to 1 hour of customer configuration time per section)

Incoming Line Details

MCC Connection Type: Main Circuit Breaker
Incoming Line Cable Entry: Top Mounted

Bus Details

Main Bus Rating: 800A
Main Bus Material: Copper / Tin Plated
Main Bus Bracing: 65kA (rms symmetrical)

Horizontal Ground Bus Size: 1/4" X 1"
Horizontal Ground Bus Plating: Unplated Copper
Horizontal Ground Bus Location: Bottom
Vertical Ground Bus Type: Plug-in Zinc Plated Steel
Incoming Ground Lug Size: #6 AWG - 250 kcmil
(2 Supplied as Standard)
Incoming Ground Cable Size: None Selected
Horizontal Neutral Bus Rating: Half of Main Bus Rating
Horizontal Neutral Bus Location}: Below Main Bus
Neutral Connection Plate: Yes
Neutral Connection Plate Location: Bottom

Enclosure Details

Enclosure Type: 1G - with Gasketed Doors. Bottom Plates Included
NEMA 3R/4 Lifting Angle: No
Section Depth: Front Mounted, 20" Deep
Section Height: 90" High
Stab Opening Protection: Automatic Shutters
Isolation Barriers: Yes
NOOXID Bus: Yes
Wireway Tie Bar: Yes
Total Shipping Block(s): 4
Total Section(s): 7
Total Unit(s): 28

Ethernet Network Information

Full Ethernet Network Information can be found on the One Line Diagram associated with this project item. This drawing can be obtained by requesting Pre-order drawings.

Section Modifications (Qty/Mods)

Section Number	Section Width (inches)	Options/Modifications
1	20"	Neutral Connection Plate Horizontal Neutral Bus
2	20"	N/A
3	20"	N/A
4	20"	N/A
5	20"	N/A
6	20"	N/A
7	20"	N/A

Rockwell Automation

Centerline 2100 Motor Control Center - Unit Description

General Information

Line Voltage / Frequency:	480 Volts / 60 Hertz
Power System Configuration:	Wye, 3-phase, 4-wire with solidly grounded neutral
Class I Wiring Type:	B-T Control and Power Terminal Blocks
NEMA Enclosure Type:	1G - with Gasketed Doors. Bottom Plates Included
Available Fault Current:	50,001 to 65,000 A
Unit Nameplate Type:	Acrylic - Black letters on white
Delivery Program:	ENG

Unit Information

Description	Unit Features
Unit Loc: 01A **Del Prog: PEII** **Unit ID: 1** MCB - Main Circuit Breaker **Rating** 600A **Name Plate Information** MAIN	**Catalog Number: 2193MT-EKC-52TMM-88HN-790A** Total Space Factor = 3 Circuit Breaker: 65kA at 480V (600) with Frame Rating of 800A (M6H Frame) , Top Mounted, 600A Trip Lugs Supplied: Std Mech/Lug Pads, 350 kcmil Size Wire, 2 Cables per Phase **Features Included** INC_NEUT_BUS Half-rated (-88HN) 1 Aux and 1 Alarm-Internal-CB (-790A)

Unit Loc: 01G **Del Prog: PEII** **Unit ID: 5** SPD - Surge Protective Device Unit **Name Plate Information** SPD	**Catalog Number: 2100-SPKB-3-751HS** Total Space Factor = 0.5 Surge Protector Type: Wye w/solidly grd neut, 4-wire **Features Included** Heat Shrink Type Markers (-751HS)
Unit Loc: 01H **Del Prog: SCII** **Unit ID: 4** METR - Metering Unit **Name Plate Information** POWER MONITOR **Ethernet Information** Device Type IP Address Subnet Mask 2190 192.168.1.2 255.255.255.0 2190 192.168.1.3 255.255.255.0 Power Monitor Firmware Version : LATEST	**Catalog Number: 2190-CKB-54M-86W54DXB-751HS** Total Space Factor = 1.5 Metering Type: Bul 1426-M5 PM 5000 w/Ethernet Ammeter Scale 800 **Features Included** Heat Shrink Type Markers (-751HS)
Unit Loc: 01L **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1
Unit Loc: 02A **Del Prog: SCII** **Unit ID: 21** FCB - 3-Pole Feeder Circuit Breaker (FCB) **Rating** 20A **Name Plate Information** FEEDER MUFFIN MONSTER **Overload Relay(s)** Motor Full Load Current (FLC) = Not Available	**Catalog Number: 2193F-AKB-31TGM-790K** Total Space Factor = 1 Circuit Breaker: 65kA at 480V (20) with Frame Rating of 125A (G6C Frame) , Plug-In Unit, 20A Trip Lugs Supplied: Std Mech/Lug Pads, 1/0 AWG Size Wire, 1 Cables per Phase **Features Included** 1 Auxiliary -Internal-CB (-790K)
Unit Loc: 02C **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1
Unit Loc: 02E **Del Prog: SCII** **Unit ID: 9** DOOR - Blank Unit Door **Name Plate Information** PUMP # 1	**Catalog Number: 2100-BK40** Total Space Factor = 4

Unit Loc: 03A **Del Prog: SCII**
Unit ID: 13
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1 HP

Name Plate Information
FAN
F-3

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 1.84
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.10	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-35TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (3A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 03C **Del Prog: SCII**
Unit ID: 11
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
0.5 HP

Name Plate Information
FAN
F-2

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 1.1
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.8	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-33TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (3A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 03E **Del Prog: FT2**
Unit ID: 6
VFD - PowerFlex 753 AC Drive w/CB

Rating
40 HP
(Heavy Duty)

Name Plate Information
PUMP # 2

Ethernet Information

Device Type	IP Address	Subnet Mask
2163U	192.168.1.4	255.255.255.0

PowerFlex 753 Firmware Version : LATEST

Catalog Number: 2163UB-065HKB-3F-5LGR-14DA2R1-14DFLPJ-14GER-14HBA6-14RLX-46TGM-751HS-790K
Total Space Factor = 4
Wiring: NEMA Type B wiring
Output Current Rating: 52A
Circuit Breaker: Inverse Time (Thermal Mag), 100kA at 480V (G6C Frame) (125A Trip)
Human Interface Module: LCD full numeric keypad - Door Mounted
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3F)
Pilot Light(s): RUN-AT SPEED Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Drive 120VAC w/ I/O (-14DA2R1)
Drive input fuses - Bussman (-14DFLPJ)
Dualport Ethernet (for VFD) (-14GER)
Drive Line Reactor (-14RLX)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)

Engineered Spec(s)/Modification(s)
(1) Bulletin 800T/H, Contact block, addition to standard number of contacts,800T-XA
Note - Extra contact block on Selector SW
(1) Engineered Modification and/or Custom Diagram
(3) Convert (1) 800F Pilot Light to (1) 800H Pilot Light

Unit Loc: 04A **Del Prog: SCII**
Unit ID: 18
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1.5 HP

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 2.51
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.15	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-36TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (7A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 04C **Del Prog: SCII**
Unit ID: 12
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1.5 HP

Name Plate Information
FAN
F-1

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 2.51
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.9	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-36TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (7A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 04E **Del Prog: FT2**
Unit ID: 7
VFD - PowerFlex 753 AC Drive w/CB

Rating
40 HP
(Heavy Duty)

Name Plate Information
PUMP # 3

Ethernet Information

Device Type	IP Address	Subnet Mask
2163U	192.168.1.5	255.255.255.0

PowerFlex 753 Firmware Version : LATEST

Catalog Number: 2163UB-065HKB-3F-5LGR-14DA2R1-14DFLPJ-14GER-14HBA6-14RLX-46TGM-751HS-790K
Total Space Factor = 4
Wiring: NEMA Type B wiring
Output Current Rating: 52A
Circuit Breaker: Inverse Time (Thermal Mag), 100kA at 480V (G6C Frame) (125A Trip)
Human Interface Module: LCD full numeric keypad - Door Mounted
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3F)
Pilot Light(s): RUN-AT SPEED Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Drive 120VAC w/ I/O (-14DA2R1)
Drive input fuses - Bussman (-14DFLPJ)
Dualport Ethernet (for VFD) (-14GER)
Drive Line Reactor (-14RLX)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)

Engineered Spec(s)/Modification(s)
(1) Bulletin 800T/H, Contact block, addition to standard number of contacts,800T-XA
Note - Extra contact block on Selector SW
(1) Engineered Modification and/or Custom Diagram
(3) Convert (1) 800F Pilot Light to (1) 800H Pilot Light

Unit Loc: 05A **Del Prog: SCII**
Unit ID: 14
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1.5 HP

Name Plate Information
SUMP PUMP

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 2.51
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.11	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-36TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (7A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 05C **Del Prog: SCII**
Unit ID: 17
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
0.75 HP

Name Plate Information
FURANCE BLOWER

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 1.5
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.14	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-34TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (3A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 05E **Del Prog: FT2**
Unit ID: 8
VFD - PowerFlex 753 AC Drive w/CB

Rating
40 HP
(Heavy Duty)

Name Plate Information
PUMP # 4

Ethernet Information

Device Type	IP Address	Subnet Mask
2163U	192.168.1.6	255.255.255.0

PowerFlex 753 Firmware Version : LATEST

Catalog Number: 2163UB-065HKB-3F-5LGR-14DA2R1-14DFLPJ-14GER-14HBA6-14RLX-46TGM-751HS-790K
Total Space Factor = 4
Wiring: NEMA Type B wiring
Output Current Rating: 52A
Circuit Breaker: Inverse Time (Thermal Mag), 100kA at 480V (G6C Frame) (125A Trip)
Human Interface Module: LCD full numeric keypad - Door Mounted
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3F)
Pilot Light(s): RUN-AT SPEED Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Drive 120VAC w/ I/O (-14DA2R1)
Drive input fuses - Bussman (-14DFLPJ)
Dualport Ethernet (for VFD) (-14GER)
Drive Line Reactor (-14RLX)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)

Engineered Spec(s)/Modification(s)
(1) Bulletin 800T/H, Contact block, addition to standard number of contacts,800T-XA
Note - Extra contact block on Selector SW
(1) Engineered Modification and/or Custom Diagram
(3) Convert (1) 800F Pilot Light to (1) 800H Pilot Light

Unit Loc: 06A **Del Prog: SCII**
Unit ID: 16
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1.5 HP

Name Plate Information
AIR COMPRESSOR #2

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 2.51
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.13	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-36TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (7A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 06C **Del Prog: SCII**
Unit ID: 15
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
1.5 HP

Name Plate Information
AIR COMPRESSOR #1

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 2.51
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.12	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-36TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (7A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

Unit Loc: 06E **Del Prog: SCII**
Unit ID: 10
FVNR - Full Voltage Non-Rev Starter w/CB

Rating
0.75 HP

Name Plate Information
MECHANICALLY
CLEANED SCREEN

Overload Relay(s)
E300 Comm Based Overload (7FE3)
E300 Communication Option = EtherNet/IP
E300 Voltage Code = 120V AC
E300 Control Module = Control Only
E300 Sensing Module = 0.5-30A Current Only
E300 Operator Station = Electronic Reset
E300 Expansion Module = None Selected
Motor RPM = 1800
Motor Full Load Current (FLC) = 1.5
Motor Service Factor = 1.15

Ethernet Information

Device Type	IP Address	Subnet Mask
2113	192.168.1.7	255.255.255.0

E300 Overload Firmware Version : LATEST

Catalog Number: 2113B-BAB-3-5LGR-6P-7FE3EDCN3CR-17-34TGA-751HS-790K-900-911
Size: NEMA Size 1
Total Space Factor = 1
Wiring: NEMA Type B wiring
Circuit Breaker: Instantaneous (MCP), 65kA at 480V (G8P Frame) (3A Trip)
Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz
Control Wiring: #16 AWG MTW(TEW) Cu

Features Included
Selector Switch: HAND-OFF-AUTO (-3)
Pilot Light(s): ON-OFF Type: LED Push To Test, Color(s): Green, Red (-5LGR)
Std Capacity Control Power Transformer W/Primary Fuses (-6P)
Contactor Surge Suppressor (-17)
Heat Shrink Type Markers (-751HS)
1 Auxiliary -Internal-CB (-790K)
2 NO on Starter (-900)
2 NC on Starter (-911)

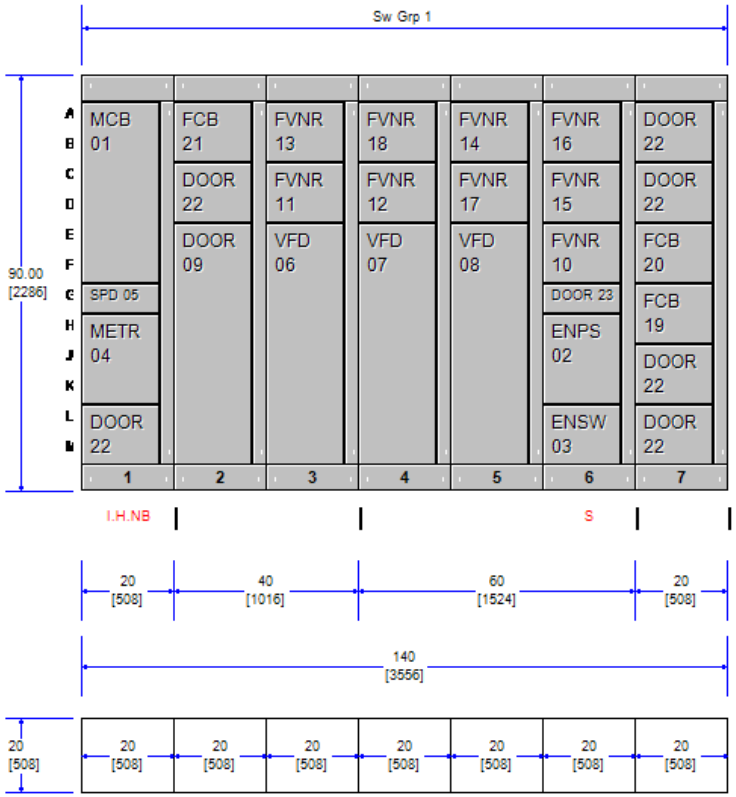
Unit Loc: 06G **Del Prog: SCII** **Unit ID: 23** DOOR - Blank Unit Door	**Catalog Number: 2100-BK05** Total Space Factor = 0.5
Unit Loc: 06H **Del Prog: SCII** **Unit ID: 2** ENPS - EtherNet Power Supply Unit **Rating** 125A **Name Plate Information** ETHERNET POWER SUPPLY	**Catalog Number: 2100-EPS8KB-30TGM-751HS-768C-790K** Total Space Factor = 1.5 Circuit Breaker: Inverse Time (Thermal Mag), 65kA at 480V (G6C Frame) (15A Trip) Disconnect Type = Circuit Breaker Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, V/60Hz Control Wiring: #16 AWG MTW(TEW) Cu **Features Included** Heat Shrink Type Markers (-751HS) Redundant ENet Power Supply (-768C) 1 Auxiliary -Internal-CB (-790K)
Unit Loc: 06L **Del Prog: ENG** **Unit ID: 3** ENSW - Stratix 5700 20-Port **Name Plate Information** ETHERNET SWITCH **Ethernet Information** Device Type IP Address Subnet Mask 2100-ESW 192.168.1.1 255.255.255.0 Ethernet Switch Firmware Version : LATEST	**Catalog Number: 2100-ESW20K-B10FDP-203W-751HS** Total Space Factor = 1 Full Stratix 5700 Firmware NAT (CIP Sync & Gigabit Ports) Power Adapters (w/Unit Mtg) **Features Included** Door Mounted Window Provided (-203W)
Unit Loc: 07A **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1
Unit Loc: 07C **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1
Unit Loc: 07E **Del Prog: SCII** **Unit ID: 20** FCB - 3-Pole Feeder Circuit Breaker (FCB) **Rating** 20A **Name Plate Information** FEEDER UH-1 **Overload Relay(s)** Motor Full Load Current (FLC) = Not Available	**Catalog Number: 2193F-AKB-31TGM-790K** Total Space Factor = 1 Circuit Breaker: 65kA at 480V (20) with Frame Rating of 125A (G6C Frame) , Plug-In Unit, 20A Trip Lugs Supplied: Std Mech/Lug Pads, 1/0 AWG Size Wire, 1 Cables per Phase **Features Included** 1 Auxiliary -Internal-CB (-790K)

Unit Loc: 07G **Del Prog: SCII** **Unit ID: 19** FCB - 3-Pole Feeder Circuit Breaker (FCB) **Rating** 50A **Name Plate Information** FEEDER TO T1 **Overload Relay(s)** Motor Full Load Current (FLC) = Not Available	**Catalog Number: 2193F-AKB-35TGM-790K** Total Space Factor = 1 Circuit Breaker: 65kA at 480V (50) with Frame Rating of 125A (G6C Frame) , Plug-In Unit, 50A Trip Lugs Supplied: Std Mech/Lug Pads, 1/0 AWG Size Wire, 1 Cables per Phase **Features Included** 1 Auxiliary -Internal-CB (-790K)
Unit Loc: 07J **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1
Unit Loc: 07L **Del Prog: SCII** **Unit ID: 22** DOOR - Blank Unit Door	**Catalog Number: 2100-BK10** Total Space Factor = 1

Rockwell Automation

Centerline 2100 Motor Control Center - Front Elevation

Rockwell Automation/Allen-Bradley
PowerControl Builder Lineup



NOTE: Dimensions are subject to change after design review.
ENCLOSURE: NEMA Type 1G (General Purpose with Gasketed Doors and Bottom Closing Plates)

Estimated Heat Loss: 3,501 watts
Heat loss values are for estimating purposes only.

6 = 600A vertical bus in section
9 = 9-inch wireway section
C = Corner section
H = Horizontal neutral bus
I = Incoming line in section

NB = Neutral connection plate in bottom of section
NT = Neutral connection plate in top of section
P = Pull box mounted on top of section
V = 9-inch wireway has vertical neutral bus
S = Ethernet switch

APPENDIX B: VENDOR QUOTATIONS

BUDGET PROPOSAL

May 15, 2018

Budget Quotation No. 8270

370 South Athol Road
Athol, MA 01331
Phone : 978-249-7924
Fax : 978-249-3072

PLEASE REPLY TO:

Atlantic Fluid Technology Inc.
354 West Boylston Street
Suite 221
West Boylston, MA 01583-2373
Phone : 508-755-0440
Fax : 508-755-9589

Subject : **Portland Pump Station**
Portland, ME

Engineer : Woodard & Curran

We are pleased to offer the following quotation for the Slide Gates

Item No.	**01** Tag No.
Location - Dwg No :	Wet Well -
Quantity	1
Size - Model :	24" Wide x 24" High. - Model 925 Stainless Steel Gate
Invert To Floor :	25'
Max Design Head :	18' seating / 18' unseated
Description :	The upward opening stainless steel slide gate will have the following features : 304 SS construction, UHMW side and top seals, and a neoprene invert seal. The single operating stem will be 304 SS.
Mounting Style :	Wall Mounted.
Anchor Bolts :	5/8" Anchor studs and nuts included.
Lifting Mechanism :	Pedestal Mounted Manual Gearbox Operator.

Item No.	**02** Tag No.
Location - Dwg No :	Wet Well -
Quantity	2
Size - Model :	36" Wide x 56" High. - Model 924 Stainless Steel Gate Designed for full upward travel with remote chain drive to locate crank at 36”.
Invert To Floor :	5'
Max Design Head :	5' seating / 5' unseated
Description :	The upward opening stainless steel slide gate will have the following features : 304 SS construction, UHMW side and top seals, and a neoprene invert seal. The single operating stem will be 304 SS.
Mounting Style :	Wall Mounted Inside Existing Channel.
Anchor Bolts :	1/2" Anchor studs and nuts included.
Lifting Mechanism :	Yoke Mounted Manual Gearbox Operator.

Total Budget Price : $24,300.00

Sincerely,

Kevin White
Whipps, Inc.
370 South Athol Road
Athol, MA 01331
Phone : 978-249-7924
Fax : 978-249-3072

Woodard and Curran

May 8, 2018

RE: City of Portland Maine estimate of probable cost

Ted Berry job No. M-18-00365

The following is an estimate of probable cost for the temporary by-pass of sanitary sewerage pumping stations in the City of Portland as requested.

The by-pass specifications are vague and flow data is either very vague or non-existent.

Ted Berry Company, Inc.

- Work will generally consist of the design, mobilization, setup, operation, and consultation of a flow isolation and by-pass system to assist the GC perform their work.
- Will perform all work in accordance with state, local, federal, and General Contractor safety policies. Ensure that all necessary safety equipment is onsite, readily available to personnel and in good working order.
- Attend a pre-construction meeting with the Project Engineer.
- Will be responsible for transporting and positioning all necessary equipment to the job site.
- Will provide a written work plan prior to the start of work

Ted Berry Company Provided Labor, Equipment, and Materials

Labor

1. Senior Project Manager (SPM) - will be responsible for execution of the project plan, project budget, and project safety
2. Project Supervisors - Will direct work activities in the field and execute the project plan
3. HDPE Pipe Fusion Technicians - Will fuse by-pass piping systems and shall be certified to fuse HDPE pipe
4. Pump System Operators - Will setup, test, operate, and maintain the pumping systems
5. Isolation System Operators - Will setup, test, operate, and maintain the isolation systems
6. Equipment Operators - Will safely operate materials handling equipment such as Lull and boom truck to deliver and setup equipment at the site
7. Technicians - Will provide general labor support to the project team

Pumping System - There are a number of significant challenges and risks associated with a by-pass of this size and configuration, however collectively through collaboration with the GC and consultant we will present a plan that will best manage the confines of the site and handle flows.

The pumping system generally consists of diesel driven pump sets stationed at the upstream manholes of each by-pass. Although sound attenuated (SA) pumps are not specified we will desire to use if it is practical. HDPE piping and hoses will be used to construct the suction and discharge systems that will transport the flows to its desired location through a leak free reliable piping system. We will provide flanged sections that will make up the road crossings in advance so GC can install them at their convenience and not during time pumping systems are on rent.

Isolation System - The isolation of the flows and the area where the pipe replacement is taking place is a critical component of the project, and the Ted Berry Company project plan would take into consideration many factors including site constrictions, existing pipe sizes, and manhole structure configurations, flow dynamics, and risks associated with various configurations and styles of pipeline plugging equipment. Often referred to as "pigs" pneumatic pipe plugs come in many shapes, styles, and configurations and can be constructed of various materials.

Support Equipment

I. HDPE fusion machine
II. Service and crew trucks
III. Equipment trailer
IV. Air regulator equipment (panels)
V. HDPE fusion racks (PolyHorse)
VI. Lull
VII. Spill containment system for each pump

Differing conditions / Assumptions

1. **Debris in the sewer** above the pumping stations gets into the by-pass pumps and damages them.
2. **Owner supplied information is inaccurate**; modification of pumping plan may be needed.
3. **Flows higher than anticipated** - If flows at any point in the system are higher than anticipated a modification to the pumping or work plan may be required.

Estimate of Probable cost

Franklin Street (4 weeks) $35,000.00
Curtis Road (2 weeks) $17,500.00

Sincerely,

Matt Timberlake
President

Global Headquarters
290 Paularino Avenue
Costa Mesa, CA 92626 USA
phone (949) 833-3888
toll-free (800) 331-2277
fax (949) 833-8858
jwce@jwce.com

CDD 2.5 CHANNEL MONSTER BUDGET DESIGN INFORMATION

DATE: 5/7/2018

PROJECT: Franklin PS Portland, ME

TO: Mike Loncoski / AQS

Thank you for choosing JWC's equipment. Enclosed you will find a specification and drawing based on the design parameters listed below. Please let us know if any of the information below changes.

Number of units:	1
Model:	CDD-5010-XDM2.5
Flow:	10 MGD(1577.3m³/hr)
Channel width	42 inches (1066.8 mm)
Channel depth	60 inches (1524 mm)
Weight	4655 lbs (2111.46145 kg)

10 HP XPFC cutter shaft motor

1 HP XPFC drum motors

PC2223 Nema 4x FRP standard motor controller with CB disconnect

BUDGET PRICE PER UNIT **$172,331**

(Freight and one startup service included)

Not to be used for construction

Please contact JWC if you have any questions.

Ritec Environmental, LLC.

A Ritec and Sullivan Associates Company

29 Lincoln St.
PO Box 514
East Boothbay, ME
04544

P (207) 633-3111
F (207) 633-7694

Quotation

Please advise if not all pages were received.

Dear Jay,

To:		Phone:	
Company:	Woodard & Curran	Fax:	
From:	Chris Williams	Date:	May 7, 2018
E-Mail:		No. of Pages:	
Subject:	Siemens MAG5100 Direct Burial	Quote No.:	

I'm pleased to provide you with a quote for a direct burial Siemens Mag5100 Magnetic Flowmeter. Please give me a call if you have any questions.

Item	*Qty*	*Description*	*Price*
3	**1**	Siemens MAG5100W Magnetic Flowmeter, 24" DIA, ANSI RF 150# Flanges, Ebonite Hard Rubber Liner, Hasteloy C Electrodes, IP68 Direct Burial Rated, FM Class I DIV II Rated, with MAG5000 Remote Mounted Signal Converter, 110VAC, 4-20mA output, Totalizer, Display, NEMA 4X 50ft of Electrode and Coil Power Cable. Part Number:**7ME6580-4HJ14-2AA2 / 7ME6910-1AA10-1AA0 / FDK:085U1053 / FDK:001SPCAB / FDK:001STCAB**	**$3,693.00 ea.**

Delivery: 1-2 Weeks ARO
FOB: Shipping point
Freight: UPS PP/A

Terms: Net 30 days
Start-Up Services: **$900.00**

Please review materials of construction, conditions of service, and all details and specifications stated herein or on attachments to verify our understanding of your requirements. If you wish to place an order, please enter in the name of: **Sullivan Associates PO Box 514 East Boothbay ME 04544**. Please fax orders to (207) 633-7694.

Best regards,

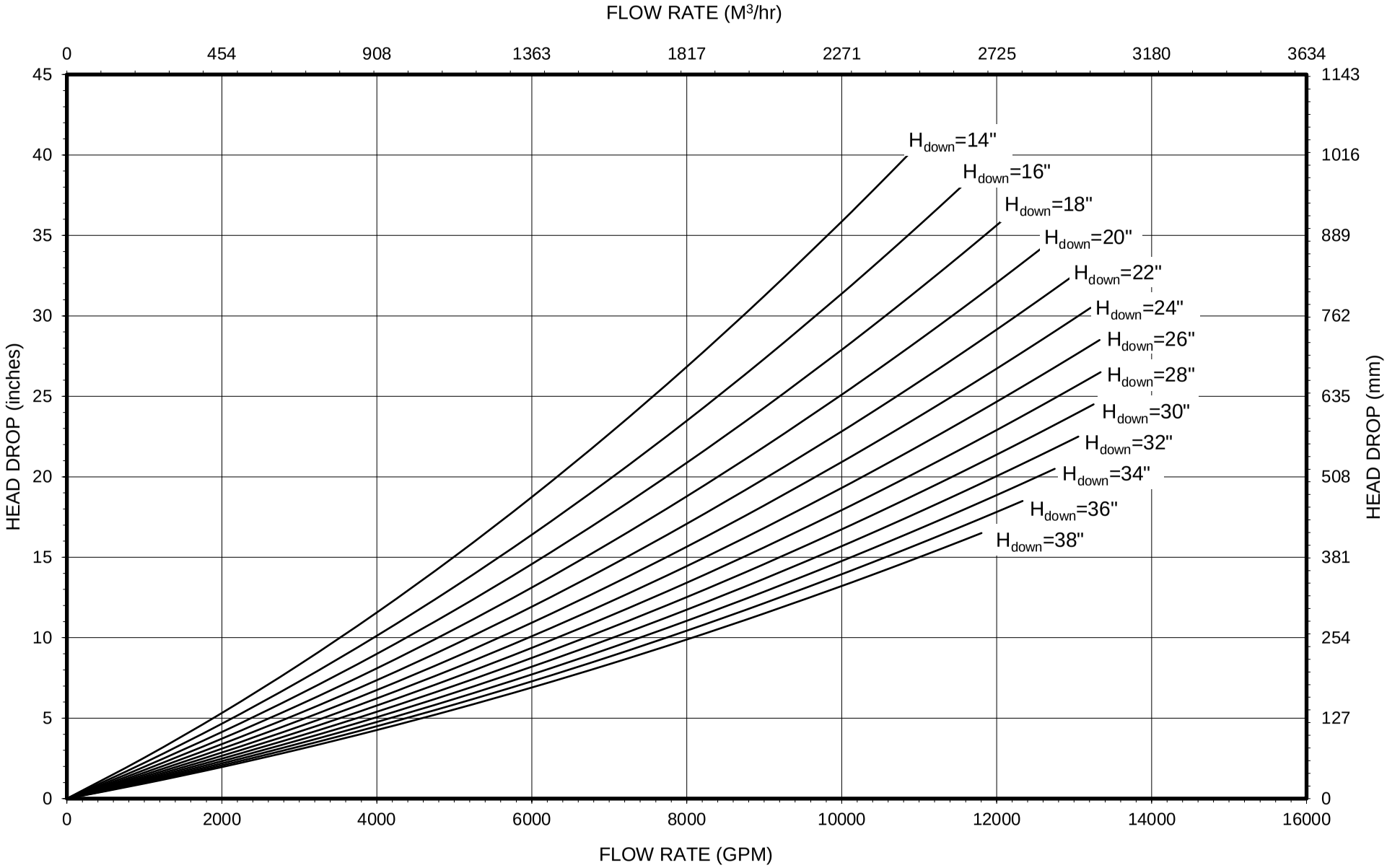
Chris Williams
Ritec Environmental, LLC &
Sullivan Associates

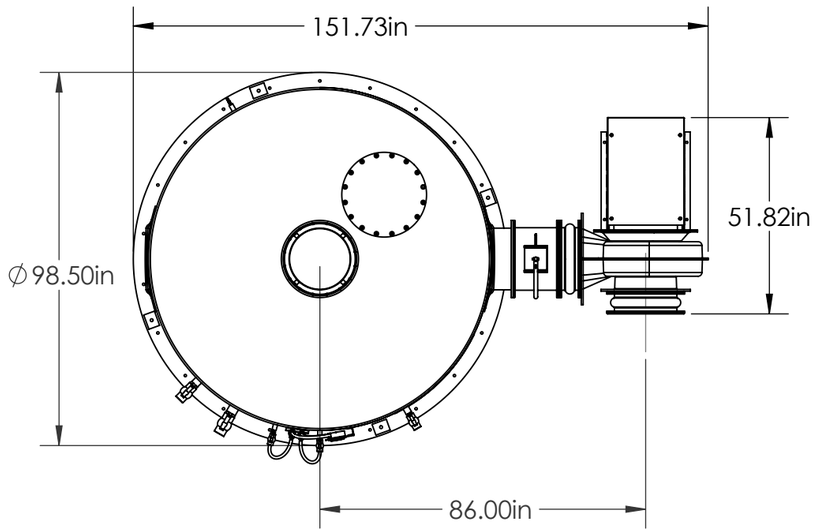
HEAD DROP

MODEL CDD5016-XD2.0

Ø1/2" PERFORATED STAINLESS STEEL DRUM

3-13-15





BASE SYSTEM SHOWN, INCLUDES:

- FRP VESSEL
- SMACNA NO-LOSS EXHAUST STACK
- ISOLATION / BALANCING DAMPER
- FRP BLOWER WITH INLET & OUTLET EXPANION JOINTS
- DWYER MAGNEHELIC DP GAUGE
- MOTOR STARTER
  (SHIPPED LOOSE, MOUNTED 3' FROM AIRSTREAM)

ECS V1 CARBON ADSORBER SYSTEM	
MODEL:	60 SERIES V1-90-2500
CARBON CAPACITY:	133 FT^3 (3' BED DEPTH)
BED VELOCITY:	57 FPM
EBRT:	3.18 SECONDS
SYSTEM PRESSURE DROP:	4.8" W.C.*
FAN DATA	
MODEL:	NYB RFE400
DESIGN:	2500 CFM @ 10" W.C.
MOTOR:	3-60-230/460V; 10 HP; FLA 14 AMPS

NOTES:

1. ALL FLANGES PER PS 15-69 UNLESS OTHERWISE NOTED

2. VESSEL CONSTRUCTION IS FRP
   -RESIN SYSTEM IS A CLASS 1 FLAME RESISTANT VINYL ESTER
   -ALL INTERNAL SURFACES HAVE A 100-MIL COROSION BARRIER
   -EXTERIOR SURFACES TO HAVE UV-INHIBITOR APPLIED

3.NOZZLE ORIENTATIONS ARE PLACED FOR CLARITY AND CAN BE CHANGED TO FIT SITE CONDITIONS

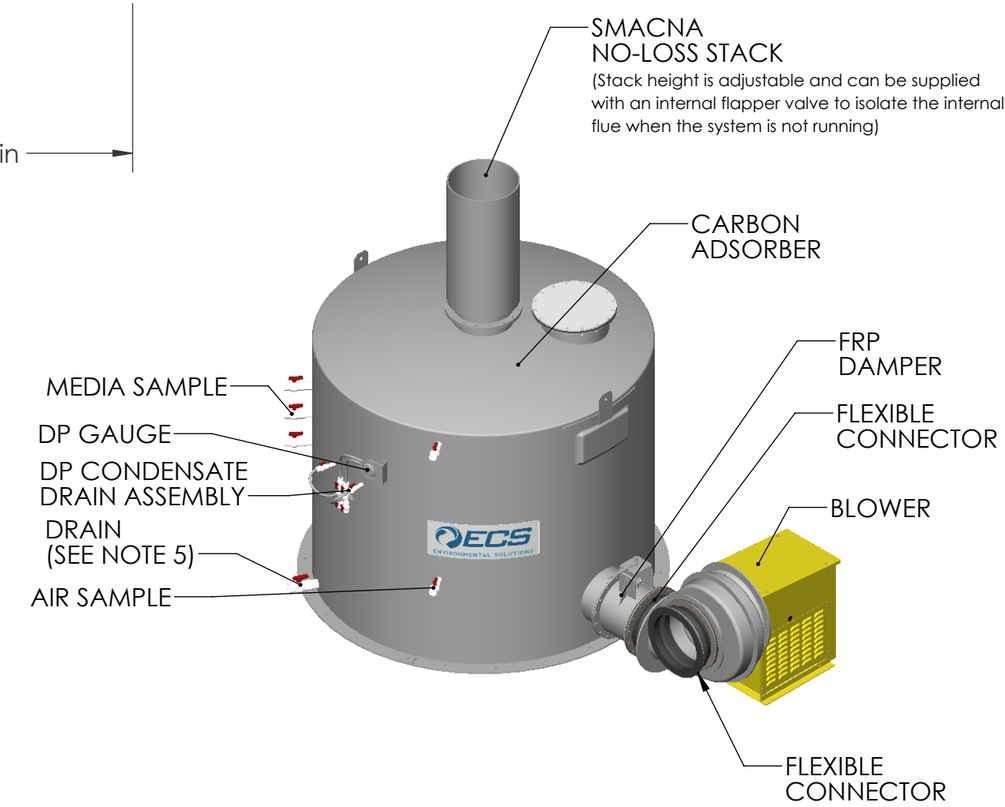
4. NEMA 4X MOTOR STARTER MOUNTED 3' FROM AIR STREAM.

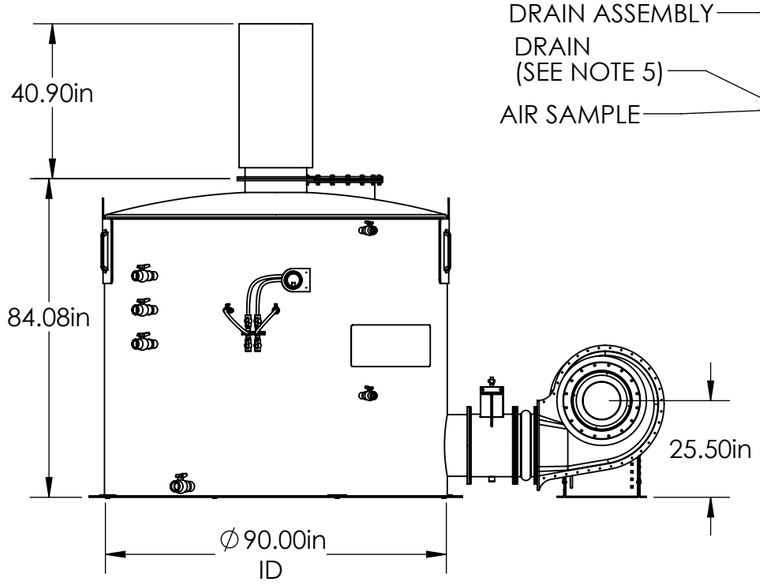
5. DRAIN PORT MAY HAVE A CONSTANT DRIP AND SHOULD BE PLUMBED AWAY FROM THE SYSTEM WITH SIX-INCH WATER TRAP. IF FREEZING CONDITIONS MAY EXIST, THIS EXTERNAL PIPING SHOULD BE INSULATED AND HEAT TRACED (EXTREME CONDITIONS)

6. IF THE ODOR CONTROL SYSTEM IS INSTALLED OUSIDE INA COLD CLIMATE, AND THE INFLUENT AIR IS WARM / MOIST, A 2" THICK FACTORY APPLIED INSULATION SYSTEM IS RECOMMENED

7. COLORS OPTIONS ARE GRAY, WHITE, OR TAN.

8. CONSULT ECS FOR MEDIA SELECTION. DIFFERENT CARBONS OR POLISHING AGENTS ARE OFFERED BASED ON TREATMENT OBJECTIVES AND CONCENTRATIONS WITH THE INTENT TO OPTIMIZE MEDIA LIFE





ESTIMATED ASSEMBLED WEIGHTS:

EMPTY: 1885#
FLOODED: 18344#
OPERATING: 6126#

PROPRIETARY AND CONFIDENTIAL

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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
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MATERIAL
FINISH
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	D Tagtow	11/4/2015
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

ECS ENVIRONMENTAL SOLUTIONS

File: 60S V1-90-2500 V1 System Pad Asy

TITLE:

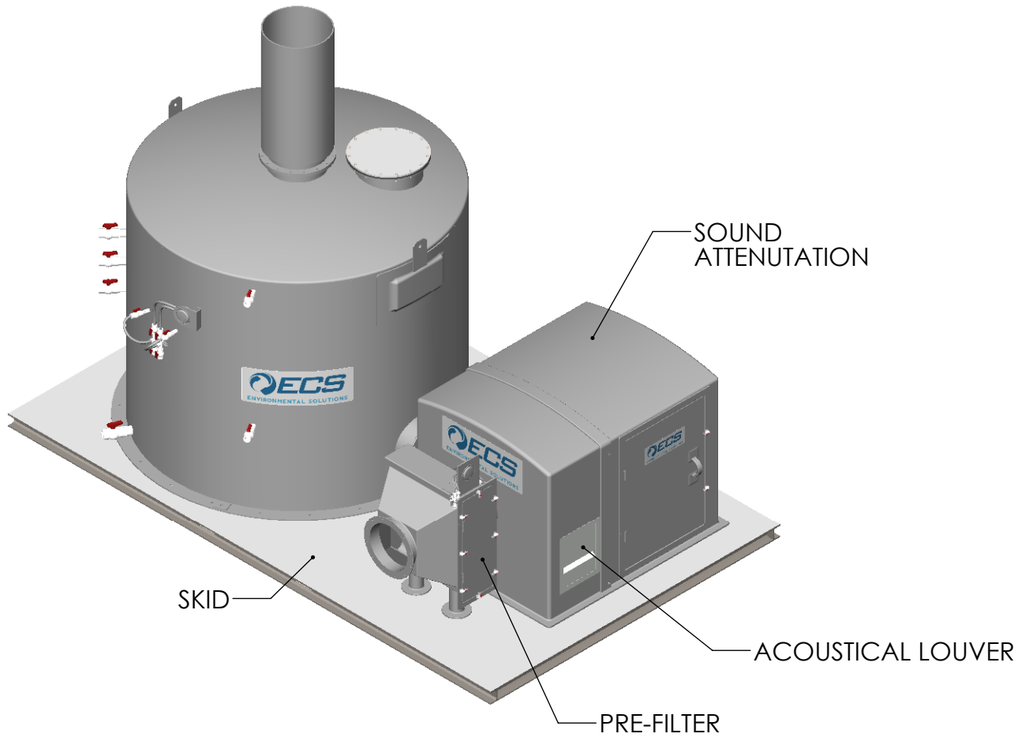
V1-90 2500 CFM

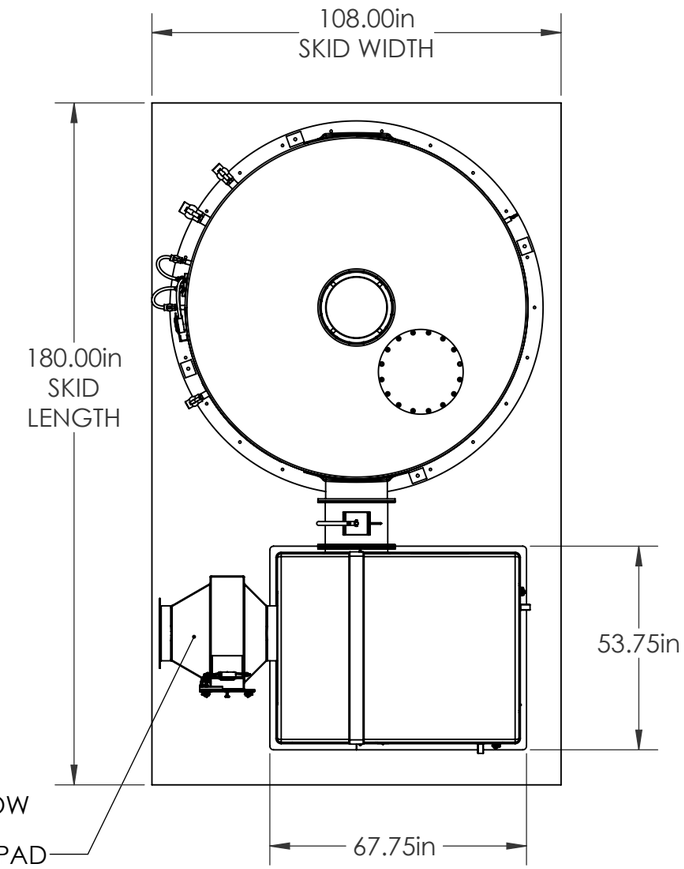
SIZE	DWG. NO.	REV
B	V1-90	A

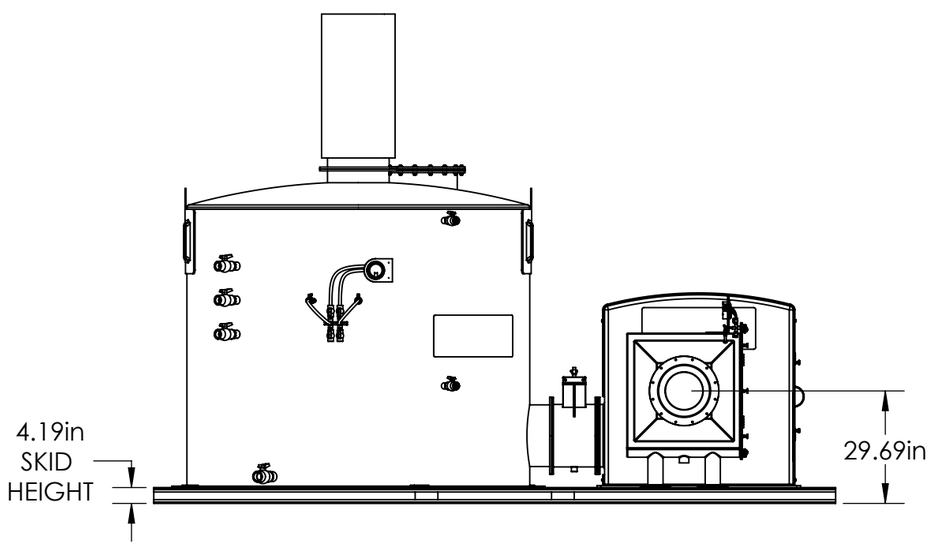
SCALE: 1:40 SHEET 1 OF 5

OPTIONAL ACCESSORIES:

- ECS SOUND ABSORB ENCLOSURE
- ECS GUARDIAN PRE-FILTER
- EPOXY COATED STEEL SKID







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DO NOT SCALE DRAWING			

File: 60S V1-90-2500 V1 System Pad Asy

TITLE:

V1-90 2500 CFM

SIZE	DWG. NO.	REV
B	V1-90	A

SCALE: 1:40 | SHEET 2 OF 5

ECS ENVIRONMENTAL SOLUTIONS

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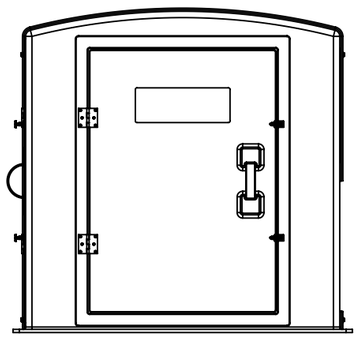
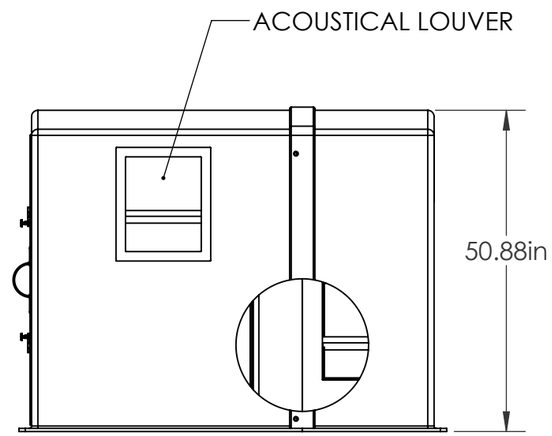
TRANSMISSION LOSS						
2 - 125	3 - 250	4 - 500	5 - 1000	6 - 2000	7 - 4000	OCT
26	29	33	44	52	60	DB



MOTOR SIDE



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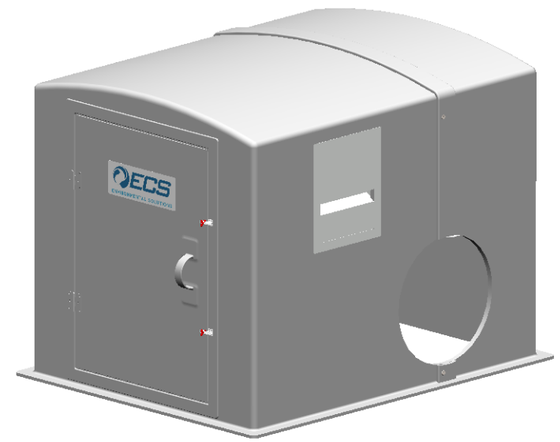
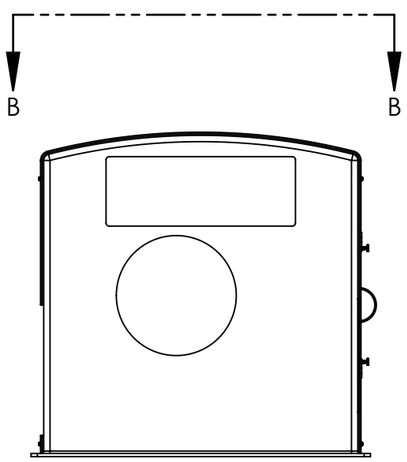
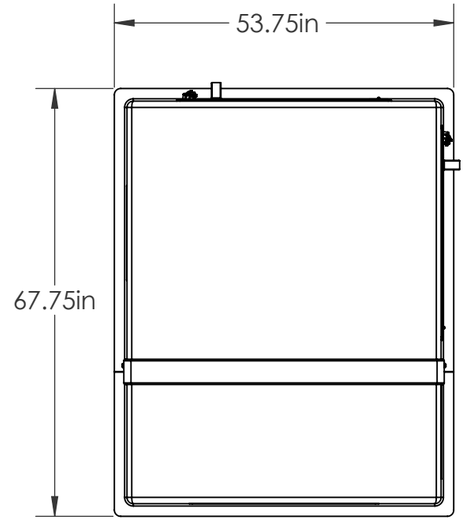


GENERAL NOTES:

- **CONSTRUCTION**
  - WALLS VACUUM-FORMED WITH TWO LAYERS OF FRP OVER A HONEY-COMB CORE
  - RESIN, LINER, AND COLOR TO MATCH V1 CONSTRUCTION
  - SPLIT LINE TO BE CENTERED ON FAN HOUSING
  - 2" OF ECS SOUND-ABSORB LINING ON ALL INTERNAL SURFACES
  -
- **STANDER FEATURES:**
  - TWO HINGED ACCESS DOORS WITH TOGGLE CLAMPS
  - TWO ACOUSTICAL LOUVERS
- **OPTIONAL FEATURES**
  - CLASS 1 DIV 1 EXHAUST FAN
  - TEMPERATURE SWITCH
  - INTERNAL LIGHTE (AVAILABLE ON LARGER ENCLOSURES)



AIR INLET SIDE



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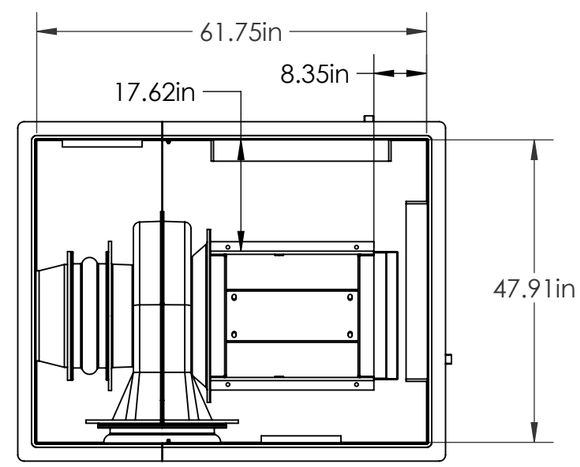

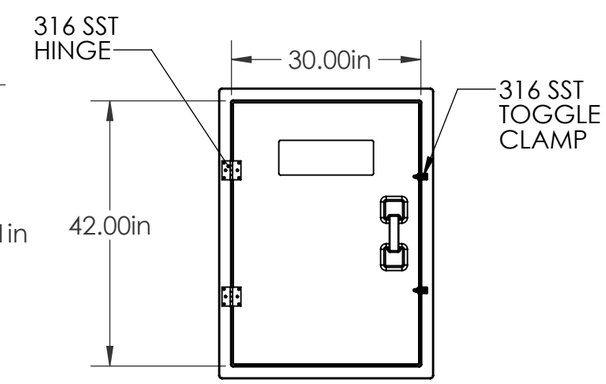

ACCESS DOOR DETAIL

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UNLESS OTHERWISE SPECIFIED:		NAME	DATE
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	MFG APPR.		
INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			

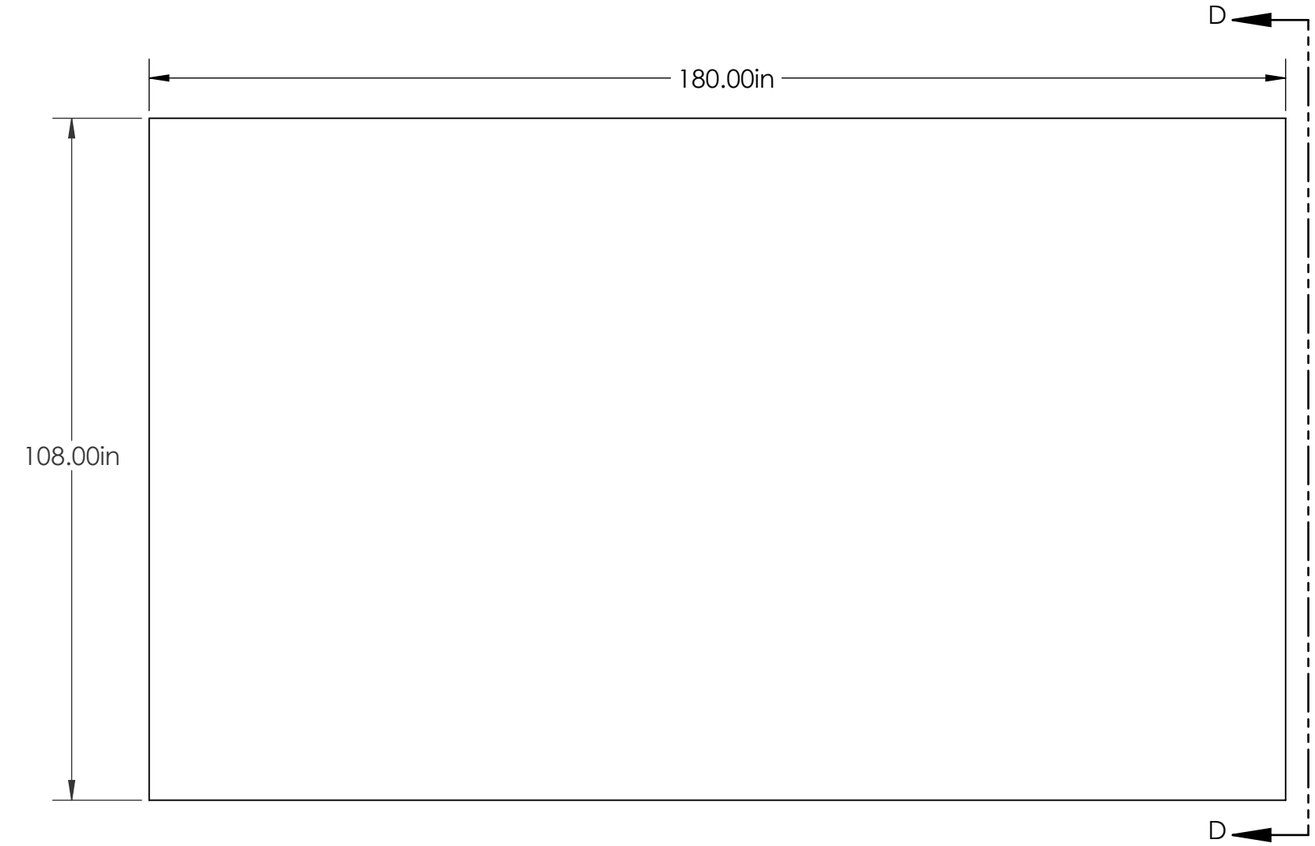
ECS ENVIRONMENTAL SOLUTIONS

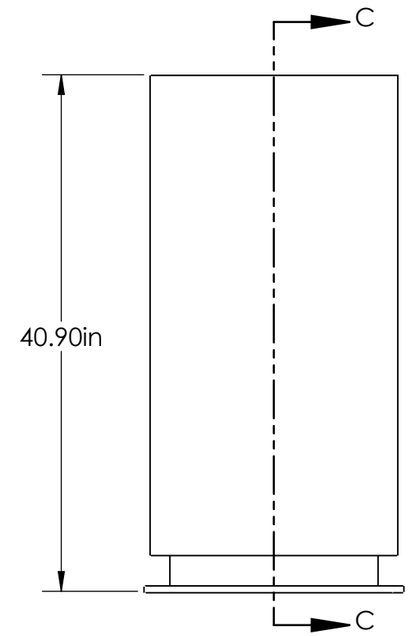
File: 60S V1-90-2500 Sound Enclosure

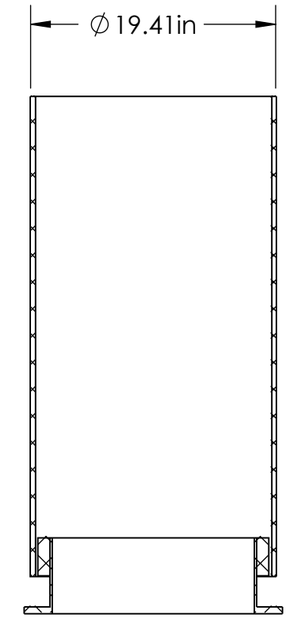
TITLE:

Sound Enclosure

SIZE	DWG. NO.	REV
B	SE-01	A
SCALE: 1:24		SHEET 3 OF 5







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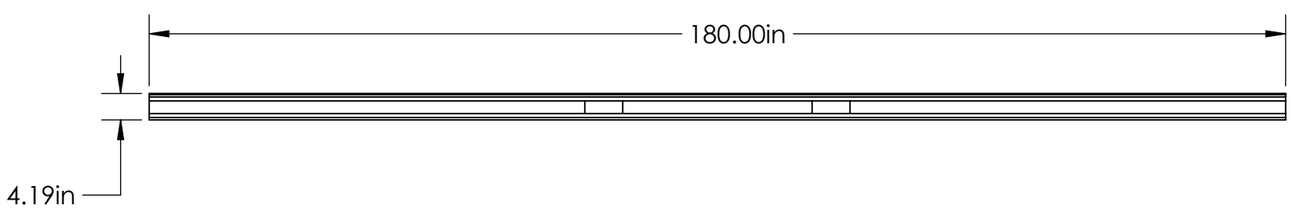
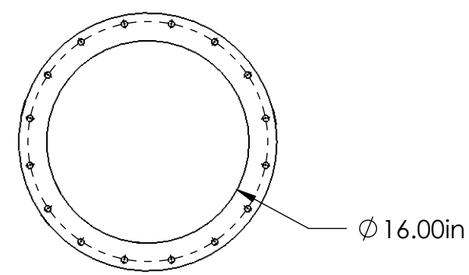
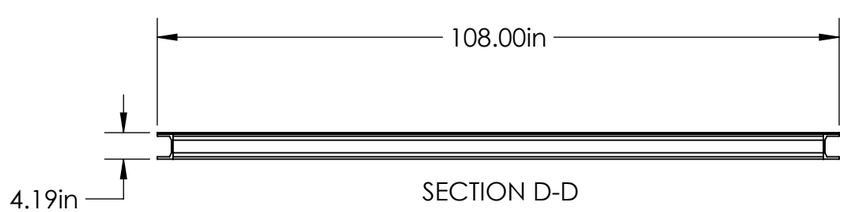
SCALE 1 : 12







SECTION D-D

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UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005	DRAWN	D Tagtow	11/4/2015
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MATERIAL			
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DO NOT SCALE DRAWING			

ECS ENVIRONMENTAL SOLUTIONS

File: 60S V1-90-2500 Skid

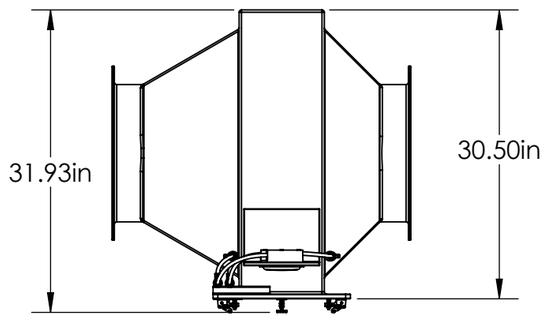
TITLE: **Epoxy Coated Steel Skid, No Loss Stack**

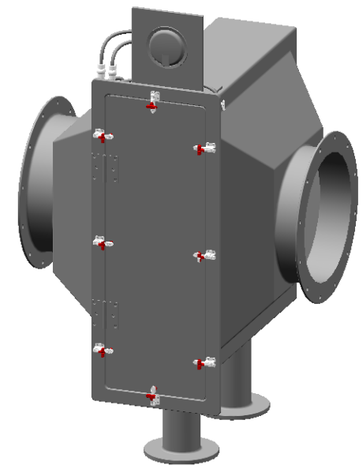
SIZE	DWG. NO.	REV
B	SKD-01	A

SCALE: 1:24 | SHEET 4 OF 5

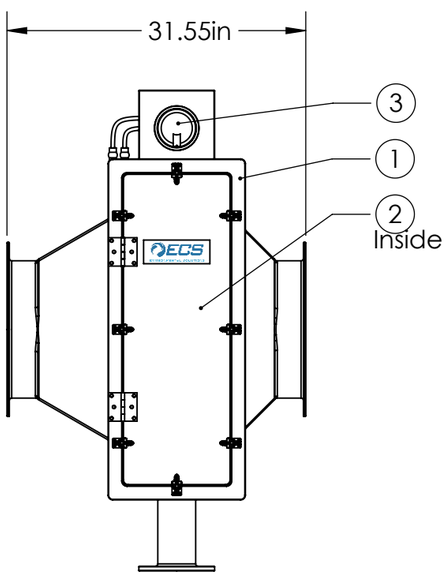
Item	Part	Part Number	Qty
1	Housing	ECS-GUARD-2500	1
2	Combination Pad	ECS-GFME-2500-30x30	1
3	Differential Pressure Gauge	ECS-DP-2015	1

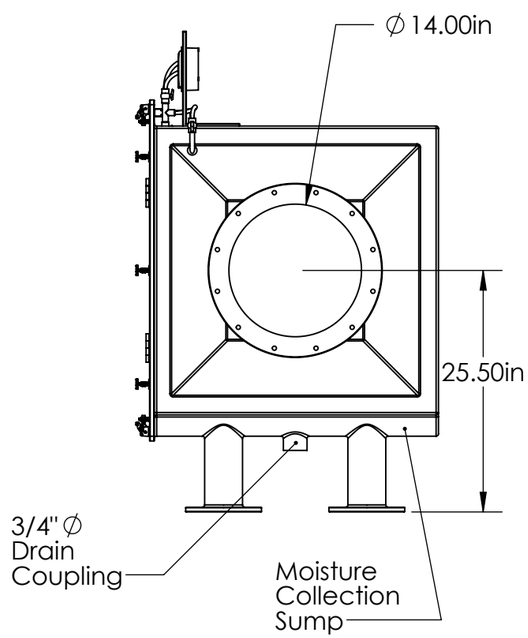
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	A	Initial Release	8/18/2015	J Jones





GUARDIAN® PREFILTER





General Notes
1. Operating Weight: 135 lbs
2. Standard end connections are sized per ASTM 3982 / NBS PS 15-169 Table 2 parameters. If alternate connection sizes are necessary please specify when ordering.
3. ECS Guardian prefilters come standard with a mechanical differential pressure indicator.
4. Pressure drop with clean pad at the design airflow will be .5" w.c.
5. Pressure drop with dirty pad at the design airflow will be 1.25" w.c.
6. Performance: 99% removal of particles 10 micron or larger
7. For applications where moisture removal is not desired an alternative particulate / grease removal pad can be supplied. Contact ECS technical service for additional information.
8. Base drain connection should be piped away from the unit
9. Effluent piping should include a water trap to prevent hold-up of liquid due to negative pressure in the prefilter housing. If freezing conditions exist this piping should be heat traced and insulated.
10. FRP housing is manufactured using a vinyl ester resin system with a class 1 flame spread rating. All interior surfaces have a 100-mil corrosion liner, exterior surfaces are gelcoated and contain a UV inhibitor. Standard colors are grey, white or tan. Please specify when ordering.
11. Client to advise Inlet CL height when ordering
12. 30" of clearance required at access door for pad removal

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DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL
See Notes

FINISH
See Notes

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	D Tagtow	8/18/2015
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

ECS ENVIRONMENTAL SOLUTIONS

CAD File: ECS-GFME-2500-30X30 Asy

TITLE:

Prefilter - 2500 cfm

SIZE **B** | DWG. NO. | REV **A**

SCALE: 1:16 | WEIGHT: 52.72 | SHEET 5 OF 5

APPENDIX C: PROCESS & INSTRUMENTATION DIAGRAM: SEAL/COOLING WATER

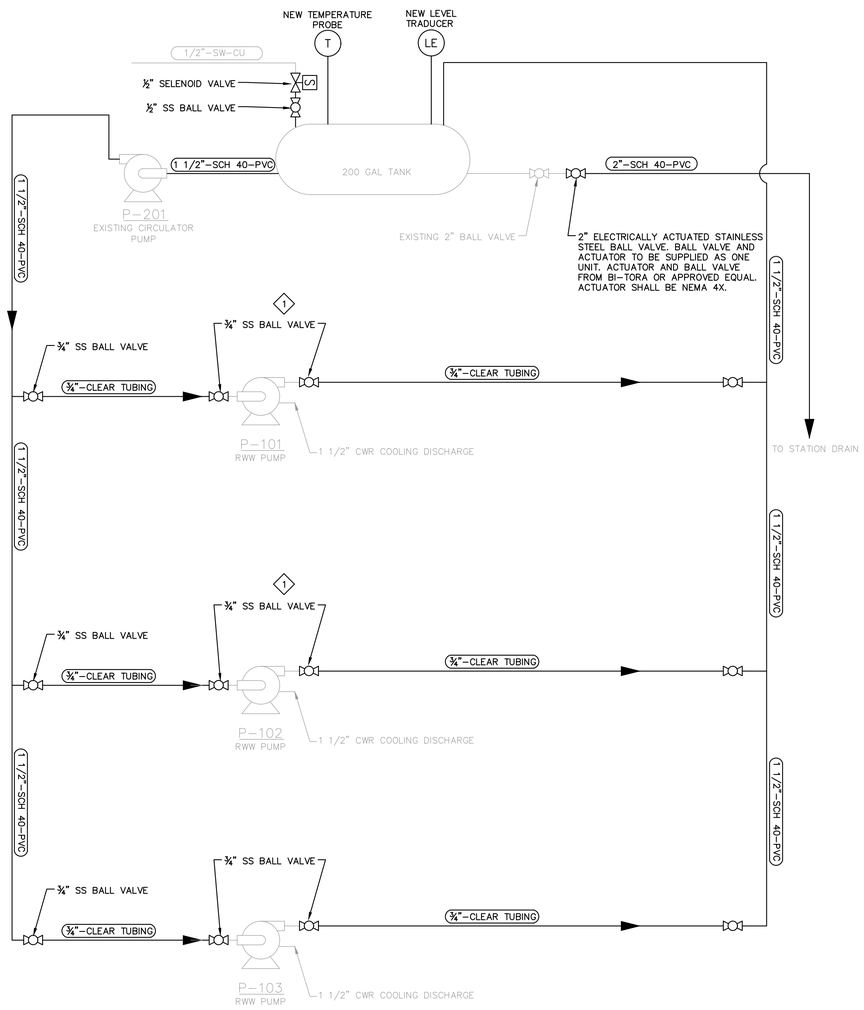
22x34 SHEET
1:1

KEYED NOTES

1. CLEAR TUBING TO CONNECT TO ¾" BALL VALVE. ¾" BALL VALVE TO ATTACH TO EXISTING COPPER PIPING AT PUPMP JACKET (TYP OF 6).

DEMOLITION GENERAL NOTES

1. NEW PIPING TO BE RUN IN LOCATION OF EXISTING PIPING.
2. VALVES SHALL LOCATED IN AREAS EASILY ACCESSIBLE.
3. SUPPORT PIPING ACCORDING TO MANUFACTURERS RECOMMENDATION.
4. PIPES SHALL BE SUPPORTED ON EACH SIDE OF VALVES.
5. PIPING SHALL NOT OBSTRUCT ACCESS TO PUMPS OR OTHER EQUIPMENT.
6. COORDINATE PIPING AND VALVE LOCATION WITH OWNER AND ENGINEER PRIOR TO CONSTRUCTION.



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Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
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REV	DESCRIPTION	DATE

DESIGNED BY: JJ
DRAWN BY: CB
CHECKED BY: JJ
0231265-PR-101.dwg

PROCESS INSTRUMENTATION DIAGRAM

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

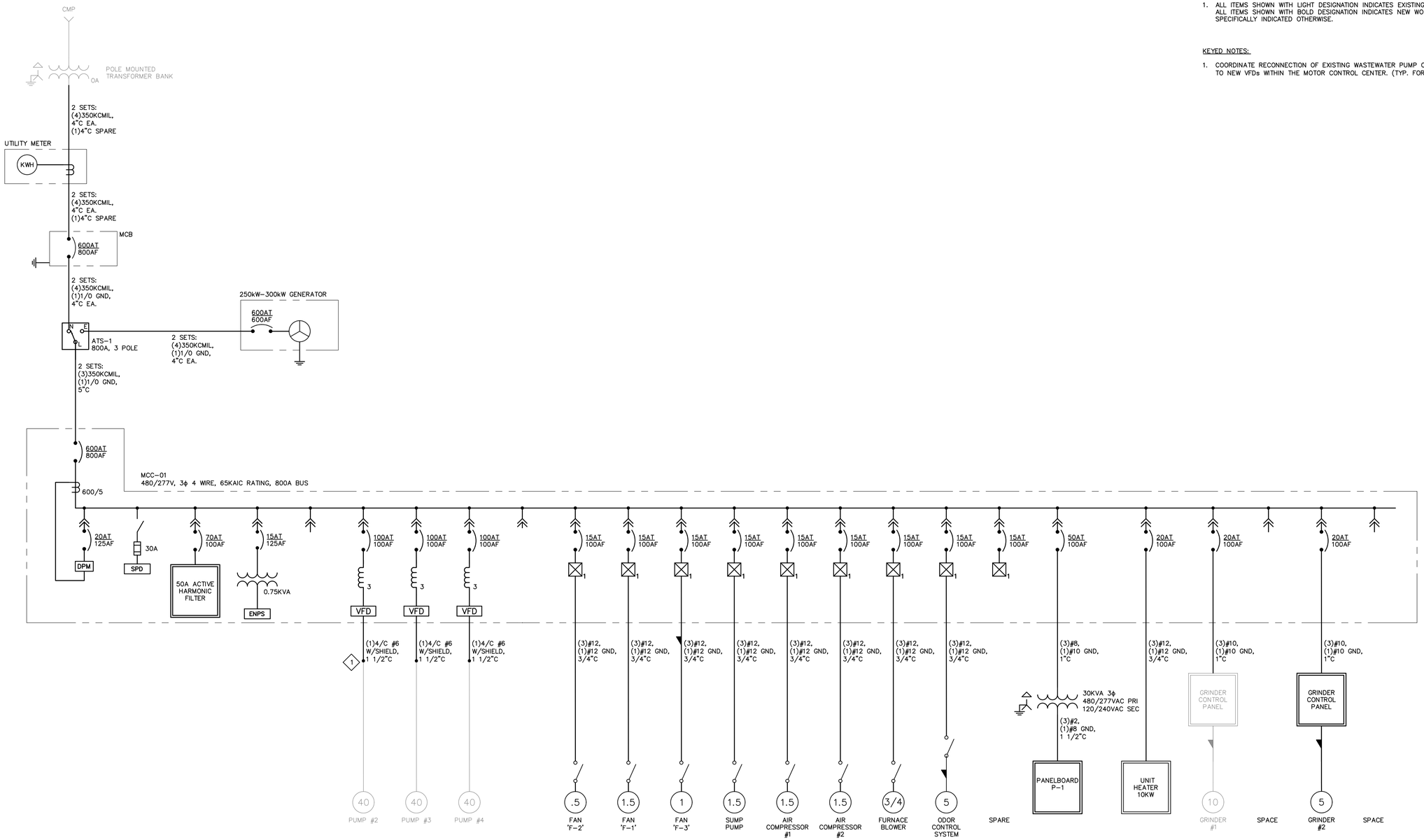
JOB NO.: 231625.00
DATE: SEPTEMBER, 2018
SCALE: NONE
SHEET: ---- OF XXX

R-101

\\woodardcurran.net\shared\Projects\0231265.00 Portland - Curtis and Franklin PS Des Bid\wip\Drawings\Franklin PS\Drawings\Process\0231265-PR-101.dwg, Aug 31, 2018 - 4:26pm

APPENDIX D: ONE-LINE DIAGRAM FOR MOTOR CONTROL CENTER

22x34 SHEET
1:1



GENERAL NOTES:

1. ALL ITEMS SHOWN WITH LIGHT DESIGNATION INDICATES EXISTING TO REMAIN. ALL ITEMS SHOWN WITH BOLD DESIGNATION INDICATES NEW WORK, UNLESS SPECIFICALLY INDICATED OTHERWISE.

KEYED NOTES:

1. COORDINATE RECONNECTION OF EXISTING WASTEWATER PUMP CABLES TO NEW VFDs WITHIN THE MOTOR CONTROL CENTER. (TYP. FOR 3)

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REV	DESCRIPTION	DATE

DESIGNED BY: XXX
DRAWN BY: XXX
CHECKED BY: XXX
E10.02.dwg

RAN LIN ONE-LINE NE

CITY OF PORTLAND, ME

FRANKLIN STREET PUMP STATION UPGRADES

JOB NO.: 231625.00
DATE: SEPTEMBER, 2018
SCALE: AS NOTED
SHEET: ---- OF XXX

E10.02

\\woodardcurran.net\shared\Projects\02\31265.00 Portland - Curtis and Franklin PS Des Bld\wip\Drawings\Franklin PS\Drawings\Electrical\E10.02.dwg, Sep 04, 2018 - 3:52pm

APPENDIX E: STRUCTURAL EVALUATION MEMORANDUM

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T 207.774.2112
F 207.774.6635

MEMORANDUM

TO: Max Kenney, Process Engineer, Woodard & Curran

FROM: Jim Sturgis, P.E., Senior Structural Engineer, Woodard & Curran

DATE: August 31, 2018

RE: City of Portland, Maine
Structural Condition Assessment for Franklin Pump Station

1.0 Introduction

The City of Portland (City) has requested that Woodard & Curran conduct a structural condition assessment of the existing Franklin Pump Stations (PS). The assessment was performed by Jim Sturgis, P.E., Sr. Structural Engineer at Woodard & Curran on July 24th, 2018. The assessment was limited to viewing all exposed-to-view areas (such as PS building exteriors and roofs, as well as interior PS and process spaces that are intended for occupancy by plant personnel).

The purpose of this assessment was to identify any major structural integrity or repair issues, so that these repair items and their severity could be understood and addressed by the City. Also, this evaluation can serve as a baseline condition assessment to which future assessments can be compared. As Wet Well tanks and channels were not accessed (on line and full of wastewater), recommendations are included to perform future confined-space-entry assessments of these structures so that a more thorough assessment of interior surfaces can be made. Therefore, for the purposes of this initial assessment and Memo, only high-level recommendations are being made for the Wet Well tanks and channels.

In general, most areas were found to be in fair condition for a facility of its age. However, there are many areas with structural deterioration, corrosion, cracking, spalling, and other surface defects that should be addressed in the near future to maintain structural integrity and to extend the life of the structures. **There were several immediate safety hazards identified**, which included the following: Wet Well ground floor compromised grating with hole in it; and all the grating in the Wet Well lower level being compromised, improperly installed, or having inadequate load capacity for worker traffic. **These areas should be corrected or barricaded as soon as possible.**

This Memorandum will provide a description of existing construction, observations with some photos, recommendations. To assist the City with planning and to provide a relative scale of urgency, a Priority Level (PL) has been assigned to each repair item defined as follows: PL #1 is highest priority and should be addressed within the next year; PL #2 is medium priority and should be addressed in the next 1-2 years; and PL #3 is lowest priority and should be addressed in the next 2-4 years.

2.0 Existing Construction

The PS record drawings are dated 1964, so the structures are over 50 years old. The original PS construction consisted of primarily cast-in-place concrete foundations for Wet and Dry Wells, concrete block and brick exterior walls, and a flat roof with precast concrete tee roof slab and asphalt roofing. The building has several painted steel doors, an metal coiling door, and several mechanical louvers. The PS Dry Well consists of four levels that are interconnected with a stairway: Ground Level, Intermediate Level 2, Intermediate Level 1, and a Lower Level. The PS Wet Well consists of three levels, the upper two of which are connected by a stairway:

Ground Level, Headworks Level (grating level over channels and Wet Wells), and the Wet Well Level (tankage and channels below grating level).

3.0 Observations

Visual observations were made in areas that were exposed to view. I was assisted and accompanied by Walter Gray and Gerry Remsen during most of the assessment. None of the Wet Well channel surfaces were clean and many were sludge-covered, but general inspections were made under the given conditions. No confined-space-entry inspection was done for either of the two Wet Well tanks or for the channels. Although these conditions partially masked the concrete substrate, it was possible to gain a reasonable understanding of the concrete condition for the channels but not the Wet Well tanks. A hammer was used to scrape and sound (tap) existing concrete surfaces in each Dry Well to check general hardness and to identify areas of hollow or unsound concrete. A spotlight and flashlight was used during inspection of some areas to enhance visibility. The following observations were made by structure with the corresponding Priority Level (PL #1, 2 or 3) for each issue:

<u>PS Exterior & Site</u>:

1. *Flat Roofing:* Roofing membrane was in poor condition with major ponding; nearly half of the roof surface was under water at time of inspection with depths up to 2". The two roof drains are not close to roof low point and slope to drains is nonexistent. There is evidence of past roof leakage between precast roof plank joints and around roof penetrations. Roof penetrations include two roof drains, three 4" diameter x 8" high vent pipes, 6" diameter x 24" high vent pipe, one HVAC exhaust vent with 20" x 34" opening, and the masonry chimney. Roofing was sampled and found to contain asbestos, so demolition will need to be abated per local and federal regulations. Age of roofing is unknown (PL #1 – see photo below left).

2. *Masonry Chimney:* The brick chimney (25" square x 33" high around 8"x8" flue) that extends above the roof membrane is in poor condition. Half of the bricks and joints are cracked and deteriorated (PL #1 – see photo above right).
3. *Precast Concrete Tee Roof Overhangs:* Underside of precast tee overhangs have some spalled concrete, approximately 10 SF (PL #1).
4. *Overhead Window Panels:* Window and louver panels below precast tee roof planks have several issues: perimeter sealant is cracked and deteriorated (may contain asbestos or PCB's); sill flashing below one window bay is missing; some windows have visible staining from past apparent roof leakage; there are a total of 10 panels (PL #2).
5. *Concrete Building Foundation:* The corners of building foundation walls have cracked and spalled concrete (2 SF x 4 places) just above grade (PL #2).

6. *Overhead Coiling Door:* Metal coiling door is in poor condition; steel channel frames at opening are have heavy corrosion at sill and on interior; concrete sill is cracked and unsound (PL #2).
7. *Painted Steel Door to Utility Room:* Existing painted metal door and transom frame are corroded (PL #3).
8. *Wet & Dry Well Door Hardware Worn:* Existing hardware is worn and needs replacement (PL #2).
9. *Sealant around Door Frames & Louvers:* Existing sealant is brittle and cracked, and also contains PCB's and/or asbestos (PL #2).
10. *Concrete Sidewalk Grout Joint:* The concrete in the 1" to 2"-wide joint between concrete walkway and building foundation is cracked and in poor condition (PL #2).

PS Dry Well Interior – Ground Level:

1. *Precast Concrete Ceiling (Roof) Slab:* There are minor cracks in the cast-in-place concrete roof slab with peeling paint and evidence of past moisture penetration, but otherwise appears to be in fair and sound condition; top surface of slab could not be inspected due to roofing (PL #2).
2. *CMU Walls:* Walls are in fair condition with peeling paint, except there is approximately 10 LF of cracked mortar joints. Sealant joint at top of CMU walls is in poor condition and may contain PCB's or asbestos (PL #2).
3. *Concrete Floor:* Painted concrete floor is in fair and sound condition, but has several minor shrinkage cracks and peeling paint (PL #3).
4. *Aluminum Railings around Stair Opening:* Railings are only 36" high and are not code compliant (PL #1).

PS Dry Well Interior – Intermediate Level 2:

1. *Concrete Ceiling Slab Above:* Fair and sound condition except for peeling paint (PL #2).
2. *Concrete Walls:* Fair and sound condition except for peeling paint and several random, localized areas with rough, pitted concrete (PL #2).
3. *Concrete Catwalk Floor:* Fair and sound condition, with approximately 10 LF of concrete shrinkage cracks and staining from residual paint peeling off walls (PL #3).
4. *Floor Opening with Wood Planking:* There is a floor slab opening approximately 4' x 12' that is infilled with wood planking, but was originally grating. Wood is not a good option durability-wise for this wastewater environment, has limited load-carrying capacity, and should be replaced. There is also a partial section of railing around opening that serves no purpose and should be demolished (PL #1).
5. *Monorail Beam Concrete Support Repair:* Per Wood report, the concrete beam to which the monorail beam is attached has a major crack at the bolted connection for the hanger clip, compromising this connection's load-carrying capacity. This is located below the Ground Floor concrete slab (PL #1).
6. *Aluminum Railings along Stairs Up & Down:* Railing height is not code compliant to act as guard on open side and there is no railing along the wall side (PL #1).
7. *Aluminum Railings along Concrete Catwalk and Suspended Maintenance Platform:* Railings are only 36" high and are not code compliant (PL #1).
8. *Painted Steel Columns:* Steel columns have peeling paint and signs of corrosion (PL #2).

PS Dry Well Interior – Intermediate Level 1:

1. *Concrete Catwalk Slab Above:* Fair and sound condition except for peeling paint (PL #2).

2. *Concrete Walls:* Fair and sound condition except for peeling paint and several random, localized areas with rough, pitted concrete (PL #2).
3. *Concrete Catwalk Floor:* Fair and sound condition, with approximately 10 LF of concrete shrinkage cracks and staining from residual paint peeling off walls (PL #3).
4. *Floor Opening with Grating:* There is a floor slab opening approximately 4' x 12' that is infilled with grating in fair condition. There is also a partial section of railing around opening that serves no purpose and should be demolished (PL #1).
5. *Aluminum Railings along Stairs Up & Down:* Railing height is not code compliant to act as guard on open side and there is no railing along the wall side (PL #1).
6. *Aluminum Railings along Concrete Catwalk:* Railings are only 36" high and are not code compliant (PL #1).
7. *Painted Steel Columns:* Steel columns have peeling paint and signs of corrosion (PL #2).

<u>PS Dry Well Interior – Lower Level Pump Room</u>:

1. *Concrete Catwalk Slab Above:* Fair and sound condition except for peeling paint (PL #2).
2. *Concrete Walls:* Fair and sound condition except for peeling paint and several random, localized areas with rough, pitted concrete. There is one small area with moisture weeping through wall – assume 10 LF of cracks and 2 SF of spalling (PL #2).
3. *Concrete Floor:* Fair and sound condition, with approximately 60 LF of concrete shrinkage cracks and 5 SF of spalling (PL #3).
4. *Painted Metal Pumps, Piping, and Pipe Supports:* Metal pumps, process piping, and pipe supports have peeling paint and signs of corrosion (PL #2).

<u>PS Utility Room Interior – Ground Level</u>:

1. *Precast Concrete Ceiling (Roof) Slab:* There are minor cracks in the cast-in-place concrete roof slab with peeling paint and evidence of past moisture penetration, but otherwise appears to be in fair and sound condition; top surface of slab could not be inspected due to roofing (PL #2).
2. *CMU Walls:* Walls are in fair condition with peeling paint, except there is approximately 10 LF of cracked mortar joints. Sealant joint at top of CMU walls is in poor condition (PL #2).
3. *Concrete Floor:* Unpainted concrete floor is in fair and sound condition.

<u>PS Wet Well Interior – Ground Level</u>:

1. *Precast Concrete Ceiling (Roof) Slab:* There are minor cracks in the cast-in-place concrete roof slab with peeling paint and evidence of past moisture penetration, but otherwise appears to be in fair and sound condition; top surface of slab could not be inspected due to roofing. There are at least four small areas with concrete spalling and exposed rebar – approximately 8 SF (PL #2).
2. *CMU Walls:* Walls are in fair condition with peeling paint, except there is approximately 10 LF of cracked mortar joints and minor block damage around overhead coiling door. Sealant joint at top of CMU walls is in poor condition (PL #2).
3. *Concrete Floor:* Painted concrete floor is in fair and sound condition, but has several minor shrinkage cracks and peeling paint. There are approximately 5 SF of concrete spalling (PL #3).
4. *Maintenance Floor Opening with Grating:* There is an 8-inch diameter hole cut in existing FRP grating over a maintenance opening, which has a large drop to the Wet Well below. The grating is not original

and is only resting unfastened on top of the concrete. **This is an immediate safety hazard as the cut grating bearing bars are structurally compromised (PL #1 – see photos below).**

5. *Painted Steel Beams & HVAC unit support frame (Overhead):* Two 5'-long I-beam pipe support beams and an HVAC unit angle-iron support frame are corroded with peeling paint (PL #3).
6. *Painted Steel Railings around Large Floor Opening down to Wet Well Below:* Railings are only 36" high and are not code compliant. Client would like to over this opening with grating and eliminate the railings (PL #1).

<u>PS Wet Well Interior – Lower Level</u>:

1. *Concrete Ceiling Slab Above:* Fair and sound condition except for peeling paint (PL #2).
2. *Concrete Walls:* Fair and sound condition except for peeling paint and several random, localized areas with rough, pitted concrete (PL #2).
3. *Concrete Floor:* Fair and sound condition.
4. *Aluminum Railings along Stairs:* Railing height is not code compliant to act as guard on open side and there is no railing along the wall side (PL #1).
5. *Grating over Headworks Channels:* Current grating is not original and consists of various depths and configurations of light-duty fiberglass grating. Multiple grating problems were observed: some grating panels only 1" thick when original aluminum grating was 1.5" (tripping hazard and load capacity issue); several holes have been cut through grating with no reinforcement, compromising structural integrity; one large grating panel spans in wrong direction, making this panel very dangerous and subject to failure; and grating does not extend close to channel grinder and gate, leaving large openings through which a person could fall. It appears that some of channels were originally covered with solid aluminum checker plate. **The existing grating is an immediate safety hazard for multiple reasons as stated above (PL #1 – see photos below).**

6. *Concrete Wet Well Channels and Tanks:* Channels and tanks were partially full of wastewater and not cleaned, but it was possible to get a general understanding of condition of above-water surfaces. Concrete appeared to be uncoated and in fair condition with no obvious signs of surface deterioration or spalling; however, a thorough inspection was not possible and should be conducted in the future (PL #3).
7. *Eye Hooks in Ceiling are Unrated:* As identified in the Wood Report, there are several eye hooks in the concrete ceiling slab that are not posted with a live load rating. These present a safety hazard when used as lifting hooks for equipment due to their unknown capacity and, therefore, are at risk for overloading by maintenance staff (PL #1).
8. *Painted Steel Railings along Concrete Channels:* Railings are only 36" high and are not code compliant (PL #1).
9. *Void in Concrete Channel Wall near Grinder:* There is an approximately 6" x 24" x 12" deep bond-out in concrete channel wall that is an step hazard that should be filled in (PL #1).
10. *Painted Metal Conduits, Piping, and Pipe Supports:* Metal pumps, process piping, and pipe supports have peeling paint and signs of corrosion (PL #2).

4.0 Recommendations

In general, this over-50-year-old Pump Station was found to be in fair condition and the structural integrity is intact; however, there are a number of structural and maintenance repair issues that should be corrected in the next 1 to 4 years, depending on the Priority Levels indicated in the Observations & Recommendations sections. Failure to address these issues in a timely manner will result in a progression of the current repair issues to the point where structural integrity will likely become compromised and more expensive repairs will be needed.

Some building materials (roofing and caulking) have been found to contain hazardous materials such as PCB's or asbestos. Please refer to the Hazardous Building Materials Survey (HBMS) for further direction relating to abatement and treatment of these items. The structural section is not intended to fully address abatement requirements and the recommendations below may require revision based on the HBMS's more detailed recommendations.

The following is a more detailed breakdown of recommendations for each area:

<u>PS Exterior & Site</u>:

1. *Flat Roofing:* Existing roof system, which includes asbestos-containing material, shall be demolished in its entirety down to the concrete roof deck following all applicable local and federal regulations. New roofing system shall include: tapered rigid insulation with minimum 4" thickness and 1/4" per foot slope; fully-adhered 60-mil EPDM roofing; new PT blocking at perimeter; minimum 0.05"-thick color-coated aluminum edge flashing at perimeter; membrane flashing for all pipes, curbs, and masonry chimney; two new roof drains and associated drainage piping to replace existing; and a minimum 15-year no-dollar-limit roofing warranty for labor and materials (PL #1).
2. *Masonry Chimney:* The brick chimney (25" square x 33" high around 8"x8" flue) that extends above the roof membrane shall be rebuilt as required to replace all damaged or cracked bricks and mortar joints. At least 50% of surface area requires replacement (PL #1).
3. *Precast Concrete Tee Roof Overhangs:* Provide 10 SF of saw-cut spall repair with SikaTop 123 Plus or equal, flush with existing adjacent concrete surfaces; any exposed rebar shall be properly prepped

and coated with anti-corrosion compound during repairs. Clean, grind, or otherwise clean off all visible staining for overhang concrete exposed to view (PL #1).

4. *Overhead Window & Louver Panels:* Window panels shall be cleaned to remove any staining; some panels may require replacement if staining cannot be removed. Remove and replace in-kind screens over louver panels. Remove and replace sealant at perimeter of windows and louvers with closed-cell backer rod and polyurethane sealant of color approved by Owner; existing sealant contains PCB's. Missing sill flashing shall be replaced in kind to match existing. There are a total of 10 bays – 8 window panels and 2 louvers (PL #2).
5. *Concrete Building Foundation:* Provide saw-cut spall repair on each building foundation corner just above grade (2 SF x 4 places) and extending maximum 12" below grade, as required - PL #2).
6. *Overhead Coiling Door:* Replace existing metal coiling door with new chain-operated coiling door system with all-aluminum slats and components; replace existing steel channel frames at opening perimeter in kind with new steel channels with industrial paint system; provide saw-cut spall repair to concrete sill as required to repair cracked and unsound concrete (PL #2).
7. *Painted Steel Door to Utility Room:* Replace existing painted metal door and transom frame in kind with new heavy-duty hollow metal door and frame, with industrial coating system and stainless steel hardware (PL #3).
8. *Wet & Dry Well Door Hardware Worn:* Replace existing hardware for two doors with new handicap-accessible stainless steel hardware; prepare and repaint door and frames inside and out (PL #2).
9. *Sealant around Door Frames & Louvers:* Remove existing sealant around metal door frames and louvers following PCB abatement protocol, as applicable, and provide new polyurethane sealant of color approved by (PL #2).
10. *Concrete Sidewalk Grout Joint:* Demolish existing cracked concrete joint filler within the 1" to 2"-wide joint between concrete walkway and building foundation. Replace with closed-cell backer rod and polyurethane sealant with sealant depth as recommended by manufacturer (PL #2).

<u>PS Dry Well Interior – Ground Level</u>:

1. *Precast Concrete Ceiling (Roof) Slab:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *CMU Walls:* Prepare/abate existing CMU wall surfaces with PCB-containing paint; fill any cracks in mortar joints (approximately 10 LF) with polyurethane sealant; remove and replace damaged or cracked sealant along tops of CMU walls below precast roof tees; and apply an epoxy coating system as a sealant to encapsulate contaminated CMU; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Floor:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
4. *Aluminum Railings around Stair Opening:* Demolish existing aluminum railings around stair opening, including railings, toe plates, supports, and anchor bolts. Provide new 42" high, anodized aluminum, 2-rail railings with continuous toe plates properly supported at mid-span, as required for stability (PL #1).

<u>PS Dry Well Interior – Intermediate Level 2</u>:

1. *Concrete Ceiling Slab Above:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *Concrete Walls:* Prepare/abate existing concrete wall surfaces with PCB-containing paint; and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Catwalk Floor:* Rout & seal approximately 10 LF of concrete floor cracks with polyurethane sealant; clean concrete floors along wall to remove staining from residual paint peeling off walls (PL #3).
4. *Floor Opening with Wood Planking:* Demolish wood plank cover in floor slab opening (approximately 4' x 12'). Provide new aluminum grating and supports (if necessary) to provide flush, durable, structurally-sound closure and walking surface over opening. Demolish partial section of aluminum railing one side of opening that serves no purpose (PL #1).
5. *Monorail Beam Concrete Support Repair:* This is located below the Ground Floor concrete slab. Provide temporary support to monorail beam; demolish existing hanger clip angle and anchor bolts into concrete beam; provide saw-cut spall repair to lower cracked section of beam with repair mortar equal to SikaTop 123 Plus (approximately 2 SF) as required to rebuild beam to its original dimensions; provide new bent plate with a longer vertical dimension, so that top angle leg bolts are located 6" higher than current bolts; provide two new 5/8" diameter stainless steel adhesive anchors into concrete beam; provide load capacity label to web of monorail beam (PL #1).
6. *Aluminum Railings along Stairs Up & Down:* Demolish existing aluminum railings along stairs, including railings, support brackets, and anchor bolts. On open side provide new 42" high, anodized aluminum, 2-rail guard with single aluminum handrail. On wall side, provide single aluminum handrail mounted to concrete wall with stainless steel expansion anchors (PL #1).
7. *Aluminum Railings along Concrete Catwalk and Suspended Maintenance Platform:* Demolish existing aluminum railings along concrete catwalk and around maintenance platform, including railings, toe plates, supports, and anchor bolts. On open sides, provide new 42" high, anodized aluminum, 2-rail guard with continuous toe plates properly supported at mid-span, as required for stability; on wall side along mezzanine platform stair only, provide wall-mounted aluminum handrail (PL #1).
8. *Painted Steel Columns:* Prepare/abate existing steel columns with potentially PCB-containing paint and apply a colored sealant to encapsulate contaminated steel (PL #2).

<u>PS Dry Well Interior – Intermediate Level 1</u>:

1. *Concrete Catwalk Slab Above:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *Concrete Walls:* Prepare/abate existing concrete wall surfaces with PCB-containing paint; and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Catwalk Floor:* Rout & seal approximately 10 LF of concrete floor cracks with polyurethane sealant; clean concrete floors along wall to remove staining from residual paint peeling off walls (PL #3).
4. *Floor Opening with Grating:* There is a floor slab opening approximately 4' x 12' that is infilled with grating. Demolish a partial section of railing around opening that serves no purpose (PL #1).

5. *Aluminum Railings along Stairs Up & Down:* Demolish existing aluminum railings along stairs, including railings, support brackets, and anchor bolts. On open side provide new 42" high, anodized aluminum, 2-rail guard with single aluminum handrail. On wall side, provide single aluminum handrail mounted to concrete wall with stainless steel expansion anchors (PL #1).
6. *Aluminum Railings along Concrete Catwalk:* Demolish existing aluminum railings along concrete catwalk, including railings, toe plates, supports, and anchor bolts. On open sides, provide new 42" high, anodized aluminum, 2-rail guard with continuous toe plates properly supported at mid-span, as required for stability (PL #1).
7. *Painted Steel Columns:* Prepare/abate existing steel columns with potentially PCB-containing paint and apply a colored sealant to encapsulate contaminated steel (PL #2).

<u>PS Dry Well Interior – Lower Level Pump Room</u>:

1. *Concrete Catwalk Slab Above:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *Concrete Walls:* Prepare/abate existing concrete wall surfaces with PCB-containing paint; provide 2 SF of saw-cut spall repair and 10 LF of polyurethane crack injection to stop leakage; grind off any efflorescence deposits in crack injection areas (10 SF); and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Floor:* Provide rout & seal repairs with polyurethane sealant to approximately 60 LF of concrete shrinkage cracks; and provide 5 SF of saw-cut spall repair (PL #3).
4. *Painted Metal Pumps, Piping, and Pipe Supports:* Prepare and repaint metal pumps, process piping, and pipe supports (PL #2).

<u>PS Utility Room Interior – Ground Level</u>:

1. *Precast Concrete Ceiling (Roof) Slab:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *CMU Walls:* Prepare/abate existing CMU wall surfaces with PCB-containing paint; fill any cracks in mortar joints (approximately 10 LF) with polyurethane sealant; remove and replace damaged or cracked sealant along tops of CMU walls below precast roof tees; and apply an epoxy coating system as a sealant to encapsulate contaminated CMU; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Floor:* No work required.

<u>PS Wet Well Interior – Ground Level</u>:

1. *Precast Concrete Ceiling (Roof) Slab:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; provide saw-cut spall repair to approximately 8 SF of spall repair and prepare/coat any exposed rebar; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *CMU Walls:* Prepare/abate existing CMU wall surfaces with PCB-containing paint; fill any cracks in mortar joints (approximately 10 LF) with polyurethane sealant; remove and replace damaged or cracked sealant along tops of CMU walls below precast roof tees; and apply an epoxy coating system as a sealant to encapsulate contaminated CMU; any rough or pitted concrete shall be filled prior to finish painting (PL #2).

3. *Concrete Floor:* Provide approximately 5 SF of saw-cut spall repair (PL #3).
4. *Maintenance Floor Opening with Grating:* Demolish existing FRP grating (with hole cut in it) laying on floor above floor opening (trip hazard) and replace with 1.5" aluminum I-bar grating installed flush with finish floor; provide aluminum support angles for grating, if necessary. **This is an immediate safety hazard as the cut FRP grating bearing bars are structurally compromised (PL #1).**
5. *Painted Steel Beams & HVAC unit support frame (Overhead):* Prepare and repaint two 5'-long I-beam pipe support beams and an HVAC unit angle-iron support frame (PL #3).
6. *Painted Steel Railings around Large Floor Opening down to Wet Well Below:* Demolish existing painted steel railings along floor opening into Wet Well below, including railings, toe plates, supports, and anchor bolts. Provide new 1.5" aluminum I-bar grating to enclose floor opening and extend floor walking surface to wall; provide support angles along two long sides of floor opening; it is recommended that some conduit running up wall at floor level be rerouted to facilitate grating support angle installation on wall (PL #1).

PS Wet Well Interior – Lower Level:

1. *Concrete Ceiling Slab Above:* Prepare/abate existing concrete ceiling surfaces with PCB-containing paint and apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
2. *Concrete Walls:* Prepare/abate existing concrete wall surfaces with PCB-containing paint; apply an epoxy coating system as a sealant to encapsulate contaminated concrete; any rough or pitted concrete shall be filled prior to finish painting (PL #2).
3. *Concrete Floor:* No work required.
4. *Aluminum Railings along Stairs:* Demolish existing aluminum railings along both sides of stairs and landing, including railings, support brackets, and anchor bolts. On open sides provide new 42" high, anodized aluminum, 2-rail guard with single aluminum handrail. On wall side, provide single aluminum handrail mounted to concrete wall with stainless steel expansion anchors (PL #1).
5. *Grating over Headworks Channels:* Demolish all existing FRP grating, aluminum hinged cover plate, and remaining hinges and edge plating from previously demolished solid cover plates. Provide new 1.5" deep aluminum I-Bar grating over all channels spanning in short direction. Any grating penetrations shall be shop-banded, and supplemental angle supports shall be provided where current salvageable supports or bearing shelfs do not exist. New grating shall come up to any gate, grinder, or other penetrations with no more than 1" clearance. **The existing grating is an immediate safety hazard for multiple reasons as stated in Observations Section (PL #1).**
6. *Concrete Wet Well Channels & Tanks:* The exposed-to-view portions of concrete channel walls appear to be in fair condition, but the tanks were not inspected. However, it is recommended that the tanks and channels be emptied and cleaned, so that a structural condition assessment can be made of the tanks and channels to ensure they are in sound condition and no concrete surface repairs are needed (PL #3).
7. *Eye Hooks in Ceiling are Unrated:* Demolish existing eye bolts flush with concrete ceiling slab; provide new lifting hooks with engineered load capacity to suit equipment to be lifted during maintenance. Provide two new lift hooks consisting of stainless steel base plate, stainless steel eye loop, and four 5/8" diameter stainless steel expansion anchors; provide signage to identify load capacity rating for each lift hook (PL #1).
8. *Painted Steel Railings along Concrete Channels:* Demolish existing painted metal railings along channels, including railings, support brackets, and anchor bolts. Provide new 42" high, anodized

aluminum, 2-rail guard along two parallel channels at grinder, with safety chain access into each channel area; also replace existing railing along the long channel next to wall (PL #1).

9. *Void in Concrete Channel Wall near Grinder:* Provide infill of 6" x 24" x 12" deep bond-out in concrete channel wall that is an step hazard using repair mortar equal to SikaTop 122 Plus (PL #1).
10. *Painted Metal Conduits, Piping, and Pipe Supports:* Prepare and repaint metal pumps, process piping, and pipe supports (PL #2).

5.0 Conclusions

It is recommended that the above repair items be implemented within the next 1 to 4 years (using the Priority Levels provided as a guide to urgency) to extend the life of the Pump Station structures and to slow down the related disrepair and deterioration issues that are currently present.

APPENDIX F: HAZARDOUS MATERIALS SURVEY

Credere Associates Franklin Street PS
Upgrades Hazardous Building Materials Survey
Report dated August 22, 2018 attached within
GMP Proposal under separate cover

Estimate Summary

Franklin Street Pump Station - GMP Proposal Estimate

Woodard & Curran
41 Hutchins Drive
Portland, Maine 04102

Date: 10/23/2018
Time: 4:06 PM
Project No.: 231265

		Labor	Material	Const. Equip.	Subcontract	Temp Matl	Proces Equip.	Other	Totals
Direct Construction Cost	%								
Base labor		$152,518	$60,594	$26,750	$1,737,454	$0	$143,024	$0	$2,120,339
Labor burden	35.00%	$53,381							$53,381
Labor fringes		$7,147							$7,147
Labor manhours		1,036							
Material sales tax	0.00%		$0						$0
Equipment shipping	3.50%			$936					$936
Temporary material markup	0.00%					$0			$0
Equipment rental markup	0.00%						$0		$0
Other markup	0.00%							$0	$0
Cost of Work		$213,046	$60,594	$27,686	$1,737,454	$0	$143,024	$0	$2,181,804
Project Contingency	10.00%								$218,180
Total Construction Cost									$2,399,984
Design-Build Fee	10.00%								$239,998
Sub-Total									$2,639,983
Final Design (after 60%)									$145,000
Engr. Services During Const.									$230,000
Sub-Total									**$3,014,983**
General Liability Insurance	0.85%								**$26,324**
Builder's Risk Insurance	0.15%								**$4,645**
Payment & Performance Bonds	$51,047								$51,047
GMP Total									**$3,097,000**

Franklin Street Pump Station - GMP Proposal Estimate

Recap - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
General Conditions			189,346.42	29,197.75	11,800.00	21,242.29					251,586
Bypass Pumping During Construction					252,500.00						252,500
Seal/Cooling Water System Improvements			634.37	3,464.00	8,100.00						12,198
Replace Water Service to Seal/Cooling Water					9,500.00						9,500
Add Channel Grinder					7,000.00		76,004.00				83,004
Replace Wetwell Gates			3,183.70	4,993.00	17,000.00		41,000.00				66,177
Replace Suction Lines/Valves From Wall to Pu					103,400.00						103,400
ADFM Hot Tap Flow Meter			3,171.84				26,020.00				29,192
Replace Copper Air Piping					12,100.00						12,100
Add Air Release Valve On Discharge					16,000.00						16,000
Caulking & Drip Edge at Windows					9,500.00						9,500
Replace Grating/Handrail/Doors					216,758.98						216,759
Replace Doors					12,702.00						12,702
Wet Well Stair Replacement					27,410.00						27,410
Replace Hoist Beam & Lifting Hooks				300.00	7,000.00						7,300
Misc Conc & Masonry Repair					16,400.00						16,400
Hazardous Material Mitigation/Prep					74,129.94						74,130
Repaint Pump Station					178,769.93						178,770
Modify 24" Gate Valve					5,000.00						5,000
Roof Replacement					66,680.01						66,680
Refurbish Existing Pump					35,708.00						35,708
HVAC Upgrades					85,000.00						85,000
Replace Generator			11,697.93	5,873.51	135,000.00	3,858.61					156,430
Replace Pump Station Lighting					40,500.00						40,500
Replace Motor Control Center			5,011.94	16,765.38	389,495.00	2,585.22					413,858
Total Gross Cost			213,046.21	60,593.64	1,737,453.87	27,686.12	143,024.00				2,181,804

Estimate Detail - Franklin Street Pump Station - GMP Proposal Estimate

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
General Conditions											
Mobilize/Demobilize	1	LS	3,418.05	4,800.00						8,218.05	8,218
Project Manager	11	WEEK	49,896.00							4,536.00	49,896
Project Superintendent - Franklin	26	WEEK	109,512.00							4,212.00	109,512
Safety Engineer	7	WEEK	19,375.20							2,980.80	19,375
Building Permit - Assume Fee is Waived		EXCL									
Electrical Permit - Assume Fee is Waived		EXCL									
Materials Testing	1	LS		1,800.00						1,800.00	1,800
Job telephone/communications	7	MO		2,340.00						360.00	2,340
Temporary Power - By Electrician	1	LS			11,800.00					11,800.00	11,800
Temporary toilets	7	MO		2,340.00						360.00	2,340
Water, ice and cups	7	MO		585.00						90.00	585
First aid supplies	7	MO		780.00						120.00	780
Safety supplies	7	MO		1,560.00						240.00	1,560
Office supplies	7	MO		585.00						90.00	585
Temporary Fence @ Street Side of PS	150	LF		1,800.00						12.00	1,800
Small tools	7	MO		1,560.00						240.00	1,560
Gasoline and lubricating oil	1,470	GALS		6,174.00						4.20	6,174
Automobile	3	MO				2,421.90				745.20	2,422
Pick-up truck	7	MO				7,120.39				1,095.44	7,120
Support Equipment	7	MO				11,700.00				1,800.00	11,700
Temporary Handrail During Construction	155	LF	1,640.74	193.75						11.84	1,834
Job clean up	7	MO	5,504.43	4,680.00						1,566.84	10,184
*** Total General Conditions**			**189,346.42**	**29,197.75**	**11,800.00**	**21,242.29**					**251,586**
Bypass Pumping During Construction											
Design/Setup/Test/Remove Bypass Pumping System	1	LS			200,000.00					200,000.00	200,000
Operate Bypass Pumping System	90	DAYS			45,000.00					500.00	45,000
Cleaning Wet Well & Channels	1	LS			7,500.00					7,500.00	7,500
*** Total Bypass Pumping During Construction**					**252,500.00**						**252,500**
Seal/Cooling Water System Improvements											
Replacement of Seal Water Piping to 3 Pumps	1	LS			8,100.00					8,100.00	8,100
3/4" SS Ball Valve	12	EACH	237.89	684.00						76.82	922
Instrumentation/Controls	1	LS	396.48	2,780.00						3,176.48	3,176
*** Total Seal/Cooling Water System Improveme**			**634.37**	**3,464.00**	**8,100.00**						**12,198**
Replace Water Service to Seal/Cooling Water Tank											
Replace Water Service	1	LS			9,500.00					9,500.00	9,500
*** Total Replace Water Service to Seal/Cooling**					**9,500.00**						**9,500**
Add Channel Grinder											
Channel Grinder (M)	1	EACH					76,004.00			76,004.00	76,004
Channel Grinder (L)	1	EACH			7,000.00					7,000.00	7,000
*** Total Add Channel Grinder**					**7,000.00**		**76,004.00**				**83,004**
Replace Wetwell Gates											
Remove Gates (incl in labor below)	1	LS									
Concrete Work In Channels	1	LS	2,805.76	3,000.00						5,805.76	5,806
O2, LEL, H2S Sensors For Wetwell	1	LS	377.95	1,993.00						2,370.95	2,371

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.To	OtherTotal	Tot.UnitCost	TotalCost
Slide Gate - Man. Operated (M)	1	EACH					8,500.00			8,500.00	8,500
Slide Gates - Channel, Elect. Operated (M)	2	EACH					32,500.00			16,250.00	32,500
Slide Gates (L)	3	EACH			17,000.00					5,666.67	17,000
*** Total Replace Wetwell Gates**			**3,183.70**	**4,993.00**	**17,000.00**		**41,000.00**				**66,177**
Replace Suction Lines/Valves From Wall to Pumps											
,18IN,PLUG,,DI,Elect. Act.,CMT	3	EACH			103,400.00					34,466.67	103,400
*** Total Replace Suction Lines/Valves From Wa**					**103,400.00**						**103,400**
ADFM Hot Tap Flow Meter											
ADFM Hot Tap Flowmeter (M) - PLUG	1	EACH					26,020.00			26,020.00	26,020
Install Flowmeter (L)	1	EACH	3,171.84							3,171.84	3,172
*** Total ADFM Hot Tap Flow Meter**			**3,171.84**				**26,020.00**				**29,192**
Replace Copper Air Piping											
Compressed Air Piping to Extg. Knife Gate Valves	1	LS			12,100.00					12,100.00	12,100
*** Total Replace Copper Air Piping**					**12,100.00**						**12,100**
Add Air Release Valve On Discharge											
Air Release Valve+Piping	1	LS			16,000.00					16,000.00	16,000
*** Total Add Air Release Valve On Discharge**					**16,000.00**						**16,000**
Caulking & Drip Edge at Windows											
Flashing/Caulking @ Windows	1	LS			9,500.00					9,500.00	9,500
*** Total Caulking & Drip Edge at Windows**					**9,500.00**						**9,500**
Replace Grating/Handrail/Doors											
Remove railings	155	LNFT			3,100.00					20.00	3,100
Aluminum horizontal handrail	155	LNFT			43,400.00					280.00	43,400
Galv. Rollup Door Channel Frame	1	EACH			2,500.00					2,500.00	2,500
Heavy duty aluminum grating (remove & replace existg)	456	SQFT			153,039.98					335.61	153,040
Caulking @ Door Frames/Louvers	1	LS			650.00					650.00	650
Remove Existing & Replace Rolling Door	1	EACH			9,835.00					9,835.00	9,835
Remove Existing & Install New Man Doors (St. Stl.)	1	EA			4,234.00					4,234.00	4,234
*** Total Replace Grating/Handrail/Doors**					**216,758.98**						**216,759**
Replace Doors											
Remove Existing & Install New Man Doors (St. Stl.)	3	EA			12,702.00					4,234.00	12,702
*** Total Replace Doors**					**12,702.00**						**12,702**
Wet Well Stair Replacement											
Steel Lapeyre Stair w/ Landing	22	TRD			27,410.00					1,245.91	27,410
*** Total Wet Well Stair Replacement**					**27,410.00**						**27,410**
Replace Hoist Beam & Lifting Hooks											
Monorail Support Repair	1	LS			4,000.00					4,000.00	4,000
SST Lifting Plates @ Channel Grinders	2	EACH			3,000.00					1,500.00	3,000
Load Rating of Monorail & Lifting Plates (by W&C Struct. - Incl w/ ESDC)	1	LS									

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.To	OtherTotal	Tot.UnitCost	TotalCost
Signage	1	LS		300.00						300.00	300
*** Total Replace Hoist Beam & Lifting Hooks**				**300.00**	**7,000.00**						**7,300**
Misc Conc & Masonry Repair											
Demo/Repair Sidewalk Joint @ Exterior	1	LS			1,400.00					1,400.00	1,400
Repair and paint precast concrete roof overhangs (exterior)	1	LS			12,500.00					12,500.00	12,500
Repair cracking concrete @ foundation corners	1	LS			2,500.00					2,500.00	2,500
*** Total Misc Conc & Masonry Repair**					**16,400.00**						**16,400**
Hazardous Material Mitigation/Prep											
Hazmat Remediation Interior Concrete Ceiling - Dry Well Ground Level	1,500	SF			6,000.00					4.00	6,000
Hazmat Remediation of Interior Walls - Drywell/Ground Level	1,800	SF			10,499.94					5.83	10,500
Hazmat Remediation of Interior Concrete Floor - Drywell/Ground Level	1	LS			2,550.00					2,550.00	2,550
Hazmat Remediation of Interior Concrete Ceiling - Dry Well Intermediate Level 2	1	LS			1,650.00					1,650.00	1,650
Hazmat Remediation of Interior Walls - Dry Well Intermediate Level 2	1	LS			3,300.00					3,300.00	3,300
Hazmat Remediation of Interior Concrete Floor - Dry Well Intermediate Level 2	1	LS			240.00					240.00	240
Hazmat Remediation of Interior Steel Columns - Dry Well Intermediate Level 2	1	LS			1,350.00					1,350.00	1,350
Hazmat Remediation of Interior Concrete Ceiling - Dry Well Intermediate Level 1	1	LS			4,500.00					4,500.00	4,500
Hazmat Remediation of Interior Walls - Dry Well Intermediate Level 1	1	LS			1,650.00					1,650.00	1,650
Hazmat Remediation of Interior Concrete Floor - Dry Well Intermediate Level 1	1	LS			450.00					450.00	450
Hazmat Remediation of Interior Steel Columns - Dry Well Intermediate Level 1	1	LS			750.00					750.00	750
Hazmat Remediation of Interior Concrete Ceiling - Dry Well Pump Level	1	LS			750.00					750.00	750
Hazmat Remediation of Interior Walls - Dry Well Pump Level	1	LS			9,000.00					9,000.00	9,000
Hazmat Remediation of Interior Concrete Floor - Dry Well Pump Level	1	LS			3,600.00					3,600.00	3,600
Hazmat Remediation of Interior Piping & Pumps - Dry Well Pump Level	1	LS			4,500.00					4,500.00	4,500
Hazmat Remediation of Interior Concrete Ceiling - Ground Level Utility Room	1	LS			750.00					750.00	750
Hazmat Remediation of Interior Walls - Ground Level Utility Room	1	LS			1,350.00					1,350.00	1,350
Hazmat Remediation of Interior Concrete Ceiling - Ground Level Wet Well	1	LS			6,000.00					6,000.00	6,000
Hazmat Remediation of Interior Walls - Ground Level Wet Well	1	LS			5,700.00					5,700.00	5,700
Hazmat Remediation of Steel Beams/Supports - Ground Level Wet Well	1	LS			240.00					240.00	240

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.To	OtherTotal	Tot.UnitCost	TotalCost
Hazmat Remediation of Interior Concrete Ceiling - Lower Level Wet Well	1	LS			3,600.00					3,600.00	3,600
Hazmat Remediation of Interior Walls - Lower Level Wet Well	1	LS			5,700.00					5,700.00	5,700
*** Total Hazardous Material Mitigation/Prep**					**74,129.94**						**74,130**
Repaint Pump Station											
Mobilize/Demob for Painting Contractor	1	LS			5,000.00					5,000.00	5,000
Re-Painting of Interior Concrete Ceiling - Dry Well Ground Level	1,500	SF			13,999.95					9.33	14,000
Re-Painting of Interior Walls - Drywell/Ground Level	1,800	SF			24,499.98					13.61	24,500
Re-Painting of Interior Concrete Floor - Drywell/Ground Level	1	LS			5,950.00					5,950.00	5,950
Re-Painting of Interior Concrete Ceiling - Dry Well Intermediate Level 2	1	LS			3,850.00					3,850.00	3,850
Re-Painting of Interior Walls - Dry Well Intermediate Level 2	1	LS			7,700.00					7,700.00	7,700
Re-Painting of Interior Concrete Floor - Dry Well Intermediate Level 2	1	LS			560.00					560.00	560
Re-Painting of Interior Steel Columns - Dry Well Intermediate Level 2	1	LS			3,150.00					3,150.00	3,150
Re-Painting of Interior Concrete Ceiling - Dry Well Intermediate Level 1	1	LS			10,500.00					10,500.00	10,500
Re-Painting of Interior Walls - Dry Well Intermediate Level 1	1	LS			3,850.00					3,850.00	3,850
Re-Painting of Interior Concrete Floor - Dry Well Intermediate Level 1	1	LS			1,050.00					1,050.00	1,050
Re-Painting of Interior Steel Columns - Dry Well Intermediate Level 1	1	LS			1,750.00					1,750.00	1,750
Re-Painting of Interior Concrete Ceiling - Dry Well Pump Level	1	LS			1,750.00					1,750.00	1,750
Re-Painting of Interior Walls - Dry Well Pump Level	1	LS			21,000.00					21,000.00	21,000
Re-Painting of Interior Concrete Floor - Dry Well Pump Level	1	LS			8,400.00					8,400.00	8,400
Re-Painting of Interior Piping & Pumps - Dry Well Pump Level	1	LS			10,500.00					10,500.00	10,500
Re-Painting of Interior Concrete Ceiling - Ground Level Utility Room	1	LS			1,750.00					1,750.00	1,750
Re-Painting of Interior Walls - Ground Level Utility Room	1	LS			3,150.00					3,150.00	3,150
Re-Painting of Interior Concrete Ceiling - Ground Level Wet Well	1	LS			14,000.00					14,000.00	14,000
Re-Painting of Interior Walls - Ground Level Wet Well	1	LS			13,300.00					13,300.00	13,300
Concrete Floor Repair - Ground Level Wet Well	1	LS			400.00					400.00	400
Re-Painting of Steel Beams/Supports - Ground Level Wet Well	1	LS			560.00					560.00	560

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.To	OtherTotal	Tot.UnitCost	TotalCost
Re-Painting of Interior Concrete Ceiling - Lower Level Wet Well	1	LS			8,400.00					8,400.00	8,400
Re-Painting of Interior Walls - Lower Level Wet Well	1	LS			13,300.00					13,300.00	13,300
Repair Concrete Channel Wall - Lower Level Wet Well	1	LS			400.00					400.00	400
*** Total Repaint Pump Station**					**178,769.93**						**178,770**
Modify 24" Gate Valve											
Modify existing 24" Gate Valve	1	LS			5,000.00					5,000.00	5,000
*** Total Modify 24" Gate Valve**					**5,000.00**						**5,000**
Roof Replacement											
Remove existing roof & insulation (incl. abatement of existing matl)	1,776	SQFT			21,312.00					12.00	21,312
Demo Exist. / Build New Chimney	1	LS			2,400.00					2,400.00	2,400
3½" polyisocyanurate tapered insulation	1,776	Sqft			14,208.00					8.00	14,208
EPDM roofing	1,776	SQFT			28,760.01					16.19	28,760
*** Total Roof Replacement**					**66,680.01**						**66,680**
Refurbish Existing Pump											
Refurbish existing pump (Hayes)	2	EACH			35,708.00					17,854.00	35,708
*** Total Refurbish Existing Pump**					**35,708.00**						**35,708**
HVAC Upgrades											
Allowance for HVAC Upgrades	1	LS			85,000.00					85,000.00	85,000
*** Total HVAC Upgrades**					**85,000.00**						**85,000**
Replace Generator											
Chain link fence, 6' high	70	LNFT	1,440.29	1,207.50						37.83	2,648
Chain link gates, 6' high x 6' wide	1	EACH	450.47	496.00						946.47	946
Forms @ pad	57	SQFT	799.64	44.39						14.81	844
Chamfer strip	38	LNFT	55.19	11.23						1.75	66
Form releasing agent	57	SQFT	25.59	1.58						0.48	27
Pad rebar		Tons	557.79	360.00						3,671.14	918
** Concrete in pads **		****									
4000 psi direct	4	CUYD	109.59	504.70		2.92				151.15	617
* Pad area *	70	SQFT									
Point and patch	57	SQFT	22.89	1.46		10.87				0.62	35
Hand trowel finish	70	SQFT	84.34	2.15		40.06				1.81	127
Protect and cure vertical surfaces	57	SQFT	24.01	2.26		11.40				0.66	38
Protect and cure horizontal surfaces	70	SQFT	28.11	2.23		13.35				0.62	44
Trenching/Concrete/Backfill for Electrical Ductbank	40	LF	3,600.00	1,440.00		1,680.00				168.00	6,720
Trenching/Concrete/Backfill for Electrical Ductbank	50	LF	4,500.00	1,800.00		2,100.00				168.00	8,400
Emergency Generator 250kW (diesel) - Equipment	1	LS			110,000.00					110,000.00	110,000
Emergency Generator 250kW - Installation	1	LS			25,000.00					25,000.00	25,000
*** Total Replace Generator**			**11,697.93**	**5,873.51**	**135,000.00**	**3,858.61**					**156,430**
Replace Pump Station Lighting											

Detail - With Taxes and Insurance

Group 1: Scope Item

Estimator : K. Rosner

Note: Indirect Costs (Fee, Engineering, Insurance, and Contingency) are not included in this report - see Summary Sheet for these costs.

Description	Quantity	UM	Lab.Total	Mat.Total	Sub.Total	Const. Eqp.	Process Eqp.	Tmp.Mat.Tot	OtherTotal	Tot.UnitCost	TotalCost
LIGHTING LABOR/INSTALLATION	1	EA			7,500.00					7,500.00	7,500
LIGHTING PACKAGE	1	EA			33,000.00					33,000.00	33,000
*** Total Replace Pump Station Lighting**					**40,500.00**						**40,500**
Replace Motor Control Center											
Forms @ pad	56	LNFT	276.54	36.78						5.60	313
Form releasing agent	19	SQFT	8.38	0.52						0.48	9
Pad rebar		Tons	65.08	42.00						3,671.14	107
** Concrete in pads **		****									
4000 psi direct	1	CUYD	26.09	120.17		0.69				151.15	147
* Pad area *	75	SQFT									
Point and patch	19	SQFT	7.50	0.48		3.56				0.62	12
Hand trowel finish	75	SQFT	90.37	2.30		42.93				1.81	136
Protect and cure vertical surfaces	19	SQFT	7.86	0.74		3.73				0.66	12
Protect and cure horizontal surfaces	75	SQFT	30.12	2.39		14.31				0.62	47
Install MCC & Complete Electrical Renovations	1	LS			165,495.00					165,495.00	165,495
Utility Fee Allowance - CMP Fees	1	ALLOW		12,000.00						12,000.00	12,000
Trench for Grounding Loop	200	LF		2,400.00						12.00	2,400
Electrical Equipment		****									
MCC-01	1	EA			190,000.00					190,000.00	190,000
Harmonic Filter	1	EA			16,000.00					16,000.00	16,000
SWITCHGEAR	1	EA			18,000.00					18,000.00	18,000
Trenching/Concrete/Backfill for Electrical Ductbank	50	LF	4,500.00	2,160.00		2,520.00				183.60	9,180
*** Total Replace Motor Control Center**			**5,011.94**	**16,765.38**	**389,495.00**	**2,585.22**					**413,858**
Total Gross Cost			**213,046.21**	**60,593.64**	**1,737,453.87**	**27,686.12**	**143,024.00**				**2,181,804**

Franklin Street Pump Station Upgrades
List of Assumptions for Guaranteed Maximum Price (GMP) Estimate

Overall

1. Wage rates assumed to be non-prevailing standard wages for Portland, Maine.
2. This estimate assumes that work will be accomplished during normal working hours (7:00 AM to 5:00 PM).
3. No winter construction is anticipated in this estimate. Construction work is expected to follow the final design and construction schedule submitted with this GMP.
4. The GMP estimate and schedule assume reasonable durations for permit procurement.
5. This estimate excludes sales tax on all materials and major equipment. We assume that the City will provide a tax-exempt certificate for all contractors on this project.
6. The estimate assumes that the emergency generator will be diesel fueled. No costs for installation of a new natural gas service are included.

General Conditions

1. Estimate assumes that utilities on site (electricity and water) can be used by contractors at no additional cost.
2. No cost for building permit or electrical permit is included. We assume that the City will waive the fees for these permits. If the City does not intend to waive the fees, add $27,900 to the GMP total.

Pump Station

1. The scope of work assumes that no contaminated soils will be encountered during construction.
2. The scope of work assumes that no rock excavation and/or removal is required during construction.
3. Temporary by-pass pumping during the renovation work is included. Flow data for the Pump Station is not available from the City. Temporary by-pass pumping assumes a maximum instantaneous flow of 10,692 gallons per minute at 32' total dynamic head. Temporary by-pass pumping has been included for a duration of ninety (90) calendar days.
4. Interferences or relocation of existing unknown or unforeseen underground utilities is not included in the estimate.
5. Replacement of wet well stairs per City of Portland provided design drawings is included.

Process/Mechanical/Electrical

1. Equipment selection is as outlined in our Design Basis Report (DBR).
2. CMP Allowance for utility connection and service fees has been included.
3. HVAC Allowance has been included for final HVAC system design equipment selection, with decision on the fuel type to be determined based on discussions with the City. Natural gas is not an option given availability at the site (see DBR Clarification 7).

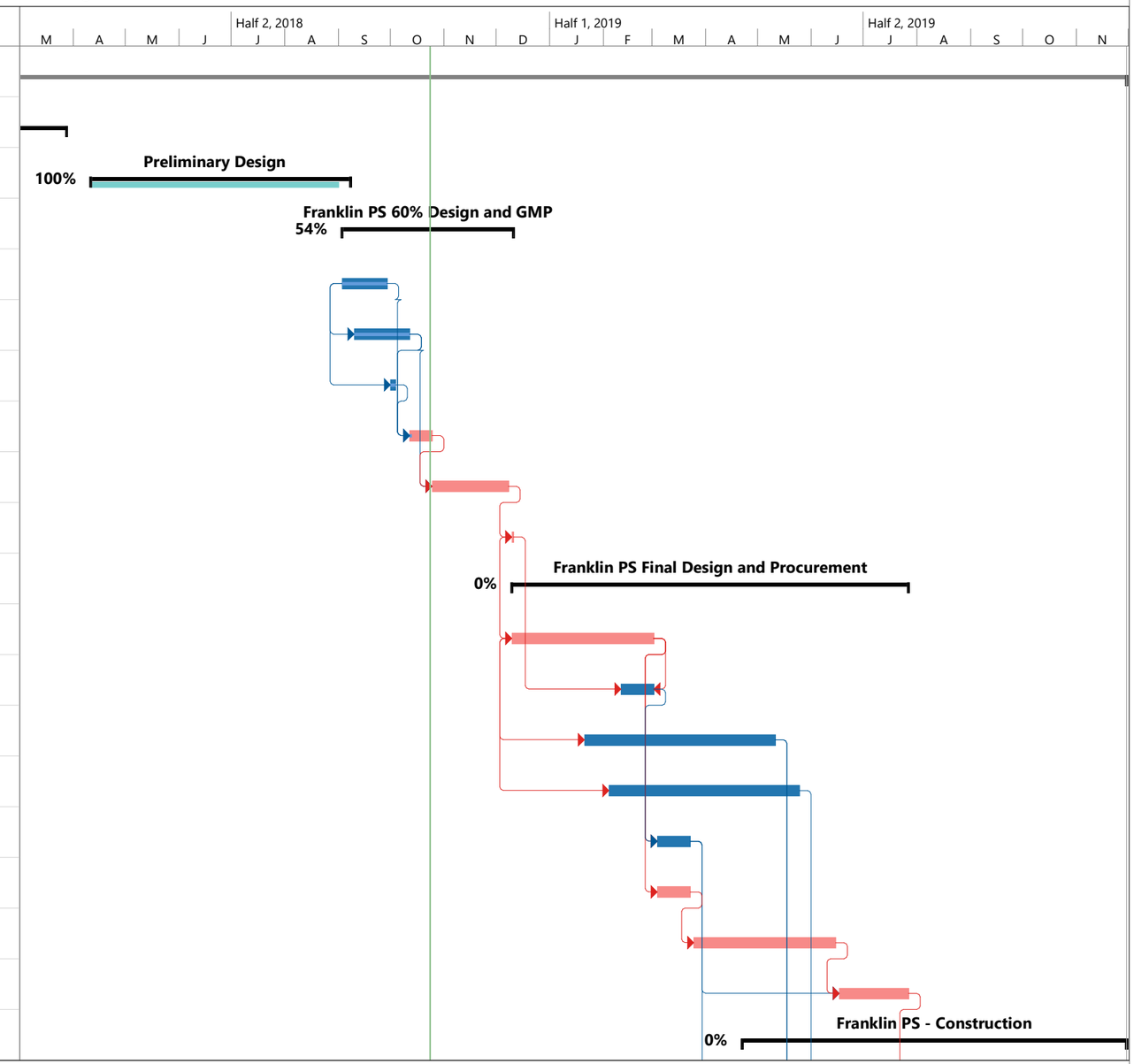
Design Basis Report Clarifications

1. As part of a due diligence investigation, the building was surveyed for asbestos, lead paint, and PCBs; these products were often used as part of standard construction practices at the time of original building construction. These materials were found within the pump station as documented within the Credere Associates Franklin Street PS Upgrades Hazardous Building Materials Survey Report dated August 22, 2018. These materials shall be managed during construction in accordance with applicable regulations; completing the remediation as described within the Project Schedule reduces the potential for exposure of these materials during construction and post-construction during operations. Mitigation of hazardous materials at this site is for removal and disposal of ACM roofing materials, preparatory work and an encapsulation coating system for paints containing Lead/PCB, removal of caulking materials with ACM/PCB. Scope is limited to known hazardous materials as documented in Credere Associates Report.
2. Adding a second grinder with slide gate in each flow channel is intended in part, to extend the life of the pump, which receives flow during high flow events (rain). The grinder and slide gates will allow flow to be sent to either side of the wet well and all three pumps utilized.

3. Replacement of the wet well section sluice (isolation) gate will allow for isolation of the wet wells, operation of all three pumps or allow Pump 1 to run alone or Pumps 2 and 3 to run. Thus, either side of the wet well can be inspected, cleaned and maintained.
4. Replacing the three (3) existing plugs valves on the pump suction lines is necessary, as the City reports one valve is now broken and requiring immediate replacement. With the plug valve inoperable, the pump cannot be cleaned out without shutting the pump station down and bypassing flow.
5. A buried flow meter and valves cut into the 24" concrete force main was initially requested to bring the station into compliance with EPA regulations. A less costly (but still technically sound) alternative was found using a low-profile insertion flow meter. This change in type of technology utilized is a cost benefit not only for direct construction cost but indirect costs also, and reduces the risks associated with the installation by containing all work associated with the meter installation within the existing pump station. Flow metering includes an ADFM Hot Tap Flow Meter installed in the existing vertical force main, inside the drywell.
6. HVAC upgrades shall bring the equipment into proper operation and air changes per hour making for a safe post-construction working environment, consistent with NFPA 820.
7. The City communicated with Unitil to evaluate the use of natural gas as a fuel source for HVAC and backup power generation; the cost of Unitil connection to extend gas to the site exceeds the benefit for a natural gas fuel source.
8. As noted in the DBR, hydrogen sulfide levels in the wet well were generally found to be low (less than 10 parts per million (ppm)). There was anomalous event during the two-week testing period where concentrations rose as high as 37 ppm. The City reviewed its records and could not find any information (e.g. sewer cleaning activities, industrial discharges, etc.) which would explain this spike in concentrations. Furthermore, the data was collected during peak temperature conditions in late July and early August. Hydrogen sulfide concentrations would be expected to be at or near their peak during this time of year. Based on the fact that relatively low concentrations were found during the sampling, it was determined that a capital investment in additional odor control equipment is not warranted at this time.
9. Handrail, grating and other miscellaneous metals will bring the station into compliance with OSHA safety standards. The handrails presently are too low to meet current standards; there are a number of locations where the grating is installed improperly or missing support or under sized. All of the associated work brings the station into compliance with OSHA standards and provides a safe working environment.

City of Portland, Maine
Franklin Street Pump Station Upgrades
Design-Build Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
0	**Franklin Street PS Design-Build Project Schedule**	**535 days**	**Mon 11/13/17**	**Fri 11/29/19**	
1	**Pre-Award**	**97 days**	**Mon 11/13/17**	**Tue 3/27/18**	
7	**Preliminary Design**	**108 days**	**Wed 4/11/18**	**Fri 9/7/18**	
22	**Franklin PS 60% Design and GMP**	**71 days**	**Mon 9/3/18**	**Mon 12/10/18**	
23	60% Design Development - Franklin	20 days	Mon 9/3/18	Fri 9/28/18	21
24	Final GMP Cost Development - Franklin	24 days	Mon 9/10/18	Thu 10/11/18	23SS+5 days
25	TAT Design	3 days	Mon 10/1/18	Wed 10/3/18	23SS+20 days
26	Submit 60% Design and GMP	9 days	Fri 10/12/18	Wed 10/24/18	24,23,25
27	City Review of GMP - Franklin	32 days	Thu 10/25/18	Fri 12/7/18	26,24
28	GMP Approval & Notice to Proceed	1 day	Mon 12/10/18	Mon 12/10/18	27
29	**Franklin PS Final Design and Procurement**	**165 days**	**Mon 12/10/18**	**Fri 7/26/19**	
30	Final Design Development - Franklin	60 days	Mon 12/10/18	Fri 3/1/19	28SS
33	Subcontractor Pre-Qualification	3 wks	Mon 2/11/19	Fri 3/1/19	28,30FF
31	Procurement of MCCs, VFDs and Generator	4 mons	Mon 1/21/19	Fri 5/10/19	30SS+30 days
32	Procurement of Channel Grinder/Slide Gates	4 mons	Mon 2/4/19	Fri 5/24/19	30SS+40 days
34	Subcontractor Bidding and Awards	3 wks	Mon 3/4/19	Fri 3/22/19	33,30
35	Complete IFC Design Documents	3 wks	Mon 3/4/19	Fri 3/22/19	30
36	100% Documents Approval by MEDEP	60 days	Mon 3/25/19	Fri 6/14/19	35
37	Secure Building and Electrical Permits	30 days	Mon 6/17/19	Fri 7/26/19	36,34
38	**Franklin PS - Construction**	**160 days**	**Mon 4/22/19**	**Fri 11/29/19**	

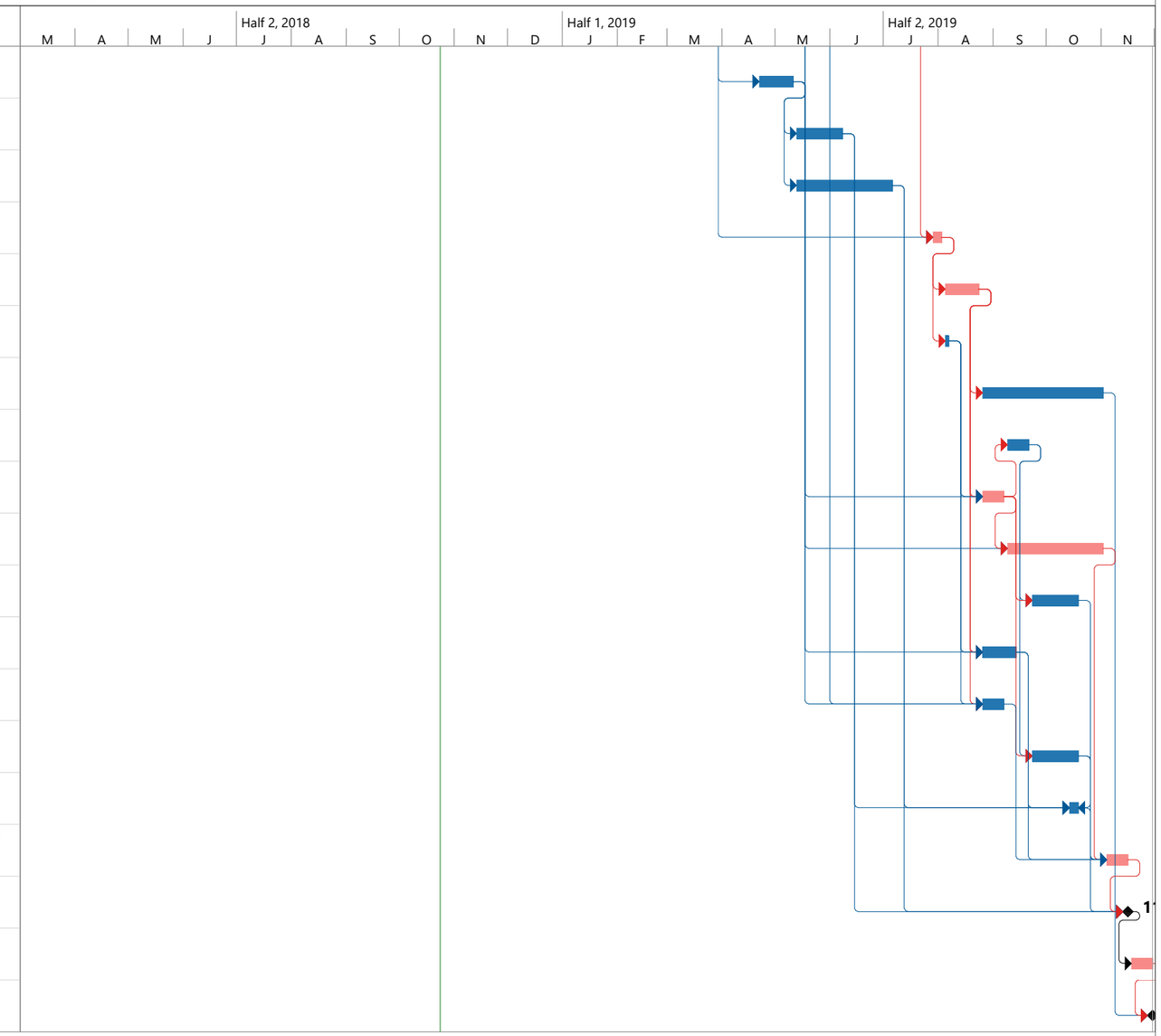


Woodard & Curran, Inc.
Franklin Street PS Design-Build
Schedule Date: October 24, 201

Task		Project Summary		Manual Task		Start-only		Deadline		Manual Progress	
Split		Inactive Task		Duration-only		Finish-only		Critical			
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Critical Split			
Summary		Inactive Summary		Manual Summary		External Milestone		Progress			

City of Portland, Maine
Franklin Street Pump Station Upgrades
Design-Build Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
39	HazMat Mitigation/Prep	15 days	Mon 4/22/19	Fri 5/10/19	34FS+20 days
40	Repaint Interior Pump Station	20 days	Mon 5/13/19	Fri 6/7/19	39
41	Misc Metals Fabrication	40 days	Mon 5/13/19	Fri 7/5/19	39
42	Mobilize	5 days	Mon 7/29/19	Fri 8/2/19	37,34
43	Set-Up and Test By-Pass Pumping for PS	15 days	Mon 8/5/19	Fri 8/23/19	42
44	Establish Temporary Lighting/Power	2 days	Mon 8/5/19	Tue 8/6/19	42
45	By-Pass Pumping	50 days	Mon 8/26/19	Fri 11/1/19	43
46	Roof Replacement	10 days	Mon 9/9/19	Fri 9/20/19	47
47	Electrical Demolition	10 days	Mon 8/26/19	Fri 9/6/19	44,43,31
48	Electrical Renovations	8 wks	Mon 9/9/19	Fri 11/1/19	31,47
51	Interior Improvements (HR, Grating, Doors, etc.)	20 days	Mon 9/23/19	Fri 10/18/19	47,46
49	Pipe and Valve Modifications	15 days	Mon 8/26/19	Fri 9/13/19	43,44,39
50	Install Channel Grinder and Slide Gates	10 days	Mon 8/26/19	Fri 9/6/19	43,44,32,39
52	HVAC Improvements	20 days	Mon 9/23/19	Fri 10/18/19	46,47
53	Painting Repair Work	5 days	Mon 10/14/19	Fri 10/18/19	52FF,41,40,49
54	Commissioning, Training and Start-up	10 days	Mon 11/4/19	Fri 11/15/19	52,48,51,49,50
55	Substantial Completion	0 days	Fri 11/15/19	Fri 11/15/19	54,41,53,40
56	Punch List	10 days	Mon 11/18/19	Fri 11/29/19	55
57	Final Completion	0 days	Fri 11/29/19	Fri 11/29/19	56,45



Woodard & Curran, Inc.
Franklin Street PS Design-Build
Schedule Date: October 24, 201

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

CREDERE ASSOCIATES, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

August 22, 2018

Jason D. Jancaitis, P.E.
Project Manager
Woodard & Curran
40 Shattuck Road, Suite 110
Andover MA 01810

Subject: Hazardous Building Materials Survey
Franklin Street Pumping Station, Portland, Maine

Dear Mr. Jancaitis:

The attached report has been prepared to present the results of a Hazardous Building Materials Survey (HBMS) completed for the above referenced property (Site), and **Section 4** of the report includes our conclusions and recommendations.

Please do not hesitate to contact me at (207) 828-1272 extension 12 if you have any questions, comments, or require additional information regarding this investigation.

Sincerely,
CREDERE ASSOCIATES, LLC

Stacy W. Towne
Environmental Specialist

Judd Newcomb, PG, CG
Project Manager

CREDERE ASSOCIATES, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

Hazardous Building Materials Survey

Franklin Street Pumping Station
Portland, Maine 04103

Prepared for:
Woodard & Curran
40 Shattuck Road
Suite 100
Andover MA 01810

Prepared by:
Credere Associates, LLC
776 Main Street
Westbrook, ME 04092

August 22, 2018

Credere Project
No. 15001293

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1. INTRODUCTION

Credere Associates, LLC (Credere) was retained by Woodard & Curran. (the Client) to conduct a Hazardous Building Material Survey (HBMS) for the Franklin Street Pumping Station in the City of Portland, Cumberland County, Maine (Site). This HBMS was completed in conformance with Credere's June 8, 2018, proposal for the Site.

1.1 PURPOSE AND STATEMENT OF OBJECTIVES

This section was developed to provide clarity and transparency in communicating and interpreting HBMS results. The primary purpose of this HBMS is to identify hazardous building materials that may be impacted by future renovations and document their location and quantity. The survey was focused on the Summit Building and the Main Building.

The following objectives were established to aid in designing the scope of work:

- Complete an asbestos-containing materials (ACM) survey to identify ACM that may be impacted by future renovations
- Complete a lead paint screening to assess the need for health and safety precautions during future renovations
- Complete a polychlorinated biphenyl (PCB)-containing building materials survey to assess the need for special handling and disposal of certain demolition debris

1.2 SITE DESCRIPTION

The Franklin Street Pumping Station Site is located at the corner of Franklin Street and Marginal Way in Portland, Maine, and is one of nine wastewater pumping stations owned and operated by the City of Portland. The approximately 1,400-square foot building was constructed in 1964 and comprises a wet and dry side, both having three levels.

2. SCOPE OF WORK & METHODOLOGY

The following sampling program was developed to investigate HBM at the Site and meet the objectives identified in **Section 1.1**.

2.1 ACM SAMPLING

On July 24, 2018, a Credere Maine Certified Asbestos Inspector surveyed the Site for the presence of suspect ACM. A copy of the inspector's certification is included in **Appendix A**. Ten (10) samples of suspect ACM were collected in triplicate (i.e., 30 total ACM samples). The sampling was performed in accordance with Maine Department of Environmental Protection (DEP) Chapter 425: Asbestos Management Regulations (Chapter 425). Samples were analyzed by EMSL Analytical, Inc. (EMSL) of South Portland, Maine, using Polarized Light Microscopy (PLM) according to the U.S. Environmental Protection Agency (EPA) Method 600/R-93/116. Sample locations are summarized in **Table 1.**

2.2 LEAD DETERMINATION

On July 24, 2018, Credere field screened painted surfaces throughout the Site building using an Innov-X Alpha 4000 X-ray fluorescence (XRF) meter. XRF screening was completed in accordance with Maine DEP Chapter 424: Lead Management Regulations (Chapter 424). Sample locations are summarized in **Table 2.**

The determination does not constitute a lead inspection as defined by Chapter 424 as the Site building is not currently and is not planned to be residential in the future.

2.3 PCB-CONTAINING BUILDING MATERIAL SAMPLING

On July 24, 2018, Credere surveyed the Site building to locate materials that in Credere's experience are likely to contain concentrations of Toxic Substances Control Act (TSCA)-regulated PCBs exceeding the PCB bulk product waste criteria as defined by 40 CFR 761.3. Eleven (11) samples of suspect PCB-containing building materials were collected (CA-PCB-1 through CA-PCB-11) using dedicated sampling tools. Sample locations are summarized in **Table 3.**

3. RESULTS

The following subsections present the results of the data collected during this HBMS .

3.1 ACM RESULTS

Laboratory analytical results for asbestos bulk samples were compared to the 1% limit specified in the Maine DEP Chapter 425. Material with concentrations of asbestos greater than 1% are considered ACM and are required to be abated per Maine DEP Chapter 425 prior to demolition or renovation of these materials.

A summary of collected asbestos sample results is provided in **Table 1,** and the complete laboratory analytical report is provided in **Appendix B**. A plan of the building levels and sample locations including positive materials is attached as **Figure 1**. The photo log attached as **Appendix C** includes pictures of each sample location.

During this survey, the following materials were identified to be ACM.

- CA-PACM-1, Gray caulk around the louvered vent fan on the east side of the building
- CA-PACM-2, Gray caulk between the dry side double door frame and the building
- CA-PACM-4, Black asphaltic roofing material with silver paint on chimney flashing
- CA-PACM-7, Black asphaltic roofing material in a fiber mesh (3rd layer of roof)
- CA-PACM-9, Black roofing felt with silver paper (5th layer of roof)

Suspect materials and materials similar to those identified as ACM herein are presumed ACM.

3.2 LEAD PAINT SCREENING RESULTS

All paint with a positive detection for lead was considered lead-containing paint (LCP) for purposes of management according to the OSHA Lead in Construction Standards (29 CFR 1926.62) and will require proper handling and worker notification. The results of the lead determination are summarized in **Table 2**.

The following surfaces were positive for LCP:

- Blue paint on pump bases at bottom level of dry side

3.3 PCB RESULTS

PCB sample results were compared to the 40 CFR 761.3 definition of PCB bulk product waste (50 milligrams per kilogram [mg/kg]), which are regulated for removal. Materials that have been analyzed to contain total PCBs at a concentration of equal to or greater than 1 mg/kg but less than 50 mg/kg are not regulated by TSCA for disposal as long as they remain in use. However, if these materials are removed from use, such as through demolition or renovation, they must be

disposed at a facility that is licensed to accept this waste. Building materials that have been analyzed to contain total PCBs at a concentration of less than 1 mg/kg are unrestricted for future use and/or disposal.

A summary of collected PCB sample results is provided in **Table 3,** and the complete laboratory analytical report is provided in **Appendix B**. A plan of the building levels and sample locations is included as **Figure 1**.

PCBs results exceeded the 50 mg/kg threshold for bulk product waste under TSCA in the following samples at the indicated concentrations:

- CA-PCB-2 (450 mg/kg): White ceiling paint on the wet side of the building
- CA-PCB-3 (210 mg/kg): Yellow paint on handrails on top level of the wet side
- CA-PCB-4 (1300 mg/kg): Gray caulk around the entrance doors to the dry side
- CA-PCB-5 (4100 mg/kg): Tan wall coating/paint on the lower level of the dry side
- CA-PCB-7 (2200 mg/kg): Gray paint on the ceiling of the dry side
- CA-PCB-8 (1000 mg/kg): Gray paint on the floor of the dry side top level
- CA-PCB-9 (110 mg/kg): Gray caulk on the base of upper windows
- CA-PCB-10 (110.mg/kg): Gray caulk on the top edge of the upper windows

PCBs results also exceeded the 1 mg/kg threshold for the requirement for proper management if removed from use in the following samples at the indicated concentrations:

- CA-PCB-1 (14 mg/kg): Gray/white caulk around the bay door frame
- CA-PCB-6 (17 mg/kg): Gray caulk above the rain ledge on west side of building
- CA-PCB-11 (24 mg/kg): Gray caulk around the vent fan on east side of building

4. CONCLUSIONS & RECOMMENDATIONS

Credere has performed a HBMS of the Franklin Street Pumping Station in Portland, Maine. The primary purpose of this HBMS was to identify HBM that may be impacted by future renovations and document their location and quantity. The HBMS has met the following objectives:

- Complete an ACM survey to identify ACM that may be impacted by future renovations
- Complete a lead paint determination to assess the need for health and safety precautions during future renovations
- Complete a PCB-containing building materials survey to assess the need for special handling and disposal of certain building materials

4.1 SUMMARY

Credere's conclusions considering the results of this HBMS include the following:

- Gray caulk around the louvered vent fan and between the dry side double door frame and the building on the east side of the building was identified as ACM.
- The built-up roofing system contains several ACMs that are impractical to separate; therefore, if the roof is replaced during building renovations the entire roof should be handled as asbestos.
- Blue paint on the pump bases on the lower level was identified as LCP.
- Multiple PCB-containing building materials were identified during the survey that require removal or require proper disposal if removed from use in accordance with TSCA. In addition, most of these PCB-containing materials are paints or caulks that may have leached PCBs into the porous substrate below (i.e. concrete); therefore, the concrete may also be impacted by PCBs.

4.2 RECOMMENDATIONS

Based on the findings and conclusions of this HBMS, Credere makes the following recommendations:

- Abate identified ACM that will be impacted during building renovations in accordance with Maine DEP Chapter 425 – Asbestos Management Regulations. If during renovations any untested suspect materials are encountered they should be sampled and analyzed for asbestos or presumed positive to allow for proper abatement.
- Collect samples of the porous concrete beneath PCB-containing caulks and paints to determine if additional TSCA regulated wastes are present in the Site building.
- Properly remove and dispose of all TSCA regulated PCB-containing building materials during building renovations.
- Employ proper health and safety practices and worker notification to prevent exposure to lead and PCBs in paint during building renovation.

5. LIMITATIONS

This report has been prepared as part of a contract agreement between Credere and the Client. This agreement was established in order to provide the Client with information upon which they can rely concerning the existence or likely existence of HBMs at the Site. This report does not reflect:

- Conditions in inaccessible and/or otherwise untested areas
- Variations in contaminant concentrations that can occur between sample locations
- The potential presence of analytes that were not analyzed for or that may be present below the Practical Quantification Limits for the analytical method
- Variations in conditions that occurred at a time other than when the Site inspection was completed

In the event that any conditions different from those described herein are encountered at a later time, Credere Associates, LLC requests an opportunity to review such differences and modify the assessment and conclusions of this report. This report was prepared expressly for the purpose described. The information in this report may not be suitable for any other use without adaptation for the specific purpose intended. Any such reuse of this report, without adaptation, shall be at the sole risk and liability of the party undertaking the reuse.

The ACM survey portion of this project was completed in accordance with relevant, applicable, and appropriate standards and was performed by exercising the degree of care and skill ordinarily exercised by a duly qualified or Certified Asbestos Inspector. However, there is a possibility that hidden, inaccessible, or otherwise unassessed ACM may exist at the Site. If suspect ACM is identified during any future Site operations including maintenance, renovations, housekeeping, or general demolition, the party performing these activities should first refer to this report. If conclusive results cannot be obtained, additional sampling and analysis must be conducted by a duly qualified or Certified Asbestos Inspector prior to the initiation of any activities that may impact or in any way disturb potential unassessed ACM.

The lead paint determination was not intended to determine the suitability of the buildings for residential or child-occupied uses, or to assess the risk associated with lead paint on the Site.

6. SIGNATURES

The following individual is a licensed professional certified to perform the above listed work in the respective jurisdiction and possess sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the existence of HBMs at the Site. Copies of applicable certificates/licenses are included in **Appendix A**.

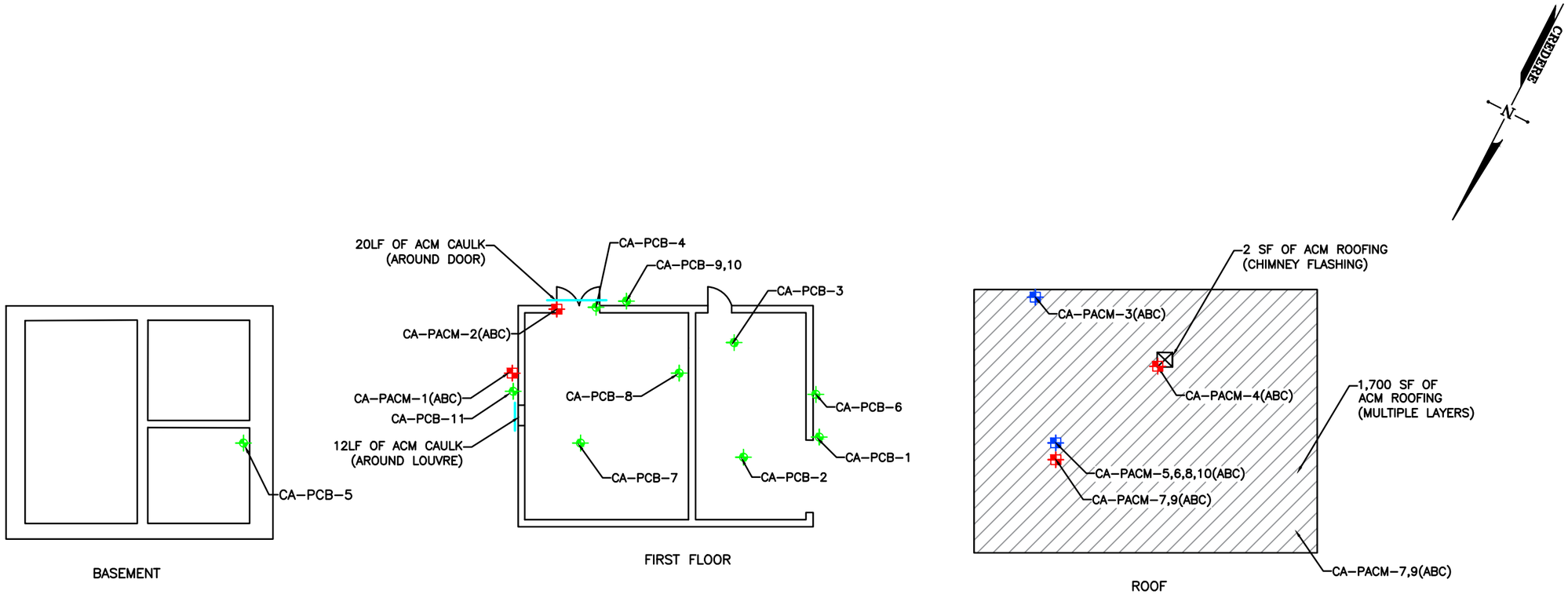
Stacy W. Towne
Environmental Specialist
Maine Certified Asbestos/Lead Inspector

Additionally, the following senior staff performed quality control on this report, however, may not by certified to perform sampling as outlined herein.

Judd Newcomb, PG, CG
Project Manager

Rick Vandenberg, PG, CG
Technical Review

FIGURES



LEGEND

- ASBESTOS SAMPLE LOCATION (POSITIVE)
- ASBESTOS SAMPLE LOCATION (NEGATIVE)
- PCB SAMPLE LOCATION
- ASBESTOS-CONTAINING ROOFING
- ASBESTOS-CONTAINING CAULK

NOTES

1. FIELD WORK WAS COMPLETED AT THE FRANKLIN STREET PUMPING STATION BY CREDERE ASSOCIATES ON JULY 24, 2018.

FIGURE 1
HAZARDOUS BUILDING MATERIALS SAMPLE LOCATION PLAN
FRANKLIN STREET PUMPING STATION

FRANKLIN STREET PUMPING STATION
FRANKLIN STREET x MARGINAL WAY
PORTLAND, MAINE

DRAWN BY: MAW | DATE: 8/8/2018
CHECKED BY: JRN | PROJECT: 15001293

CREDERE ASSOCIATES, LLC
776 MAIN STREET
WESTBROOK, MAINE 04092
FAX: 207.887.1051
TEL: 207.828.1272
WWW.CREDERELLC.COM

Economy Community Environment

TABLES

Table 1
Asbestos Sample Summary and Results
Franklin Street Pumping Station
Portland, Maine

Sample Number	Location	Material	Asbestos Content	Approximate Quantity of ACM (unit)
CA-PACM-1	Around Louvre Vent Fan	Caulk (Gray)	**3.3% Chrysotile**	**12 LF**
CA-PACM-2	Entance Doors to Dry Side	Caulk (Gray)	**1.6% Chrysotile**	**20 LF**
CA-PACM-3	Roof Edge at Flashing	Cloth with Asphalt Roofing (Black)	0.57% Chrysotile	NA
CA-PACM-4	Roof /Chimney Joint	Asphalt Roofing with Silver Paint	**5.5% Chrysotile**	**2 SF**
CA-PACM-5	Bottom Layer of Roof	Roof Felt with Asphalt (Black)	ND	NA
CA-PACM-6	Roof/ 2nd Layer	Roof Felt with Asphalt (Black)	0.34% Chrysotile	NA
CA-PACM-7	Roof/ 3rd Layer	Asphalt in Mesh (Black)	**14.3% Chrysotile**	**1700 SF**
CA-PACM-8	Roof/ 4th Layer	Asphalt with Gravel (Black)	ND	NA
CA-PACM-9	Roof/ 5th Layer	Felt with Paper Back (Black/Silver)	**11.7% Chrysotile**	**1700 SF**
CA-PACM-10	Roof/ Top Layer	Paint on Rubber (Silver)	ND	NA

ND - None detected, sampled in triplicate
ACM - asbestos-containing material (>1% asbestos)
NA - Not applicable
SF - square feet
LF - linear feet
Bold - Positive detection of ACM exceeding 1%

Table 2
Lead Determination Results
Franklin Street Pumping Station
Portland, Maine

Location	Building Component	Substrate	Paint Color	Paint Condition	Lead Concentration (mg/cm^2)
Influent control room	Loading dock	Concrete	Gray	Poor	0.00
Influent control room	Wall	CMU block	Tan	Good	0.00
Influent control room	Wall	CMU block	Gray	Good	0.00
Wet Side	Wall	CMU block	Green/Tan	Poor	0.00
Wet Side	Hand Rail	Metal	Yellow	Poor	0.00
Wet Side	Floor Stripe	Concrete	Yellow	Poor	0.00
Wet Side	Wall	Concrete	Gray/White	Poor	0.00
Wet Side	Hand rail	Metal	Yellow	Poor	0.00
Dry Side	Floor	Concrete	Gray	Poor	0.00
Dry Side	Ceiling	Concrete	Gray	Good	0.00
Dry Side	Electrical Conduit	Metal	Yellow	Good	0.00
Dry Side	Stair Riser	Concrete	Yellow	Good	0.00
Wet Side	Ceiling	Concrete	White	Poor	0.00
Dry Side Pump Room	Pump Base	Metal	Red/Blue	Fair	0.00
Dry Side Pump Room	Pump Motor	Metal	Black	Fair	0.00
Dry Side Pump Room	Gate Valve	Metal	Gray	Fair	**0.05**
Dry Side Pump Room	Pump Base	Metal	Red	Fair	0.00
Dry Side Pump Room	Pump Base	Metal	Blue	Fair	**>3.63**
Dry Side Pump Room	Pump Base	Metal	Blue	Fair	**>2.56**
Dry Side Pump Room	Pump Base	Metal	Blue	Fair	**>1.68**

Bold indicated detectable concentrations of lead (i.e., lead containing paint [LCP])

Table 3
PCB Sample Summary and Results
Franklin Street Pumping Station
Portland, Maine

Sample Name	Date	Location	Material	Substrate	Regulatory Criteria (mg/kg)	Total PCBs (mg/kg)
CA-PCB-1	7/24/2018	Bay Door Exterior Frame	Caulk (White/Gray)	Metal	50/1*	14
CA-PCB-2	7/24/2018	Wet Side Ceiling	Ceiling Paint (White)	Concrete		**450**
CA-PCB-3	7/24/2018	Wet Side Handrail	Paint (Yellow)	Metal		**210**
CA-PCB-4	7/24/2018	Dry Side Entrance Doors	Caulk (Gray)	Metal		**1300**
CA-PCB-5	7/24/2018	Dry Side Bottom Level Wall	Paint/Wall Coating (Tan)	Concrete		**4100**
CA-PCB-6	7/24/2018	Rain Ledge above Bay Door	Caulk (Gray)	Brick		17
CA-PCB-7	7/24/2018	Dry Side Ceiling	Paint (Gray)	Concrete		**2200**
CA-PCB-8	7/24/2018	Dry Side Floor	Paint(Gray)	Concrete		**1000**
CA-PCB-9	7/24/2018	Base of Upper Windows	Caulk (Gray)	Metal		**110**
CA-PCB-10	7/24/2018	Top of Upper Windows	Caulk (Gray)	Concrete		**110**
CA-PCB-11	7/24/2018	Around Vent Fan	Caulk (Gray/White)	Metal/Brick		24

ND<0.2 - result below laboratory reporting limit, reporting limit indicated
mg/kg - milligrams per kilogram
J - results are considered estimated
PCB - polychlorinated biphenyl
CMU - concrete masonry unit
*Results were compared to the 40 CFR 761.3 definition of PCB bulk product waste where results greater than 50 mg/kg of PCBs are required to be removed. Results that exceed 1 mg/kg and are below 50 mg/kg are regulated for disposal when removed from use.
Reporting limit exceeds regulatory criteria

APPENDIX A

INSPECTOR CERTIFICATION DOCUMENTS

STATE OF MAINE
DEPARTMENT OF
ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

State of Maine
Asbestos Abatement Program

Stacy W. Towne

Inspector
Cert No. AI-0642
Trn.Exp.Date 01/19/2019
Expiration Date 01/31/2019
This is not a legal form of official identification

February 8, 2018

Credere Associates, LLC
776 Main St.
Westbrook, Maine 04092

Dear Licensee:

Asbestos application(s) for individual certification of the **one** employee(s) listed below have been received and **approved**. Individual certification numbers are listed below and wallet card(s) are enclosed. Card(s) are property of the individual to whom each is issued. Your responsibility as a licensee is to ensure delivery of the cards to persons in your employment. This letter should be retained for your company files as record of certification. Please attach 1 updated passport size photo with every application.

Remember, in Maine all **certified employees** working on an asbestos abatement project, whether conducting removal/repair, air monitoring, design, inspection, or analysis functions, **must work for a State of Maine licensed asbestos firm** and carry his/her wallet card(s) on the job site.

As a reminder, prior to renewing your asbestos certification, the State of Maine **requires** an annual refresher course to be taken before submitting a renewal application. A certificate shall expire one year from the last day of the month from the date of issuance, **or on the last day of the month that the training certificate expires**, whichever is sooner.

All our asbestos forms can be found at http://www.maine.gov/dep/rwm/asbestos/newupdatedformsasb.htm. Thank you for your cooperation and your completed application(s).

Name	Category	Certification #	Exp. Date
Stacy W. Towne	Inspector	AI-0642	01/31/2019

Sincerely,

Sandra J. Moody

Sandra J. Moody, Environmental Specialist
Division of Remediation
Bureau of Remediation and Waste Management

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

June 7, 2018

Attn: Stacy W. Towne
Credere Associates, LLC
776 Main St.
Westbrook, Maine 04092

Dear Mr. Towne,

Your lead application for certification has been received and **approved**. You have been granted certification as a **Lead Inspector LI-0456**. Enclosed is your wallet card, with an expiration date of **May 31, 2019**. All employees working on a lead abatement project must carry this photo ID wallet card. The card is property of the individual to whom it is issued. Your responsibility as a licensee is to ensure delivery of the card to person in your employment. This letter should be retained for your company files as record of certification. Please attach 1 updated passport size photo with every application.

Thank you for your cooperation and your completed application(s). Applications can now be found on our DEP webpage at the following:
http://www.maine.gov/dep/rwm/lead/forms/index.htm

If you have any questions on this certification or on any other aspect of DEP's lead abatement licensing program, please call Sandy Moody (207) 287-7751 or email sandy.j.moody@maine.gov

Sincerely,

Sandra J. Moody

Sandra J. Moody, Environmental Specialist
Division of Remediation
Bureau of Remediation and Waste Management

Enclosure

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
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BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
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PORTLAND, MAINE 04103
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PRESQUE ISLE
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PRESQUE ISLE, MAINE 04679-2094
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

APPENDIX B

ANALYTICAL LABORATORY REPORTS

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Judd Newcomb
CREDERE Associates
776 Main Street
Westbrook, ME 04092

PO Number: None
Job ID: 45287
Date Received: 7/26/18

Project: Franklin St. Pumping Station 15001293

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

Jennifer Lowe (for)

Sue Sylvester
Principal, General Manager

Date of Approval: 8/9/2018
Total number of pages: 14

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Franklin St. Pumping Station 15001293

Sample Association Table

Field ID	Matrix	Date-Time Sampled	Lab#	Analysis
CA-PCB-1	Solid	7/24/2018 10:40	45287-001	PCBs in soil by Soxhlet 8082
CA-PCB-2	Solid	7/24/2018 10:45	45287-002	PCBs in soil by Soxhlet 8082
CA-PCB-3	Solid	7/24/2018 10:50	45287-003	PCBs in soil by Soxhlet 8082
CA-PCB-4	Solid	7/24/2018 10:55	45287-004	PCBs in soil by Soxhlet 8082
CA-PCB-5	Solid	7/24/2018 11:05	45287-005	PCBs in soil by Soxhlet 8082
CA-PCB-6	Solid	7/24/2018 11:15	45287-006	PCBs in soil by Soxhlet 8082
CA-PCB-7	Solid	7/24/2018 11:30	45287-007	PCBs in soil by Soxhlet 8082
CA-PCB-8	Solid	7/24/2018 11:45	45287-008	PCBs in soil by Soxhlet 8082
CA-PCB-9	Solid	7/24/2018 11:50	45287-009	PCBs in soil by Soxhlet 8082
CA-PCB-10	Solid	7/24/2018 11:55	45287-010	PCBs in soil by Soxhlet 8082
CA-PCB-11	Solid	7/24/2018 12:00	45287-011	PCBs in soil by Soxhlet 8082

Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287

Sample#: 45287-001
Sample ID: CA-PCB-1
Matrix: Solid
Sampled: 7/24/18 10:40

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1221	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1232	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1242	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1248	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1254	**14**	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1260	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1262	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
PCB-1268	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**70**	30-150	%	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A
decachlorobiphenyl SUR	**88**	30-150	%	5	AAG	7/26/18	10882	7/31/18	12:50	SW3540C8082A

Sample#: 45287-002
Sample ID: CA-PCB-2
Matrix: Solid
Sampled: 7/24/18 10:45

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1221	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1232	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1242	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1248	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1254	**450**	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1260	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1262	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
PCB-1268	< 16	16	ug/g	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	100	AAG	7/26/18	10882	7/31/18	13:05	SW3540C8082A

DOR = Diluted out of range.

Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287

Sample#: 45287-003
Sample ID: CA-PCB-3
Matrix: Solid
Sampled: 7/24/18 10:50

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1221	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1232	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1242	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1248	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1254	**210**	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1260	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1262	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
PCB-1268	< 8.1	8.1	ug/g	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	13:20	SW3540C8082A

DOR = Diluted out of range.

Sample#: 45287-004
Sample ID: CA-PCB-4
Matrix: Solid
Sampled: 7/24/18 10:55

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1221	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1232	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1242	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1248	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1254	**1300**	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1260	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1262	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
PCB-1268	< 72	72	ug/g	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	500	AAG	7/26/18	10882	8/1/18	11:22	SW3540C8082A

DOR = Diluted out of range.

Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287

Sample#: 45287-005
Sample ID: CA-PCB-5
Matrix: Solid
Sampled: 7/24/18 11:05

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1221	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1232	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1242	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1248	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1254	**2900**	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1260	**1200**	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1262	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
PCB-1268	< 130	130	ug/g	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	1000	AAG	7/26/18	10882	8/8/18	11:30	SW3540C8082A

DOR = Diluted out of range.

Sample#: 45287-006
Sample ID: CA-PCB-6
Matrix: Solid
Sampled: 7/24/18 11:15

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1221	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1232	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1242	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1248	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1254	**17**	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1260	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1262	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
PCB-1268	< 0.7	0.7	ug/g	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**81**	30-150	%	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A
decachlorobiphenyl SUR	**93**	30-150	%	5	AAG	7/26/18	10882	7/31/18	14:06	SW3540C8082A

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Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287

Sample#: 45287-007
Sample ID: CA-PCB-7
Matrix: Solid
Sampled: 7/24/18 11:30

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1221	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1232	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1242	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1248	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1254	**2200**	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1260	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1262	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
PCB-1268	< 81	81	ug/g	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	500	AAG	7/26/18	10882	7/31/18	14:22	SW3540C8082A

DOR = Diluted out of range.

Sample#: 45287-008
Sample ID: CA-PCB-8
Matrix: Solid
Sampled: 7/24/18 11:45

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1221	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1232	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1242	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1248	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1254	**1000**	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1260	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1262	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
PCB-1268	< 38	38	ug/g	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	250	AAG	7/26/18	10882	7/31/18	14:37	SW3540C8082A

DOR = Diluted out of range.

Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287

Sample#: 45287-009
Sample ID: CA-PCB-9
Matrix: Solid
Sampled: 7/24/18 11:50

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1221	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1232	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1242	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1248	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1254	**110**	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1260	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1262	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
PCB-1268	< 7.6	7.6	ug/g	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	14:52	SW3540C8082A

DOR = Diluted out of range.

Sample#: 45287-010
Sample ID: CA-PCB-10
Matrix: Solid
Sampled: 7/24/18 11:55

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1221	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1232	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1242	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1248	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1254	**110**	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1260	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1262	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
PCB-1268	< 7.5	7.5	ug/g	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A
decachlorobiphenyl SUR	**DOR**	30-150	%	50	AAG	7/26/18	10882	7/31/18	15:08	SW3540C8082A

DOR = Diluted out of range.

Project ID: Franklin St. Pumping Station 15001293
Job ID: 45287
Sample#: 45287-011
Sample ID: CA-PCB-11
Matrix: Solid
Sampled: 7/24/18 12:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
PCB-1016	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1221	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1232	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1242	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1248	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1254	**24**	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1260	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1262	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
PCB-1268	< 1.6	1.6	ug/g	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
Surrogate Recovery		**Limits**								
tetrachloro-m-xylene SUR	**92**	30-150	%	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A
decachlorobiphenyl SUR	**64**	30-150	%	10	AAG	8/6/18	10915	8/8/18	12:16	SW3540C8082A

Absolute Resource associates

Quality Control Report

124 Heritage Avenue Unit 16
Portsmouth, NH 03801
www.absoluteresourceassociates.com

Case Narrative
Lab # 45287

Sample Receiving and Chain of Custody Discrepancies

Samples were received in acceptable condition, at 0 degrees C, on ice, and in accordance with sample handling, preservation and integrity guidelines.

Calibration

No exceptions noted.

Method Blank

No exceptions noted.

Surrogate Recoveries

PCB: The surrogates were diluted out of the calibration range in the following samples: 45287-002, -003, -004, -005, -007, -008, -009, and -010.

Laboratory Control Sample Results

No exceptions noted.

Matrix Spike/Matrix Spike Duplicate/Duplicate Results

Not requested for this project.

Other

Reporting Limits: Dilutions performed during the analysis are noted on the result pages.

No other exceptions noted.

GLOSSARY

%R	Percent Recovery
BLK	Blank (Method Blank, Preparation Blank)
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
Dil'n	Dilution
DL	Detection Limit
DUP	Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MB	Methanol Blank (associated with solid VOC samples)
MLCS	Methanol Laboratory Control Sample (associated with solid VOC samples)
MLCSD	Methanol Laboratory Control Sample Duplicate (associated with solid VOC samples)
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PB	Preparation Blank
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
SUR	Surrogate

- QC Report -

Method	QC ID	Parameter	Associated Sample		Result	Units	Amt Added	%R	Limits		RPD	RPD Limit
SW3540C8082A	BLK10882	PCB-1016		<	0.2	ug/g						
		PCB-1221		<	0.2	ug/g						
		PCB-1232		<	0.2	ug/g						
		PCB-1242		<	0.2	ug/g						
		PCB-1248		<	0.2	ug/g						
		PCB-1254		<	0.2	ug/g						
		PCB-1260		<	0.2	ug/g						
		PCB-1262		<	0.2	ug/g						
		PCB-1268		<	0.2	ug/g						
		tetrachloro-m-xylene SUR			57	%			30	150		
		decachlorobiphenyl SUR			74	%			30	150		
SW3540C8082A	LCS10882	PCB-1016			1.9	ug/g	3.33	58	40	140		
		PCB-1221		<	0.2	ug/g						
		PCB-1232		<	0.2	ug/g						
		PCB-1242		<	0.2	ug/g						
		PCB-1248		<	0.2	ug/g						
		PCB-1254		<	0.2	ug/g						
		PCB-1260			2.1	ug/g	3.33	62	40	140		
		PCB-1262		<	0.2	ug/g						
		PCB-1268		<	0.2	ug/g						
		tetrachloro-m-xylene SUR			60	%			30	150		
		decachlorobiphenyl SUR			76	%			30	150		
SW3540C8082A	LCSD10882	PCB-1016			2.1	ug/g	3.33	63	40	140	9	30
		PCB-1221		<	0.2	ug/g						
		PCB-1232		<	0.2	ug/g						
		PCB-1242		<	0.2	ug/g						
		PCB-1248		<	0.2	ug/g						
		PCB-1254		<	0.2	ug/g						
		PCB-1260			2.2	ug/g	3.33	68	40	140	8	30
		PCB-1262		<	0.2	ug/g						
		PCB-1268		<	0.2	ug/g						
		tetrachloro-m-xylene SUR			65	%			30	150		
		decachlorobiphenyl SUR			80	%			30	150		

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Method	QC ID	Parameter	Associated Sample		Result	Units	Amt Added	%R	Limits		RPD	RPD Limit
SW3540C8082A	BLK10915	PCB-1016		<	0.1	ug/g						
		PCB-1221		<	0.1	ug/g						
		PCB-1232		<	0.1	ug/g						
		PCB-1242		<	0.1	ug/g						
		PCB-1248		<	0.1	ug/g						
		PCB-1254		<	0.1	ug/g						
		PCB-1260		<	0.1	ug/g						
		PCB-1262		<	0.1	ug/g						
		PCB-1268		<	0.1	ug/g						
		tetrachloro-m-xylene SUR			60	%			30	150		
		decachlorobiphenyl SUR			63	%			30	150		
SW3540C8082A	LCS10915	PCB-1016			1.3	ug/g	2	65	40	140		
		PCB-1221		<	0.1	ug/g						
		PCB-1232		<	0.1	ug/g						
		PCB-1242		<	0.1	ug/g						
		PCB-1248		<	0.1	ug/g						
		PCB-1254		<	0.1	ug/g						
		PCB-1260			1.3	ug/g	2	63	40	140		
		PCB-1262		<	0.1	ug/g						
		PCB-1268		<	0.1	ug/g						
		tetrachloro-m-xylene SUR			72	%			30	150		
		decachlorobiphenyl SUR			81	%			30	150		
SW3540C8082A	LCSD10915	PCB-1016			1.3	ug/g	2	64	40	140	2	30
		PCB-1221		<	0.1	ug/g						
		PCB-1232		<	0.1	ug/g						
		PCB-1242		<	0.1	ug/g						
		PCB-1248		<	0.1	ug/g						
		PCB-1254		<	0.1	ug/g						
		PCB-1260			1.2	ug/g	2	60	40	140	6	30
		PCB-1262		<	0.1	ug/g						
		PCB-1268		<	0.1	ug/g						
		tetrachloro-m-xylene SUR			70	%			30	150		
		decachlorobiphenyl SUR			74	%			30	150		

Absolute Resource associates

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
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CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

45287

Company Name: CREDERE ASSOCIATE
Company Address: 776 MAIN ST WESTBROOK
Report To: JUDD NEWCOMB
Phone #:
Invoice to: ABOVE
Email: jnewcomb@crederellc.com
PO #:

Project Name: FRANKLIN ST PUMPING STATION
Project #: 15601293
Project Location: NH MA ME VT
Accreditation Required? N/Y:
Protocol: RCRA SDWA NPDES MCP NHDES DOD
Reporting Limits: QAPP GW-1 S-1 EPA DW Other
Quote #
☐ NH Reimbursement Pricing

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP ☐ VOC 624 ☐ VOC BTEX MtBE, only ☐ VOC 8021VT ☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane ☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List: ☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint ☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB ☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB SOXHLET EXT ☐ O&G 1664 ☐ Mineral O&G 1664 ☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity ☐ Apparent Color ☐ TSS ☐ TDS ☐ TS ☐ TVS ☐ Alkalinity ☐ Acidity ☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness ☐ Total Metals-list: ☐ Dissolved Metals-list: ☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC ☐ Ferrous Iron ☐ T-Phosphorus ☐ Bacteria P/A ☐ Bacteria MPN ☐ Enterococci ☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P ☐ Phenols ☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride ☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP ☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide Subcontract: ☐ Grain Size ☐ Herbicides ☐ Asbestos ☐ PFAS Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	8082 PCB
45287-01	CA-PCB-1	1		✓							7/26/18	1040	ST	✓
-02	CA-PCB-2	1		✓								1045	ST	✓
-03	CA-PCB-3	1		✓								1050	ST	✓
-04	CA-PCB-4	1		✓								1055	ST	✓
-05	CA-PCB-5	1		✓								1105	ST	✓
-06	CA-PCB-6	1		✓								1115	ST	✓
-07	CA-PCB-7	1		✓								1130	ST	✓
-08	CA-PCB-8	1		✓								1145	ST	✓
-09	CA-PCB-9	1		✓								1150	ST	✓
-10	CA-PCB-10	1		✓								1155	ST	✓
-11	CA-PCB-11	1		✓								1200	ST	✓

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard ☐ (10 Business Days)
*Date Needed

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☑ PDF (e-mail address) jnewcomb@crederellc.com
☐ HARD COPY REQUIRED ☐ EDD

RECEIVED ON ICE ☑ YES ☐ NO
TEMPERATURE 6.0 °C

Annah checked temp AD
HE AW 7/26

CUSTODY RECORD
QSD-01 Revision 3/12/18

Relinquished by Sampler:	Date	Time	Received by:	Date	Time
Steve Tomm	7/26/18	1045	[illegible]	7/26/18	10:45
Relinquished by: [illegible]	7/26/18	1600	Received by:	Date	Time
Relinquished by:	Date	Time	Received by Laboratory: Abigail Wood	7/26/18	1600

EMSL Analytical, Inc.
161 John Roberts Road South Portland, ME 04106
Tel/Fax: (207) 517-6921 / (207) 517-6922
http://www.EMSL.com / portlandlab@emsl.com

EMSL Order: 621801361
Customer ID: CRED25
Customer PO:
Project ID:

Attention: Judd Newcomb
Credere Associates, LLC
776 Main Street
Westbrook, ME 04092

Project: Franklin Pump Station / 15001293

Phone: (204) 828-1272
Fax: (207) 887-1051
Received Date: 07/24/2018 4:40 PM
Analysis Date: 08/07/2018
Collected Date: 07/24/2018

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via EPA 600/R-93/116 section 2.3

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
CA-PACM1A *621801361-0001*	Around Louvre Vent Fan - Gray Caulk	Gray Non-Fibrous Homogeneous	96.7	None	3.3% Chrysotile
CA-PACM1B *621801361-0002*	Around Louvre Vent Fan - Gray Caulk				
Positive Stop (Not Analyzed)					
CA-PACM1C *621801361-0003*	Around Louvre Vent Fan - Gray Caulk				
Positive Stop (Not Analyzed)					
CA-PACM2A *621801361-0004*	Double Door To Dry Side - Gray Caulk	Gray Non-Fibrous Homogeneous	98.4	None	1.6% Chrysotile
CA-PACM2B *621801361-0005*	Double Door To Dry Side - Gray Caulk				
Positive Stop (Not Analyzed)					
CA-PACM2C *621801361-0006*	Double Door To Dry Side - Gray Caulk				
Positive Stop (Not Analyzed)					
CA-PACM3A *621801361-0007*	Roof Edge @ Flashing - Black Asphalt Roofing In Cloth	Black Fibrous Homogeneous	99.7	None	0.32% Chrysotile
CA-PACM3B *621801361-0008*	Roof Edge @ Flashing - Black Asphalt Roofing In Cloth	Black Fibrous Homogeneous	100	None	<0.25% Chrysotile
CA-PACM3C *621801361-0009*	Roof Edge @ Flashing - Black Asphalt Roofing In Cloth	Black Fibrous Homogeneous	99.4	None	0.57% Chrysotile
CA-PACM4A *621801361-0010*	Roof @ Chimney Flashing - Black Roofing With Silver Paint	Black/Silver Non-Fibrous Homogeneous	94.5	None	5.5% Chrysotile
CA-PACM4B *621801361-0011*	Roof @ Chimney Flashing - Black Roofing With Silver Paint				
Positive Stop (Not Analyzed)					

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. Thiis report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition, unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Esimate of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. South Portland, ME NVLAP Lab Code 500094-0, MA AA000236, VT AL197271, ME LM-0039, CT PH-0346

Initial report from: 08/07/2018 15:44:04

EMSL Analytical, Inc.
161 John Roberts Road South Portland, ME 04106
Tel/Fax: (207) 517-6921 / (207) 517-6922
http://www.EMSL.com / portlandlab@emsl.com

EMSL Order: 621801361
Customer ID: CRED25
Customer PO:
Project ID:

Attention: Judd Newcomb
Credere Associates, LLC
776 Main Street
Westbrook, ME 04092

Project: Franklin Pump Station / 15001293

Phone: (204) 828-1272
Fax: (207) 887-1051
Received Date: 07/24/2018 4:40 PM
Analysis Date: 08/07/2018
Collected Date: 07/24/2018

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via EPA 600/R-93/116 section 2.3

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
CA-PACM4C *621801361-0012*	Roof @ Chimney Flashing - Black Roofing With Silver Paint				
Positive Stop (Not Analyzed)					
CA-PACM5A *621801361-0013*	Bottom Layer On Roof Deck - Black Felt With Asphalt	Black Fibrous Homogeneous	100	None	No Asbestos Detected
CA-PACM5B *621801361-0014*	Bottom Layer On Roof Deck - Black Felt With Asphalt	Black Fibrous Homogeneous	100	None	No Asbestos Detected
CA-PACM5C *621801361-0015*	Bottom Layer On Roof Deck - Black Felt With Asphalt	Black Fibrous Homogeneous	100	None	No Asbestos Detected
CA-PACM6A *621801361-0016*	2nd Layer Of Roofing - Black Felt With Asphalt	Black Fibrous Homogeneous	100	None	No Asbestos Detected
CA-PACM6B *621801361-0017*	2nd Layer Of Roofing - Black Felt With Asphalt	Black Fibrous Homogeneous	99.7	None	0.34% Chrysotile
CA-PACM6C *621801361-0018*	2nd Layer Of Roofing - Black Felt With Asphalt	Black Fibrous Homogeneous	100	None	No Asbestos Detected
CA-PACM7A *621801361-0019*	3rd Layer Of Roofing - Fiber Mesh With Asphalt	Black Fibrous Homogeneous	85.7	None	14.3% Chrysotile
CA-PACM7B *621801361-0020*	3rd Layer Of Roofing - Fiber Mesh With Asphalt				
Positive Stop (Not Analyzed)					
CA-PACM7C *621801361-0021*	3rd Layer Of Roofing - Fiber Mesh With Asphalt				
Positive Stop (Not Analyzed)					
CA-PACM8A *621801361-0022*	4th Layer Of Roofing - Gravel Mixed With Asphalt	Black Fibrous Homogeneous	100	None	<0.25% Chrysotile
CA-PACM8B *621801361-0023*	4th Layer Of Roofing - Gravel Mixed With Asphalt	Black Fibrous Homogeneous	100	None	<0.25% Chrysotile

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. Thiis report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition, unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Esimate of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. South Portland, ME NVLAP Lab Code 500094-0, MA AA000236, VT AL197271, ME LM-0039, CT PH-0346

Initial report from: 08/07/2018 15:44:04

EMSL Analytical, Inc.
161 John Roberts Road South Portland, ME 04106
Tel/Fax: (207) 517-6921 / (207) 517-6922
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EMSL Order: 621801361
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Attention: Judd Newcomb
Credere Associates, LLC
776 Main Street
Westbrook, ME 04092

Project: Franklin Pump Station / 15001293

Phone: (204) 828-1272
Fax: (207) 887-1051
Received Date: 07/24/2018 4:40 PM
Analysis Date: 08/07/2018
Collected Date: 07/24/2018

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via EPA 600/R-93/116 section 2.3

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
CA-PACM8C *621801361-0024*	4th Layer Of Roofing - Gravel Mixed With Asphalt	Black Fibrous Homogeneous	100	None	<0.25% Chrysotile
CA-PACM9A *621801361-0025*	5th Layer Of Roofing - Felt With Silver Paper	Black/Silver Non-Fibrous Homogeneous	88.3	None	11.7% Chrysotile
CA-PACM9B *621801361-0026*	5th Layer Of Roofing - Felt With Silver Paper				
Positive Stop (Not Analyzed)					
CA-PACM9C *621801361-0027*	5th Layer Of Roofing - Felt With Silver Paper				
Positive Stop (Not Analyzed)					
CA-PACM10A *621801361-0028*	Top Layer Of Roofing - Silver Paint On Rubber	Black/Silver Non-Fibrous Homogeneous	100	None	<0.25% Chrysotile
CA-PACM10B *621801361-0029*	Top Layer Of Roofing - Silver Paint On Rubber	Black/Silver Non-Fibrous Homogeneous	100	None	<0.25% Chrysotile
CA-PACM10C *621801361-0030*	Top Layer Of Roofing - Silver Paint On Rubber	Black/Silver Non-Fibrous Homogeneous	100	None	<0.25% Chrysotile

ME CERT # BA-0178, BA-0188

Analyst(s)

Samantha Voigt (15)
Stephen Severn (5)

Zackary Carbee, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. Thiis report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition, unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Esimate of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. South Portland, ME NVLAP Lab Code 500094-0, MA AA000236, VT AL197271, ME LM-0039, CT PH-0346

Initial report from: 08/07/2018 15:44:04

OrderID: 621801361

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): 621801361

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Company: CREDERE ASSOCIATES	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 776 MAIN ST	
City: WESTBROOK **State/Province:** ME	**Zip/Postal Code:** **Country:**
Report To (Name): JUDD NEWCOMB	**Telephone #:**
Email Address: jnewcomb@credenellc.com	**Fax #:** **Purchase Order:**
Project Name/Number: FRANKLIN PUMP STATION 15001293	**Please Provide Results:** ☐ Fax ☐ Email
U.S. State Samples Taken: ME	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☑ 2 Week

*For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

PLM - Bulk (reporting limit)	TEM – Bulk
☑ PLM EPA 600/R-93/116 (<1%)	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☑ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 (TEM)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1 (friable in NY)	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB (non-friable-NY)	**Other**
☐ OSHA ID-191 Modified	☐
☐ Standard Addition Method	

☑ **Check For Positive Stop – Clearly Identify Homogenous Group** **Date Sampled:** 7/24/18

Samplers Name: **Samplers Signature:**

Sample #	HA #	Sample Location	Material Description
CA-PACM1	ABC	AROUND LOUVRE VENT FAN	GRAY CAULK
CA-PACM2	ABC	DOUBLE DOOR TO DRY SIDE	GRAY CAULK
CA-PACM3	ABC	ROOF EDGE @ FLASHING	BLACK ASPHALT ROOFING IN CLOTH
CA-PACM4	ABC	ROOF @ CHIMNEY FLASHING	BLACK ROOFING WITH SILVER PAINT
CA-PACM5	ABC	BOTTOM LAYER ON ROOF DECK	BLACK FELT WITH ASPHALT
CA-PACM6	ABC	2ND LAYER OF ROOFING	BLACK FELT WITH ASPHALT
CA-PACM7	ABC	3RD LAYER OF ROOFING	FIBER MESH WITH ASPHALT
CA-PACM8	ABC	4th LAYER OF ROOFING	GRAVEL MIXED WITH ASPHALT
CA-PACM9	ABC	5th LAYER OF ROOFING	FELT WITH SILVER PAPER
CA-PACM10	ABC	TOP LAYER OF ROOFING	SILVER PAINT ON RUBBER

Client Sample # (s): 1-10 - **Total # of Samples:** 30

Relinquished (Client): [signature] **Date:** 7/24/18 **Time:** 1640 SV

Received (Lab): Samantha Voigt **Date:** 7/24/18 **Time:** ~~4:35~~ 4:40pm

Comments/Special Instructions:

RECEIVED
JUL 24 2018
By SV
Walk-in

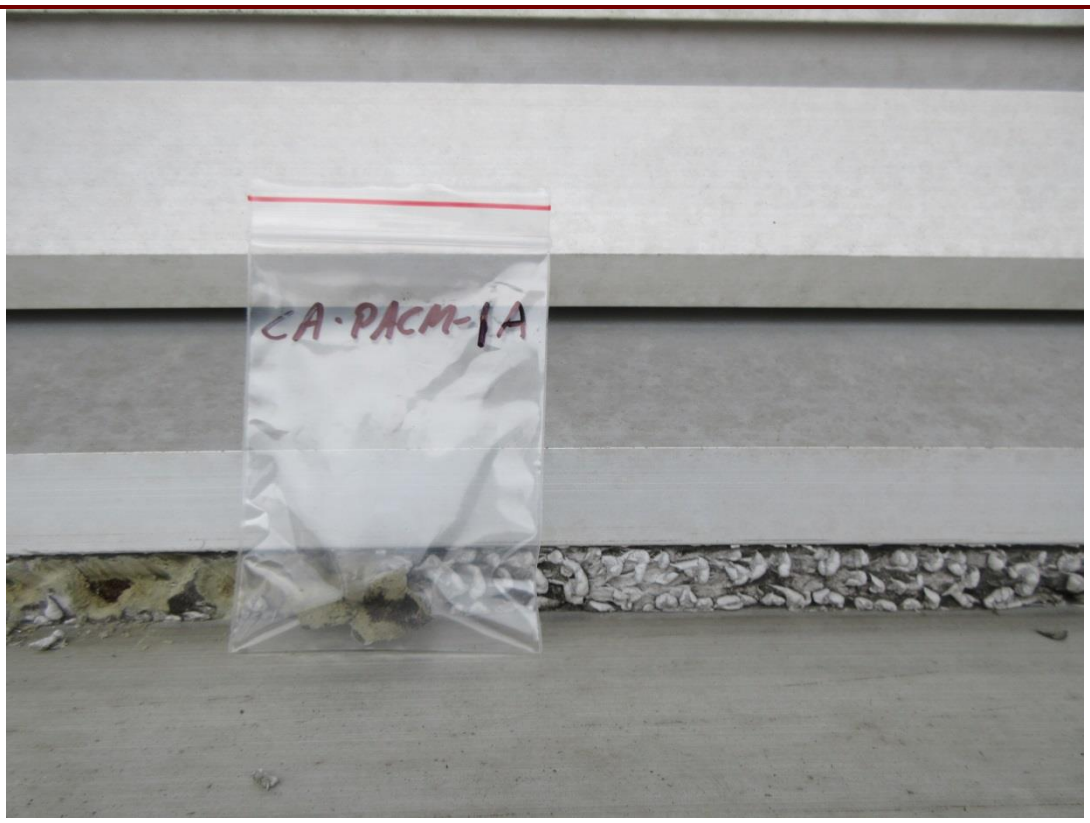
Controlled Document – Asbestos COC – R6 – 11/29/2012

Page 1 of 1 pages

APPENDIX C

SITE PHOTOGRAPH LOG

Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine



1. Gray Caulk around louvered vent on east side of building (CA-PACM-1).

2. Black asphaltic roofing material with silver paint on chimney base (CA-PACM-4).

Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine

3. Site of roof core for samples CA-PACM-5 – CA-PACM-10.

4. Site of roof core for samples CA-PACM-5 – CA-PACM-10.

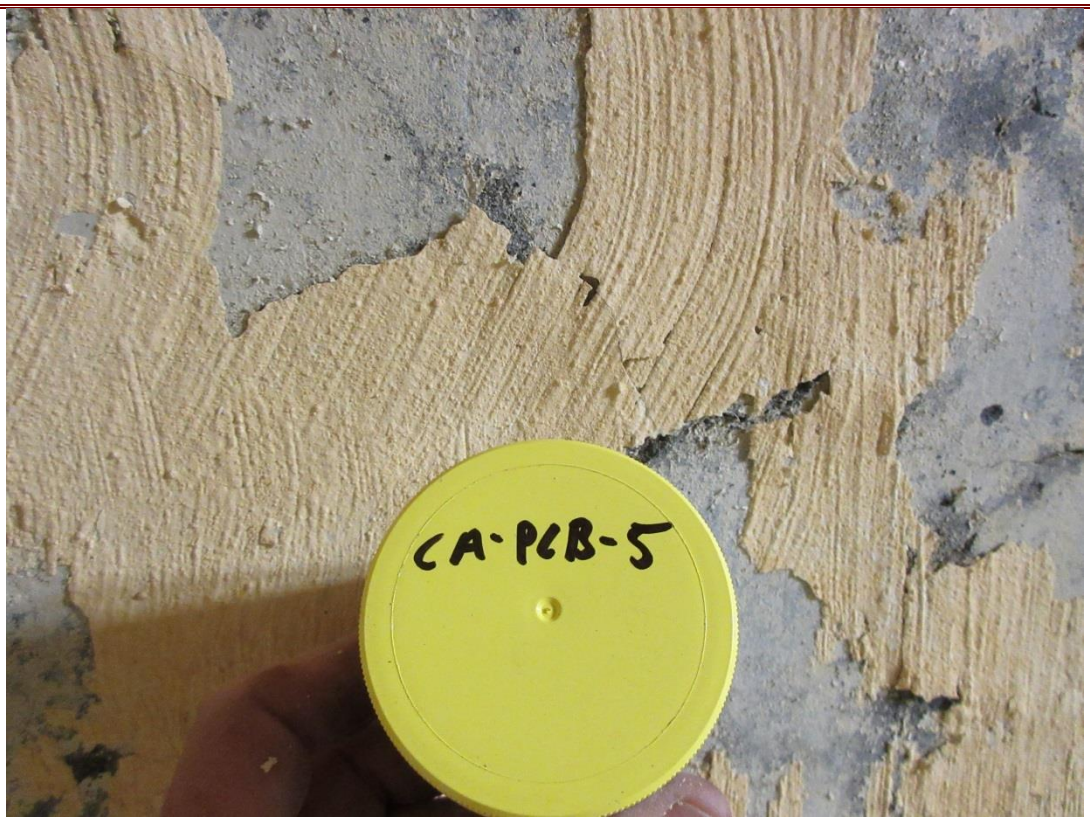
Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine

5. White ceiling paint on wet side of building (CA-PCB-2) 450 mg/kg.

6. Yellow paint on handrails (CA-PCB-3) 210 mg/kg.

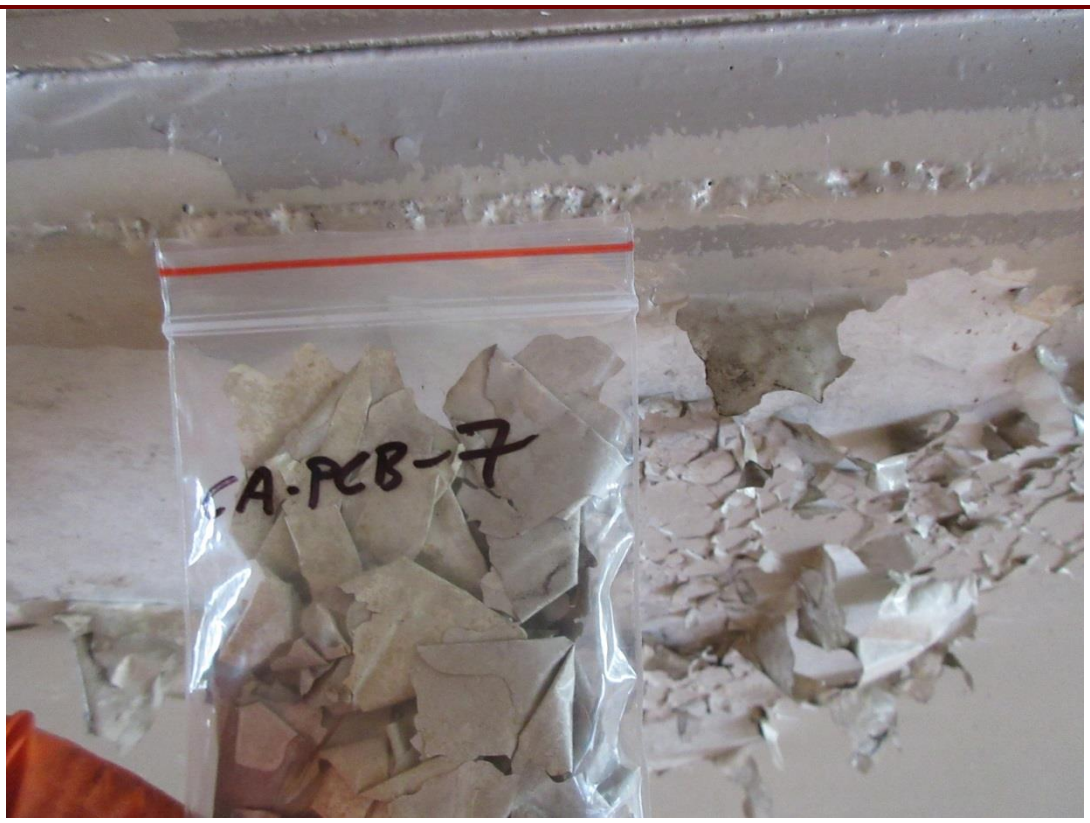
Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine

7. Gray caulk around double entry doors (CA-PCB-4) 1300 mg/kg.



8. Tan wall coating/paint at bottom level dry side (CA-PCB-5) 4100 mg/kg.

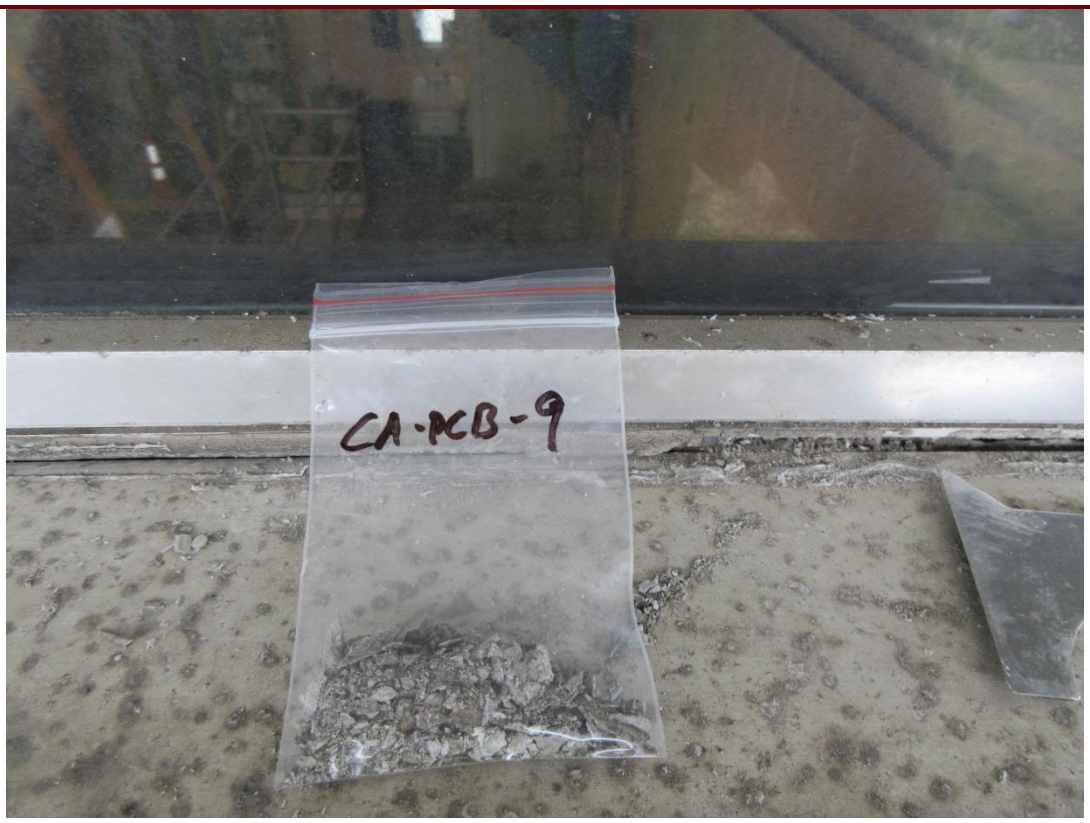
Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine



9. Gray paint on ceiling of dry side (CA-PCB-7) 2200 mg/kg.

10. Gray paint on floor of dry side (CA-PCB-8) 1000 mg/kg.

Appendix C – Photo Log
Franklin Street Pumping Station
Portland, Maine



11. Gray caulk at base of upper windows (CA-PCB-9) 110 mg/kg.

12. Gray caulk from top of upper windows (CA-PCB-10) 110 mg/kg.

2017 - 2018 Rate Schedule

WOODARD &CURRAN

Consultant Personnel	
Labor Category	Hourly Rate
I. Support Services	
- Administrative / Clerical	$73
- Drafter	$83
- Project Assistant	$97
II. Professional Services	
- Designer	$87
- Technician	$92
- Inspector	$95
- Consultant	$96
- Technician 2	$97
- GIS Analyst / Operations Specialist	$98
- Designer 2	$107
- Control System Engineer / Scientist	$108
- Geologist 1/ GIS Developer	$112
- Technical Service Specialist 1	$113
- Engineer 1 / GIS Analyst 2	$114
- Scientist 2	$118
- Geologist 2	$120
- Designer 3	$122
- Resident Engineer	$123
- Geologist 3	$124
- Engineer 2	$126
- Scientist 3	$128
- Senior Designer	$131
- Technical Service Specialist 2	$133
- GIS Solutions Analyst / Planner	$134
- Project Geologist / Project Scientist	$140
- GIS App Developer / GIS Manager	$144
- Construction Manager / Engineer 3 / Project Geologist 2 / Project Technical Specialist	$145
- GIS App Developer 2	$148
- Project Engineer	$155
- GIS Administrator	$159
- Project Scientist 2 / Project Technical Specialist 2	$160
- Senior Planner	$163
- Project Engineer 2	$165
- Senior Engineer / Senior Geologist / Senior Project Engineer / Service Manager	$170
- Technical Manager 1	$172
- Project Manager 1 / Technical Leader	$175
- Technical Manager 2	$193
- Principal Project Manager / Project Manager 2	$195
- Senior Project Manager / Senior Technical Manager	$210
- Licensed Site Professional	$220
- Principal / Senior Vice President / Vice President	$225

This Rate Schedule is confidential and for customer internal use only.
W&C reserves the right to adjust billing rates annually at the beginning of each calendar year.

Expense Category

Travel[1]	.535/mile
Expenses	At Cost Plus 10%

1. Mileage rate will change as the federal allowable rate is modified.

#184

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
3/15/2018	15692

BILL TO
City of Portland Public Works Admin 55 Portland St Portland, ME 04101

PROJECT INFORMATION
6% CCTV Contract (Second Extension) Portland, ME December 18, 2017 & March 5 - 6, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	3/16/2018	4/14/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
1,492.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - Payson Park	2.55	3,805.11
1,630.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - Baxter Blvd	2.55	4,157.27
22	MHIB	Cleaning as Needed (Per Hour)	275.00	6,050.00
10	MMIS	Traffic Control (Per Hour)	18.00	180.00
3	MMIS	GIS Analyst (Per Hour)	65.00	195.00
1	MMIS	Deliverable	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total $14,462.38

Ph (207) 897-3348 FX (207) 897-3627

Pipe Segment Reference	Surveyed By	Date	Project Name	Street	Upstream MH	Pre-Cleaning	Downstream MH	Direction	Length surveyed
SSGM-07515	James_Knowles_III	12/18/2017	FY18 6% Sewer Assessment	X-Country (off Baxter Blvd)	SSMH-6397	Not Known	SSMH-6404	Upstream	451.7
SSGM-07506	James_Knowles_III	12/18/2017	FY18 6% Sewer Assessment	X-Country (off Baxter Blvd)	SSMH-6398	Not Known	SSMH-6405	Upstream	452.7
SSGM-07505	James_Knowles_III	12/18/2017	FY18 6% Sewer Assessment	X-Country (off Baxter Blvd)	SSMH-6399	No Pre-Cleaning	SSMH-6404	Upstream	131.3
SSGM-07505	Jimmy_Wolfe	3/5/2018	FY18 6% Sewer Assessment	XC (off Baxter Blvd.)	SSMH-6399	Jetting	SSMH-6404	Upstream	455.3
SSGM-07391	Jimmy_Wolfe	3/5/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6418	Jetting	SSMH-6417	Upstream	215.7
Gate inspection	Jimmy_Wolfe	3/5/2018	FY18 6% Sewer Assessment	XC (off Baxter Blvd.)	SSMH-6404	Not Known	SSMH-6401	Downstream	1.2
SSGM-07397	Jimmy_Wolfe	AM	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6424	Jetting	SSMH-6422	Upstream	222.9
SSGM-07398	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6425	Jetting	SSMH-6424	Upstream	99.6
SSGM-07395	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6422	No Pre-Cleaning	SSMH-6423	Downstream	13.5
SSGM-07396	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6623	Jetting	SSMH-6621	Downstream	371.4
SSGM-07394	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6421	Jetting	SSMH-6420	Upstream	157.8
SSGM-07393	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6420	Jetting	SSMH-6419	Downstream	267.2
SSGM-07392	Jimmy_Wolfe	3/6/2018	FY18 6% Sewer Assessment	Baxter Blvd.	SSMH-6419	Jetting	SSMH-6418	Downstream	282.2

	Qty	Unit Price	Unit of Measure		
Payson Park	1492.2	2.55	Per Ft		3805.1
Baxter Blvd	1630.3	2.55	Per Ft		4157.3
Cleaning Hours	22	275	Per hour		6050.0
Traffic Control	10	18	Per hour		180.0
Deliverable	75	1	Lumpsum		75.0
GIS analyst	65	3	Per hour		195.0
				$	14,267.4

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
5/15/2018	15839

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME April 16 - May 4, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	5/17/2018	6/14/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
2,124	MVIA	CCTV Pipe Line Inspection (Per Ft) - 8" Pipe	1.00	2,124.00
3,633.5	MVIA	CCTV Pipe Line Inspection (Per Ft) - 10" Pipe	1.00	3,633.50
7,046.1	MVIA	CCTV Pipe Line Inspection (Per Ft) - 12" Pipe	1.00	7,046.10
4,349.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 15" Pipe	1.00	4,349.60
2,495.7	MVIA	CCTV Pipe Line Inspection (Per Ft) - 18" Pipe	1.00	2,495.70
147.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 20" Pipe	1.00	147.20
296.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 24" Pipe	1.00	296.20
413.9	MVIA	CCTV Pipe Line Inspection (Per Ft) - 30" Pipe	1.25	517.38
1,976.7	MVIA	Light Cleaning (Per Ft) - 8" Pipe	0.75	1,482.53
3,141.2	MVIA	Light Cleaning (Per Ft) - 10" Pipe	0.75	2,355.90
6,322.4	MVIA	Light Cleaning (Per Ft) - 12" Pipe	0.75	4,741.80
3,342.7	MVIA	Light Cleaning (Per Ft) - 15" Pipe	0.75	2,507.03
1,892.6	MVIA	Light Cleaning (Per Ft) - 18" Pipe	0.75	1,419.45
479.8	MVIA	Heavy Cleaning (Per Ft) - 10" Pipe	5.00	2,399.00
723.7	MVIA	Heavy Cleaning (Per Ft) - 12" Pipe	1.00	723.70
1,006.9	MVIA	Heavy Cleaning (Per Ft) - 15" Pipe	5.00	5,034.50
603.1	MVIA	Heavy Cleaning (Per Ft) - 18" Pipe	2.00	1,206.20
147.2	MVIA	Heavy Cleaning (Per Ft) - 20" Pipe	2.00	294.40
296.2	MVIA	Heavy Cleaning (Per Ft) - 24" Pipe	2.00	592.40
413.9	MVIA	Heavy Cleaning (Per Ft) - 30" Pipe	6.50	2,690.35
120	MMIS	Traffic Control - Week 4/17/18 - 4/20/18	18.00	2,160.00
133.5	MMIS	Traffic Control - Week 4/23/18 - 4/27/18	18.00	2,403.00
68	MMIS	Traffic Control - Week 4/30/18 - 5/4/18	18.00	1,224.00
16	MMIS	GIS Analyst (Per Hour)	65.00	1,040.00
1	MMIS	Deliverables	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total $52,958.94

Ph (207) 897-3348 FX (207) 897-3627

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
6/13/2018	15928

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME May 7 - May 18, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	6/14/2018	7/13/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
400.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 8" Pipe	1.00	400.60
867.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 10" Pipe	1.00	867.60
3,659.7	MVIA	CCTV Pipe Line Inspection (Per Ft) - 12" Pipe	1.00	3,659.70
268.5	MVIA	CCTV Pipe Line Inspection (Per Ft) - 14" Pipe	1.00	268.50
2,102.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 15" Pipe	1.00	2,102.60
5,188.7	MVIA	CCTV Pipe Line Inspection (Per Ft) - 18" Pipe	1.00	5,188.70
269.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 20" Pipe	1.00	269.30
133.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 21" Pipe - Refer to Change Order	1.00	133.20
8,643.8	MVIA	CCTV Pipe Line Inspection (Per Ft) - 24" Pipe	1.00	8,643.80
584	MVIA	CCTV Pipe Line Inspection (Per Ft) - 26" Pipe - Refer to Change Order	1.25	730.00
935.9	MVIA	CCTV Pipe Line Inspection (Per Ft) - 30" Pipe	1.25	1,169.88
1,494.1	MVIA	CCTV Pipe Line Inspection (Per Ft) - 36" Pipe	1.00	1,494.10
114.7	MVIA	CCTV Pipe Line Inspection (Per Ft) - 45" Pipe	1.00	114.70
417.9	MVIA	CCTV Pipe Line Inspection (Per Ft) - 60" Pipe	1.50	626.85
195.1	MHIB	Light Cleaning (Per Ft) - 8" Pipe	0.75	146.33
472.4	MHIB	Light Cleaning (Per Ft) - 10" Pipe	0.75	354.30
2,576.2	MHIB	Light Cleaning (Per Ft) - 12" Pipe	0.75	1,932.15
268.5	MHIB	Light Cleaning (Per Ft) - 14" Pipe	0.75	201.38
1,823.5	MHIB	Light Cleaning (Per Ft) - 15" Pipe	0.75	1,367.63
4,220.2	MHIB	Light Cleaning (Per Ft) - 18" Pipe	0.75	3,165.15
72.5	MHIB	Light Cleaning (Per Ft) - 20" Pipe	1.00	72.50
133.2	MHIB	Light Cleaning (Per Ft) - 21" Pipe - Refer to Change Order	1.00	133.20
6,483.5	MHIB	Light Cleaning (Per Ft) - 24" Pipe	1.00	6,483.50
584	MHIB	Light Cleaning (Per Ft) - 26" Pipe - Refer to Change Order	3.25	1,898.00
547	MHIB	Light Cleaning (Per Ft) - 30" Pipe	3.25	1,777.75

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total

Ph (207) 897-3348 FX (207) 897-3627

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
6/13/2018	15928

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME May 7 - May 18, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	6/14/2018	7/13/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
465.9	MHIB	Light Cleaning (Per Ft) - 36" Pipe	1.00	465.90
114.7	MHIB	Light Cleaning (Per Ft) - 45" Pipe	1.00	114.70
205.5	MHIB	Heavy Cleaning (Per Ft) - 8" Pipe	3.00	616.50
395.2	MHIB	Heavy Cleaning (Per Ft) - 10" Pipe	5.00	1,976.00
1,083.5	MHIB	Heavy Cleaning (Per Ft) - 12" Pipe	1.00	1,083.50
279.1	MHIB	Heavy Cleaning (Per Ft) - 15" Pipe	5.00	1,395.50
968.5	MHIB	Heavy Cleaning (Per Ft) - 18" Pipe	2.00	1,937.00
196.8	MHIB	Heavy Cleaning (Per Ft) - 20" Pipe	2.00	393.60
2,160.3	MHIB	Heavy Cleaning (Per Ft) - 24" Pipe	2.00	4,320.60
388.9	MHIB	Heavy Cleaning (Per Ft) - 30" Pipe	6.50	2,527.85
1,028.2	MHIB	Heavy Cleaning (Per Ft) - 36" Pipe	5.00	5,141.00
11	MHIB	Heavy Cleaning (Per Ft) - 60" Pipe (Somerset) - Refer to Change Order (Dock to Dock)	320.00	3,520.00
120.8	MMIS	Traffic Control - Week 5/7/18 - 5/11/18	18.00	2,174.40
125.3	MMIS	Traffic Control - Week 5/14/18 - 5/18/18	18.00	2,255.40
16	MMIS	GIS Analyst (Per Hour)	65.00	1,040.00
1	MMIS	Deliverables	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total $72,238.37

Ph (207) 897-3348 FX (207) 897-3627

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
6/29/2018	15996

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME May 21 - Jun 15, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	7/2/2018	7/29/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
210.5	MVIA	CCTV Pipe Line Inspection (Per Ft) - 8" Pipe	1.00	210.50
290.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 10" Pipe	1.00	290.60
1,020.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 12" Pipe	1.00	1,020.60
1,284.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 15" Pipe	1.00	1,284.60
407.4	MVIA	CCTV Pipe Line Inspection (Per Ft) - 16" Pipe	1.00	407.40
3,489.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 18" Pipe	1.00	3,489.20
521.1	MVIA	CCTV Pipe Line Inspection (Per Ft) - 24" Pipe	1.00	521.10
803.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 30" Pipe	1.25	1,004.13
1,760.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 36" Pipe	1.00	1,760.30
975.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 44" Pipe	1.00	975.30
210.5	MHIB	Light Cleaning (Per Ft) - 8" Pipe	0.75	157.88
145.1	MHIB	Light Cleaning (Per Ft) - 10" Pipe	0.75	108.83
695.5	MHIB	Light Cleaning (Per Ft) - 12" Pipe	0.75	521.63
845.3	MHIB	Light Cleaning (Per Ft) - 15" Pipe	0.75	633.98
1,866.9	MHIB	Light Cleaning (Per Ft) - 18" Pipe	0.75	1,400.18
427.1	MHIB	Light Cleaning (Per Ft) - 24" Pipe	1.00	427.10
396.9	MHIB	Light Cleaning (Per Ft) - 30" Pipe	3.25	1,289.93
648.3	MHIB	Light Cleaning (Per Ft) - 36" Pipe	1.00	648.30
145.5	MHIB	Heavy Cleaning (Per Ft) - 10" Pipe	5.00	727.50
321.1	MHIB	Heavy Cleaning (Per Ft) - 12" Pipe	1.00	321.10
439.3	MHIB	Heavy Cleaning (Per Ft) - 15" Pipe	5.00	2,196.50
407.4	MHIB	Heavy Cleaning (Per Ft) - 16" Pipe	5.00	2,037.00
1,622.3	MHIB	Heavy Cleaning (Per Ft) - 18" Pipe	2.00	3,244.60
54.8	MHIB	Heavy Cleaning (Per Ft) - 24" Pipe	2.00	109.60
406.4	MHIB	Heavy Cleaning (Per Ft) - 30" Pipe	6.50	2,641.60
121	MHIB	Heavy Cleaning (Per Ft) - Refer to Change Order (Dock to Dock)	320.00	38,720.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total

Ph (207) 897-3348 FX (207) 897-3627

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627

Invoice

DATE	INVOICE #
6/29/2018	15996

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME May 21 - Jun 15, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	REP	SHIP	DUE DATE	State	PROJECT
044636	Net 30	VJ	7/2/2018	7/29/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
11.75	MHIB	Heavy Cleaning (Per Ft) - Refer to Change Order (Dock to Dock)	320.00	3,760.00
57.5	MMIS	Traffic Control - Week 5/21/18 - 5/25/18	18.00	1,035.00
11.5	MMIS	Traffic Control - Week 5/28/18 - 6/01/18	18.00	207.00
7.5	MMIS	Traffic Control - Week 6/11/18 - 6/15/18	18.00	135.00
11	MMIS	Traffic Control - 5/03/18 - Late Receipt from Flagging Company	18.00	198.00
24	MMIS	GIS Analyst (Per Hour)	65.00	1,560.00
1	MMIS	Deliverables	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total $73,119.46

Ph (207) 897-3348 FX (207) 897-3627

TED BERRY COMPANY Inc.
521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627
www.tedberrycompany.com

Invoice

DATE	INVOICE #
7/31/2018	16096

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME June 18 - July 20, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	State	PROJECT
044636	Net 30	8/30/2018	VJ	7/31/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
141.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 8" Pipe	1.00	141.20
88	MVIA	CCTV Pipe Line Inspection (Per Ft) - 10" Pipe	1.00	88.00
1,079.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 12" Pipe	1.00	1,079.30
1,260.8	MVIA	CCTV Pipe Line Inspection (Per Ft) - 15" Pipe	1.00	1,260.80
879.1	MVIA	CCTV Pipe Line Inspection (Per Ft) - 18" Pipe	1.00	879.10
354.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 20" Pipe	1.00	354.60
472.9	MVIA	CCTV Pipe Line Inspection (Per Ft) - 24" Pipe	1.00	472.90
572.2	MVIA	CCTV Pipe Line Inspection (Per Ft) - 30" Pipe	1.25	715.25
3,376.3	MVIA	CCTV Pipe Line Inspection (Per Ft) - 36" Pipe	1.00	3,376.30
493.8	MVIA	CCTV Pipe Line Inspection (Per Ft) - 44" Pipe	1.00	493.80
228.6	MVIA	CCTV Pipe Line Inspection (Per Ft) - 60" Pipe	1.50	342.90
141.2	MHIB	Light Cleaning (Per Ft) - 8" Pipe	0.75	105.90
88	MHIB	Light Cleaning (Per Ft) - 10" Pipe	0.75	66.00
828.6	MHIB	Light Cleaning (Per Ft) - 12" Pipe	0.75	621.45
847.4	MHIB	Light Cleaning (Per Ft) - 15" Pipe	0.75	635.55
350.2	MHIB	Light Cleaning (Per Ft) - 18" Pipe	0.75	262.65
354.6	MHIB	Light Cleaning (Per Ft) - 20" Pipe	1.00	354.60
160	MHIB	Light Cleaning (Per Ft) - 24" Pipe	1.00	160.00
256	MHIB	Light Cleaning (Per Ft) - 30" Pipe	3.25	832.00
250.7	MHIB	Heavy Cleaning (Per Ft) - 12" Pipe	1.00	250.70
413.4	MHIB	Heavy Cleaning (Per Ft) - 15" Pipe	5.00	2,067.00
528.9	MHIB	Heavy Cleaning (Per Ft) - 18" Pipe	2.00	1,057.80
193.9	MHIB	Heavy Cleaning (Per Ft) - 24" Pipe	2.00	387.80
25.7	MHIB	Heavy Cleaning (Per Ft) - 30" Pipe	6.50	167.05
307.4	MHIB	Heavy Cleaning (Per Ft) - 36" Pipe	5.00	1,537.00
86	MHIB	Heavy Cleaning (Dock to Dock)	320.00	27,520.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total	
Payments/Credits	
Balance Due	

TED BERRY COMPANY Inc.
521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627
www.tedberrycompany.com

Invoice

DATE	INVOICE #
7/31/2018	16096

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME June 18 - July 20, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	State	PROJECT
044636	Net 30	8/30/2018	VJ	7/31/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
29	MMIS	Traffic Control - Week 6/18/18 - 6/22/18	18.00	522.00
16.5	MMIS	Traffic Control - Week 6/25/18 - 6029/18	18.00	297.00
26	MMIS	GIS Analyst (Per Hour)	65.00	1,690.00
1	MMIS	Deliverables	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total	$47,813.65
Payments/Credits	$0.00
Balance Due	$47,813.65

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627
www.tedberrycompany.com

Invoice

DATE	INVOICE #
9/14/2018	16208

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME MSI: June 25 - July 10, 2018 MH: July 11 - August 10, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	State	PROJECT
044636	Net 30	10/14/2018	VJ	9/17/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
50	MVIA	CCTV Pipe Line Inspection (Per Ft) - 6" Pipe	1.00	50.00
2,606.6	MVIA	CCTV Multi Sensor Inspection (Per Ft) - 44" - 48" Pipe	1.00	2,606.60
568.5	MVIA	CCTV Multi Sensor Inspection (Per Ft) - 60" Pipe	1.50	852.75
854.6	MVIA	CCTV Multi Sensor Inspection (Per Ft) - 72" Pipe	1.50	1,281.90
1,146.7	MVIA	CCTV Multi Sensor Inspection (Per Ft) - 96" Pipe	1.50	1,720.05
2,418.6	MVIA	LIDAR Multi Sensor Inspection (Per Ft) - 44" - 48" Pipe	6.00	14,511.60
568.5	MVIA	LIDAR Multi Sensor Inspection (Per Ft) - 60" Pipe	6.00	3,411.00
854.6	MVIA	LIDAR Multi Sensor Inspection (Per Ft) - 72" Pipe	6.00	5,127.60
1,146.7	MVIA	LIDAR Multi Sensor Inspection (Per Ft) - 96" Pipe	6.00	6,880.20
2,227.6	MVIA	SONAR Multi Sensor Inspection (Per Ft) - 44" - 48" Pipe	4.50	10,024.20
255.5	MVIA	SONAR Multi Sensor Inspection (Per Ft) - 60" Pipe	4.50	1,149.75
39.5	MVIA	SONAR Multi Sensor Inspection (Per Ft) - 72" Pipe	4.50	177.75
264.9	MVIA	SONAR Multi Sensor Inspection (Per Ft) - 96" Pipe	4.50	1,192.05
449	MMIS	Manhole Inspection - Level 2	50.00	22,450.00
185	MMIS	GIS Analyst - Post Processing - CCTV & Manhole Scans (up to 8/31/18)	65.00	12,025.00
16	MMIS	Traffic Control - Week 7/9/18 - 7/13/18	18.00	288.00
7.25	MMIS	Traffic Control - Week 716/18 - 7/20/18	18.00	130.50
15	MMIS	Traffic Control - Week 7/23/18 - 7/27/18	18.00	270.00
1	MMIS	Deliverables	75.00	75.00

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total	$84,223.95
Payments/Credits	$0.00
Balance Due	$84,223.95

TED BERRY COMPANY Inc.

521 Federal Rd., Livermore, ME 04253
Tel: 207-897-3348 Fax: 207-897-3627
www.tedberrycompany.com

Invoice

DATE	INVOICE #
10/10/2018	16276

BILL TO	PROJECT INFORMATION
City of Portland Public Works Admin. 55 Portland St Portland, ME 04101	6% CCTV Contract (Second Extension) Portland, ME September 1 - October 7, 2018 Benjamin Pearson

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	State	PROJECT
044636	Net 30	11/9/2018	VJ	10/12/2018	ME	M-17-00708

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
204.6	MMIS	GIS Analyst - Post Processing - 131 - Manhole Scans September 1 - October 7, 2018	65.00	13,299.00
46.03	MMIS	GIS Analyst - Post Processing - Manhole Scans Up to August 31, 2018	65.00	2,991.95

Past due invoices are subject to 1.5% per month finance charge. Finance charges will begin 30 days from the date of invoice if not paid in full or if other arrangements have not been made in writing. Further collection processes may be taken uo to and including liens. Any disputes to the accuracy of this bill must be received by the due date of the bill or the amount will be deemed to be as agreed upon and billed.

Total	$16,290.95
Payments/Credits	$0.00
Balance Due	$16,290.95

Precision Trenchless, LLC

1710 Erie Boulevard
Schenectady, NY 12308
Phone: 518-346-5800 Fax: 528-346-6077

Invoice: # 229
Date: 7/26/2018

BILL TO
City of Portland
Public Works Admin.
55 Portland Street
Portland, ME 04101

SITE ADDRESS
Sewer Inspection
Riverside Industrial Park
Riverside Street
Portland, ME 04103

ACCOUNT NO	PO NUMBER	REP	TERMS	JOB #	PAGE
PORTLAND	C16503 / 043843	LC	Net 30	18-03023	1

ITEM NO	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED
	1	Sewer inspection of approximately 2,000 LF of cross-country sewer line running from Riverside Industrial Park to Riverside Street.	31,000.00	31,000.00

A 1 ½% per month late charge will be assessed on past due amounts over 30 days.

BALANCE DUE **31,000.00**

DUE DATE: 8/25/2018

Ben Pe
10/31/2018
Po # 43843

emailed to Ben w/ certified PR 7/30/18
Videos recieved October 17th, 2018 so payment was withheld until they were reviewed

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD &CURRAN

June 5, 2018

Mr. John Emerson
Wastewater Facilities Coordinator
Department of Public Services
109 District Road
Portland, Maine 04102

Re: FY 2019 SCADAServ Renewal
July 1, 2018 – June 30, 2019

Dear John:

Woodard and Curran (W&C) submits to The City of Portland Department Public Services this SCADAServe renewal proposal for fiscal year (FY) 2019. Execution of this contract will allow us to continue to support your SCADA systems at your facilities.

SCOPE OF SERVICES

The general scope of services under this subscription shall be system hardware checks, programming and operator interface, software modifications, system backups and documentation, operator training, system operating enhancements and operations and maintenance support.

The work proposed herein shall include, up to:

- Four (4) Scheduled Onsite Maintenance Visits (one full working day per visit); and
- Unscheduled emergency support via phone, remote access (VPN Connection) and/or site visits (100 hours total).

The following are the typical tasks that may be performed on a scheduled visit for maintenance, or emergency support and at the direction of the City.

System Hardware Checks

- Check instrument to PLC input scaling and instrument configurations as requested by the City.
- Physical inspection of PLC panels for ingress of moisture, insects, foreign materials, corrosion or any other damage.
- Physical inspection and record keeping of UPS Battery life
- SCADA Servers and HMI hardware inspection for Ethernet connectivity security
- Network and Wireless Access point inspections
- Check panel drawings for accuracy.
- Check spare parts list for availability and/or inventory.
- Recommend and plan improvements to potential problem areas.

PLC and Operator Interface Software Checks

- PLC programming - Modify PLC programs as requested to correct and/or optimize controls.
- System adjustments - Perform minor software tuning/modifications as necessary to maintain proper system performance and operation.
- Alarm notification - Review, test and modify alarms as requested.
- System performance review - Review alarm and event logs to diagnose system problems.

- Operator interface adjustments - Operator interface screen and database modifications as required to continuously improve system operation, data collection, and efficiency.
- Maintenance review - Meet with operators to discuss and rectify issues that may relate to control system performance or operation.

System Backups and Documentation

- Onsite PLC program - PLC program backups will be maintained on the City's computers.
- Offsite PLC program - Current PLC programs will be stored on the W&C network server.
- Offsite operator interface files - Current operator interface project files will be stored on the W&C network server.
- Operations and Maintenance manual updates - Any applicable O&M manuals will be kept current to reflect changes in the system.
  a. O&M Manuals to include a list of recommended spare parts for SCADA hardware
  b. O&M Manuals to include Preventative Maintenance tasks including system checks for UPS units, Back-Up Float Controls, and Generator Checks

NOTE: W&C recommends keeping all SCADA related software current by applying the appropriate upgrades. Installation of software upgrades can cause interactions that are unanticipated and undesirable. We recommend only W&C SCADA specialists install these upgrades.

Operations Staff Training

- SCADA system training - Review fundamental SCADA system troubleshooting with operations staff as required.
- Review SCADA system file management procedures with operations staff as required.
- At the City's discretion, training may be given in the use/operation of PLC/HMI software programs.

Responsibilities of Woodard & Curran:

W&C shall provide trained and competent personnel who are available to respond during normal working hours, 8:00am – 5:00pm, excluding weekends and holidays. W&C guarantees emergency response time of 12 hours during normal working hours and 24 hours during weekends and holidays. Response means either by telephone or onsite, as required by the emergency.

** The first phone call should be to 866-MY-SCADA or 866-697-2232 for immediate assistance **

Charles Dyer (207) 518-1760 (cell)
Kevin Mesick (207) 432-0666 (cell)

Responsibilities of City:

City agrees not to remove any equipment or products, to the extent W&C has a maintenance responsibility or has retained any interest therein, from the location at which it is installed, except in an emergency, without prior written consent of W&C, which consent shall not be unreasonably withheld.

City's personnel should not perform maintenance or attempt repairs to the system while the system is under the purview of W&C, except as requested or specified by W&C staff.

FEE PROPOSAL

W&C proposes to perform the work as described under this Subscription on a Time and Materials basis, to be billed monthly based upon services provided with a not to exceed amount of $25,000. SCADA Team Rates shall be billed in accordance with the Rate Table attached. Within the budget, we have included a $5,000 allowance for hardware, software and miscellaneous expenses such as travel.

TERMS AND CONDITIONS

Terms and Conditions of this work will be per the executed *Agreement between the City of Portland and Woodard & Curran, dated March 18, 2014 and Extension of Agreement dated March 19, 2018*. If this proposal is acceptable to you, please indicate your agreement by signing this letter and returning a copy for our records. We can begin our work upon an email authorization, with the understanding that an executed copy of this agreement will be forthcoming.

We welcome any questions you may have on this. Please do not hesitate to call us at (207) 558-3687.

Sincerely,

WOODARD & CURRAN INC.

Peter Andromalos, PMP
Project Manager

Attachment: SCADA Team and Rates

Accepted this 12 Day of July, 2018

By: John W Emery

Title: Utility Coordinator

Attachment:

SCADA Team and Rates

Personnel	Staff Name	Hourly Rate
Technical Manager	Craig Gaudet	$160.00
SCADA Engineer	Kevin Mesick	$130.00
Technical Specialist	Charles Dyer	$113.00
Project Manager	Peter Andromalos	$160.00

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

January 25, 2018
Project No: 0221832.04
Invoice No: 146843

Project 0221832.04 CITY OF PORTLAND SCADASERV MAINTENANCE

Professional Services for the period ending January 12, 2018

Phase 008 SERVICE 1.9

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	1.50	113.00	169.50	
Tech Manager I	.25	160.00	40.00	
Clerical	1.25	60.00	75.00	
Totals	3.00		284.50	
Labor Total				**284.50**
		Total this Phase		**$284.50**
		Total this Invoice		**$284.50**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

570 3112 520 3500 Q WE 1/31/18

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD
&CURRAN

Via Regular US Mail

February 21, 2018

John Emerson
Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland 2018 SCADAServ Maintenance

Dear John:

Enclosed please find our invoice #147528 in the amount of $2,030.77 for professional services rendered for the above-mentioned project through the period ending February 9, 2018.

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos
Project Manager
Woodard & Curran

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

February 21, 2018
Project No: 0221832.07
Invoice No: 147528

Project 0221832.07 CITY OF PORTLAND 2018 SCADASERV MAINTENANCE
PO #44208

Professional Services for the period ending February 9, 2018

Phase 001 SERVICE 1.27, 1.31, 2.9

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	4.25	113.00	480.25	
Technical Specialist	4.00	130.00	520.00	
Tech Manager I	4.25	160.00	680.00	
Clerical	3.00	60.00	180.00	
Staff Engineer - Electrical	2.00	80.00	160.00	
Totals	17.50		2,020.25	
Labor Total				**2,020.25**

Reimbursable

Field Supplies		10.52	
Reimbursable Total		**10.52**	**10.52**

Total this Phase **$2,030.77**

Total this Invoice **$2,030.77**

	Current Fee	Previous Fee	Total
Project Summary	**2,030.77**	**0.00**	**2,030.77**

Approved by:

Peter Andromalos, PMP
Project Manager
Woodard & Curran

JWE
3-6-18

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD & CURRAN

Via Regular US Mail

MAR 30 2018

March 28, 2018

John Emerson
Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland 2018 SCADAServ Maintenance

Dear John:

Enclosed please find our invoice #148514 in the amount of $2,813.75 for professional services rendered for the above-mentioned project through the period ending March 9, 2018.

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos
Project Manager
Woodard & Curran

570 3112 500 3500. JM 4/2/18

5703120240 3500

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

March 28, 2018
Project No: 0221832.07
Invoice No: 148514

Project 0221832.07 CITY OF PORTLAND 2018 SCADASERV MAINTENANCE
PO #44208

Professional Services for the period ending March 9, 2018

Phase 002 SERVICE 3.5, 3.1, 2.28. 2.21

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	8.50	113.00	960.50	
Clerical	3.25	60.00	195.00	
Staff Engineer - Electrical	14.00	80.00	1,120.00	
Totals	25.75		2,275.50	
Labor Total				**2,275.50**

Reimbursable

Postage/Shipping	24.68	
Field Equipment	513.57	
Reimbursable Total	**538.25**	**538.25**

Total this Phase **$2,813.75**

Total this Invoice **$2,813.75**

	Current Fee	Previous Fee	Total
Project Summary	**2,813.75**	**2,030.77**	**4,844.52**

Approved by:

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
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Boston, MA 02205-5008

T 800.426.4262
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F 207.774.6635

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Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works 55
Portland Street
Portland, ME 04101

May 18, 2018
Project No: 0221832.07
Invoice No: 150233

Project 0221832.07 CITY OF PORTLAND 2018 SCADASERV MAINTENANCE PO
#44208
Professional Services for the period ending May 11, 2018

Phase 003 SERVICE 4.17,4.18,4.27,4.30,5.2,5.8 & 5.11

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist	214.00	113.00	1,582.00	
Technical Specialist 3	1.50	128.00	192.00	
Tech Manager I	1.50	160.00	240.00	
Clerical	3.25	60.00	195.00	
Totals	20.25		2,209.00	
Labor Total				**2,209.00**

Reimbursable

Postage/Shipping	9.68	
Field Equipment	935.09	
Reimbursable Total	**944.77**	**944.77**

Total this Phase **$3,153.77**

Total this Invoice **$3,153.77**

Outstanding Invoices

Number	Date	Balance
148514	3/28/2018	2,813.75
Total		**2,813.75**

	Current Fee	Previous Fee	Total
Project Summary	**3,153.77**	**4,844.52**	**7,998.29**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

~~Job 570 3112 500 55 02~~
5/25/18 PO #44208

Please include our invoice number in your remittance. Thank you.

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.2.21	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.04/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	10:00	Trip End:	11:00	Travel Time:	0 h 00
Onsite:	10:00	Offsite:	11:00	Onsite Time:	1 h 00
				Total Time:	1 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW SCADAServ. Went to District Road to attempt to retreive Baxter CSO Data for January-May of 2017. Was not able to retreive data from old PC, I believe data was lost when the old PC failed. When I arrived, Factorytalk would not boot, restarted machine and it booted fine. Set up SCADA2 so that screen will not turn off, and accounts will not logout, this will allow them to utilize the TV in the office to view the SCADA Overview.

Material Used:

NOTE:

TERMS & CONDITIONS

1. Woodard & Curran Inc. ("Consultant") will perform all work in accordance with the Scope of Services as described on this Call/Trip report form.
2. Consultant will perform all work in a professional manner that is consistent with other professionals performing similar work in the geographic area at the time services are rendered. Consultant shall comply with all laws and regulations applicable to Con
3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

John Emerson — 4/2/18
Client Signature — Date

(If client not available) Charles Dyer — 2018.2.21
W&C Employee Signature — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.2.28	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.04/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	8:00	Trip End:	10:30	Travel Time:	0 h 00
Onsite:	8:00	Offsite:	10:30	Onsite Time:	2 h 30
				Total Time:	2 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DWP SCADAServ. Check IO mapping for Baxter Blvd.

Material Used:

NOTE:

TERMS & CONDITIONS

1. Woodard & Curran Inc. ("Consultant") will perform all work in accordance with the Scope of Services as described on this Call/Trip report form.
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3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date: 4/2/18

(If client not available) Charles Dyer, W&C Employee Signature — Date: 2018.2.28

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.03.01	4463	Charles Dyer		
Project/Phase Number	**Client/Job Name**	**Contact Name:**	John Emerson	**Client P.O.#**
221832.04/100	City of Portland DPW	**Contact Tel.#:**		

Purpose of service: SCADA Service

Notes:

Trip Start:	9:00	**Trip End:**	13:00	**Travel Time:**	0 h 00
Onsite:	9:00	**Offsite:**	13:00	**Onsite Time:**	4 h 00
				Total Time:	4 h 00
Start Mileage:	0	**End Mileage:**		**Total Mileage:**	0

Work Performed: City of Portland DPW SCADAServ. Tested Remote control of North Baxter CSO. Adjusted Logic so that gates can be operated in Hand remotely from HMI. Also updated Alarm definitions for North Baxter CSO.

Material Used:

NOTE:

TERMS & CONDITIONS

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3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date: 4/2/18

(If client not available) Charles Dyer — W&C Employee Signature — Date: 2018.03.01

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 326N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.03.05	4483	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.04/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	12:00	Trip End:	13:00	Travel Time:	0 h 00
Onsite:	12:00	Offsite:	13:00	Onsite Time:	1 h 00
				Total Time:	1 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland SCADAServ. Linden St. Pump Station control values were not changing. Looked over code and found a typo that was causing the Local values to be pushed into the control registers even when the site was in remote. Fixed typo, station should run correctly now.

Material Used:

NOTE:

TERMS & CONDITIONS

1. Woodard & Curran Inc. ("Consultant") will perform all work in accordance with the Scope of Services as described on this Call/Trip report form.
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3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

John Emerson — 4/2/18
Client Signature — Date

(If client not available) Charles Dyer — 2018.03.05
W&C Employee Signature — Date

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD
&CURRAN

Via Regular US Mail

June 18, 2018

John Emerson
Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland 2018 SCADAServ Maintenance

Dear John:

Enclosed please find our invoice #151234 in the amount of $3,022.50 for professional services rendered for the above-mentioned project through the period ending June 8, 2018.

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos
Project Manager
Woodard & Curran

OK JWE 6-29-18

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

June 15, 2018
Project No: 0221832.07
Invoice No: 151234

Project 0221832.07 CITY OF PORTLAND 2018 SCADASERV MAINTENANCE
PO #44208

Professional Services for the period ending June 8, 2018

Phase 004 SERVICE 5.21,5.23,5.24,5.29,5.30,5.31,6.01,6.04 & 6.08

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	17.50	113.00	1,977.50	
Tech Manager I	5.50	160.00	880.00	
Clerical	2.75	60.00	165.00	
Totals	25.75		3,022.50	
Labor Total				**3,022.50**
		Total this Phase		**$3,022.50**
		Total this Invoice		**$3,022.50**

Outstanding Invoices

Number	Date	Balance
148514	3/28/2018	2,813.75
Total		**2,813.75**

	Current Fee	Previous Fee	Total
Project Summary	**3,022.50**	**7,998.29**	**11,020.79**

Approved by: Peter Andromalos

Peter Andromalos, PMP
Project Manager
Woodard & Curran

OK JWC 6-29-18

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD
&CURRAN

Via Regular US Mail

August 1, 2018

John Emerson
Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland 2018 SCADAServ Maintenance

Dear John:

Enclosed please find our invoice #152761 in the amount of $2,115.25 for professional services rendered for the above-mentioned project through the period ending July 13, 2018.

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos
Project Manager
Woodard & Curran

JWE 8-8-18

57031202 403500

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

August 1, 2018
Project No: 0221832.07
Invoice No: 152761

Project 0221832.07 CITY OF PORTLAND 2018 SCADASERV MAINTENANCE
PO #44208

Professional Services for the period ending June 30, 2018

Phase	SVC	SERVICE	Hours	Rate	Amount	
Professional Personnel						
		Technical Specialist 2	7.00	113.00	791.00	
		Technical Specialist	1.00	130.00	130.00	
		Tech Manager I	5.25	160.00	840.00	
		Clerical	1.75	60.00	105.00	
		Principal Professional Engineer	.50	150.00	75.00	
		Totals	15.50		1,941.00	
		Labor Total				**1,941.00**
Reimbursable						
		Field Equipment			174.25	
		Reimbursable Total			**174.25**	**174.25**

Please include our invoice number in your remittance. Thank you.

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

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Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Project	0221832.07	CITY OF PORTLAND 2018 SCADASERV MAINTENA	Invoice	152761
		Total this Phase		**$2,115.25**
		Total this Invoice		**$2,115.25**

Outstanding Invoices

Number	Date	Balance
148514	3/28/2018	2,813.75
Total		**2,813.75**

	Current Fee	Previous Fee	Total
Project Summary	**2,115.25**	**11,020.79**	**13,136.04**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
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Boston, MA 02205-5008

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F 207.774.6635

INVOICE

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Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

August 21, 2018
Project No: 0221832.09
Invoice No: 153496

Project 0221832.09 CITY OF PORTLAND FY2019 SCADASERV

Professional Services for the period ending August 10, 2018

Phase 001 SERVICE 7.9,7.10,7.23,7.25,7.30,8.1,8.2,8.9

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	10.50	113.00	1,186.50	
Technical Specialist	1.00	130.00	130.00	
Tech Manager I	8.00	160.00	1,280.00	
Clerical	3.25	60.00	195.00	
Principal Professional Engineer	.50	150.00	75.00	
Totals	23.25		2,866.50	
Labor Total				**2,866.50**

Reimbursable

Postage/Shipping	15.61	
Field Equipment	546.00	
Reimbursable Total	**561.61**	**561.61**

Total this Phase **$3,428.11**

Total this Invoice **$3,428.11**

	Current Fee	Previous Fee	Total
Project Summary	**3,428.11**	**0.00**	**3,428.11**

Approved by:

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

JWE 9/7/18 57031202 403500

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

5703120240350 0

OCT 15 2018

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

October 11, 2018
Project No: 0221832.09
Invoice No: 155226

Project 0221832.09 CITY OF PORTLAND FY2019 SCADASERV

Professional Services for the period ending September 28, 2018

Phase 002 SERVICE 8.15,8.17,9.4,9.25,9.26

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	16.00	113.00	1,808.00	
Tech Manager I	3.00	160.00	480.00	
Clerical	2.75	60.00	165.00	
Principal Professional Engineer	.50	150.00	75.00	
Totals	22.25		2,528.00	
Labor Total				**2,528.00**

Reimbursable

Postage/Shipping	20.39	
Field Equipment	1,470.98	
Reimbursable Total	**1,491.37**	**1,491.37**

Total this Phase **$4,019.37**

Total this Invoice **$4,019.37**

Project Summary

Current Fee	Previous Fee	Total
4,019.37	3,428.11	7,447.48

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.08.15	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.07/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	8:00	Trip End:	9:30	Travel Time:	0 h 00
Onsite:	8:00	Offsite:	9:30	Onsite Time:	1 h 30
				Total Time:	1 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW. Riverside St new pump will not run because pump relay is tripped. Troubleshooting, looks like overtemp and seal fail are not working right.

Material Used:

NOTE:

TERMS & CONDITIONS

1. Woodard & Curran Inc. ("Consultant") will perform all work in accordance with the Scope of Services as described on this Call/Trip report form.
2. Consultant will perform all work in a professional manner that is consistent with other professionals performing similar work in the geographic area at the time services are rendered. Consultant shall comply with all laws and regulations applicable to Con
3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — Date 2018.08.15

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.08.17	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.07/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	9:30	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	9:30	Onsite Time:	2 h 00
				Total Time:	2 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW. Worked with Campbells Electric and Larry Mills(Pump Rep) to troubleshoot issues. Turns out we got wrong drawings, re-wired pump and it works fine. Also had to re-wire Pump 1 so that seal fail would work correctly.

Material Used:

NOTE:

TERMS & CONDITIONS

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Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — Date 2018.08.17

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.09.04	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.07/100	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	12:00	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	12:00	Onsite Time:	4 h 30
				Total Time:	4 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland. Looked at Partridge Backup PLC, Backup PLC fail keeps coming in, looks like PLC is going bad. Added permission so all operators can turn pumps on and off, and acknowledge alarms. Fixed pump amperage data logging so it will display correctly. Talked with Jordan about pulling data from SQL. Looked into Riverton yesterday pump runtime showing as zero, made a change taht should fix it.

Material Used:

NOTE:

TERMS & CONDITIONS

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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — 2018.09.04
W&C Employee Signature — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.09.20	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	12:00	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	12:00	Onsite Time:	4 h 30
				Total Time:	4 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW SCADAServ. Replaced backup PLC at Partridge, and main PLC at district Road to resolve polling fail issues. Fixed issue with Factorytalk not start on PC Startup. Wrote SOP for restarting control panel at district road.

Material Used:

NOTE:

TERMS & CONDITIONS

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Client Signature — Date

(If client not available) Charles Dyer — 2018.09.20
W&C Employee Signature — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.09.25	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	8:00	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	8:00	Onsite Time:	0 h 30
				Total Time:	0 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW. Looked into solution for Factorytalk window being resized. Rockwell did not have any good answers.

Material Used:

NOTE:

TERMS & CONDITIONS

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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — Date 2018.09.25

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.09.26	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	8:00	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	8:00	Onsite Time:	0 h 30
				Total Time:	0 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland DPW SCADAServ. Checked out Munjoy Hill repeater with Walter and Operators. Looked into adding floats to Back Cove North Actuator Vaults. Tried to change factorytalk so that window cannot be resized.

Material Used:

NOTE:

TERMS & CONDITIONS

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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — 2018.09.26 — Date

WOODARD & CURRAN

COMMITMENT & INTEGRITY
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Remit to:
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Electronic Transfer:
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5703120240 3500

NOV 08 2018

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

November 5, 2018
Project No: 0221832.09
Invoice No: 156061

Project 0221832.09 CITY OF PORTLAND FY2019 SCADASERV

Professional Services for the period ending October 26, 2018

Phase 003 SERVICE 8.16,10.05,10.16,10.19

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	4.50	113.00	508.50	
Technical Specialist	1.25	130.00	162.50	
Tech Manager I	.75	160.00	120.00	
Clerical	3.00	60.00	180.00	
Totals	9.50		971.00	
Labor Total				**971.00**
		Total this Phase		**$971.00**
		Total this Invoice		**$971.00**

	Current Fee	Previous Fee	Total
Project Summary	**971.00**	**7,447.48**	**8,418.48**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

CALL / TRIP REPORT

WOODARD & CURRAN INC.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781) 251-0200/Fax: (781) 251-0847

Date	Work Performed By:	Kevin Mesick		Employee Code:	2903
8/16/2011	Client/Job Name:	Portland, ME		Contact Name:	John Emerson
Client P.O.#	City/State:	Seabrook	NH	Contact Tel.#:	
	Project/Phase:	221832	3	Purpose:	project/service

Purpose of service: Scheduled service to finish testing/programming of RACO Backup Alarm Dialer located in the Master Polling Control Panel at the Portland DPW.

Notes:

(Please check one): ☑ Scheduled Service ☐ Unscheduled Service ☐ Startup Service

Mileage Start:	0	9	Mileage:	9	Travel
Trip Start:	7:50 AM	3:00 PM	Off Site:	8:40 AM	0:20
On Site:	8:00 AM	3:00 PM	End Trip:	8:50 AM	Worked 0:40

Description of work performed: Scheduled service to finish work on RACO Backup Alarm Dialer. All numbers programmed. Two dedicated phone lines in place (1 RSMessenger, 1 RACO). RACO alarm programming, dial-out & alarm ack tested. Review of RACO function with John Emerson. In addition to RACO Dialer, request was made and work completed to add 'date' next to current alarm in the alarm banner on SCADA screens.

Follow up needed:

Client Signature — Date

Kevin Mesick — 8/16/2011

(If client not available) W&C Employee Signature — Date

Revised 8/8/02

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.10.05	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	8:30	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	8:30	Onsite Time:	1 h 00
				Total Time:	1 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland. Operator got a UPS fault alarm, and tried to replace batteries, and pulled one of the wires off of the UPS relay. The UPS would not start up properly. When I tried to boot up the UPS all of the lights on the front of the UPS stayed on solid, and the display did not light up. Looked in manual, looks like UPS has failed. Ordering a new one.

Material Used:

NOTE:

TERMS & CONDITIONS

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Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — 2018.10.05 — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.10.16	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	10:00	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	10:00	Onsite Time:	2 h 30
				Total Time:	2 h 30
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: City of Portland. Replaced UPS at Riverton. Fixed a few bugs in SCADA Screens. Changed settings so that Factorytalk window will not resize.

Material Used:

NOTE:

TERMS & CONDITIONS

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Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — 2018.10.16 — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.10.19	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	8:30	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	8:30	Onsite Time:	1 h 00
				Total Time:	1 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: Portland DPW. Got VPN connection setup, was not able to vnc into SCADA PC.

Material Used:

NOTE:

TERMS & CONDITIONS

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Client Signature — Date

Charles Dyer — 2018.10.19

(If client not available) W&C Employee Signature — Date

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

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F 207.774.6635

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Electronic Transfer:
⑆211274450⑆ 2427662596⑈

JAN 04 2019

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
250 Canco Road
Portland, ME 04101

December 13, 2018
Project No: 0221832.09
Invoice No: 157509

Project 0221832.09 CITY OF PORTLAND FY2019 SCADASERV

Professional Services for the period ending November 30, 2018

Phase 004 SERVICE 11.14,11.28,11.29,11.30

Professional Personnel

	Hours	Rate	Amount	
Technical Specialist 2	6.00	113.00	678.00	
Tech Manager I	1.00	160.00	160.00	
Clerical	1.00	60.00	60.00	
Staff Engineer - Electrical	1.50	80.00	120.00	
Totals	9.50		1,018.00	
Labor Total				**1,018.00**
Reimbursable				
Field Equipment			340.59	
Reimbursable Total			**340.59**	**340.59**
		Total this Phase		**$1,358.59**
		Total this Invoice		**$1,358.59**

	Current Fee	Previous Fee	Total
Project Summary	1,358.59	8,418.48	9,777.07

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.11.14	4463	Charles Dyer		
Project/Phase Number	**Client/Job Name**	**Contact Name:**	John Emerson	**Client P.O.#**
221832.09/SVC	City of Portland DPW	**Contact Tel.#:**		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	**Trip End:**	8:00	**Travel Time:**	0 h 00
Onsite:	7:30	**Offsite:**	8:00	**Onsite Time:**	0 h 30
				Total Time:	0 h 30
Start Mileage:	0	**End Mileage:**		**Total Mileage:**	0

Work Performed: City of Portland SCADAServ. Fixed Server so that it will boot up on Power up.

Material Used:

NOTE:

TERMS & CONDITIONS

1. Woodard & Curran Inc. ("Consultant") will perform all work in accordance with the Scope of Services as described on this Call/Trip report form.
2. Consultant will perform all work in a professional manner that is consistent with other professionals performing similar work in the geographic area at the time services are rendered. Consultant shall comply with all laws and regulations applicable to Con
3. Client shall pay Consultant in accordance with the payment methods, rates, and charges set forth in the Scope of Services or otherwise agreed upon.
4. Consultant is protected by Worker's Compensation Insurance, Employer's Professional Liability Insurance, and by General Liability Insurance each (with the exception of Workers' Compensation) with a minimum limit of $1,000,000 per occurrence and in the agg
5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
6. The total liability, in the aggregate, of Consultant shall not exceed the total compensation received by Consultant under this Agreement, or the total amount of $50,000, whichever is greater. Neither party shall be responsible or held liable to the other
7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — 2018.11.14 — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.11.28	4358	Emily Dunn		
Project/Phase Number	**Client/Job Name**	**Contact Name:**	**John Emerson**	**Client P.O.#**
221832.04/100	City of Portland DPW	**Contact Tel.#:**		

Purpose of service: SCADA Services

Notes:

Trip Start:	10:00	**Trip End:**	11:30	**Travel Time:**	0 h 00
Onsite:	10:00	**Offsite:**	11:30	**Onsite Time:**	1 h 30
				Total Time:	1 h 30
Start Mileage:	0	**End Mileage:**		**Total Mileage:**	0

Work Performed: City of Portland DPW SCADAServ. North Baxter CSO was having issues with OIT, looked into it remotely, on PLC program, on OIT program, talked with Walter

Material Used:

NOTE:

TERMS & CONDITIONS

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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Emily Dunn — 2018.11.28
W&C Employee Signature — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.11.29	4463	Charles Dyer		
Project/Phase Number	Client/Job Name	Contact Name:	John Emerson	Client P.O.#
221832.09/SVC	City of Portland DPW	Contact Tel.#:		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	Trip End:	8:30	Travel Time:	0 h 00
Onsite:	7:30	Offsite:	8:30	Onsite Time:	1 h 00
				Total Time:	1 h 00
Start Mileage:	0	End Mileage:		Total Mileage:	0

Work Performed: Portland. Fixed WIN911 issue not calling out, restarted WIN911 and it's fine. Looked into why Walter could not log in on his tablet, was because they were on generator power and the IT network switch was not powered up.

Material Used:

NOTE:

TERMS & CONDITIONS

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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — W&C Employee Signature — 2018.11.29 — Date

CALL/TRIP REPORT

Woodard Curran Inc.
980 Washington Street, Suite 325N, Dedham, MA 02026
Tel: (781)251-0200 Fax: (781)251-0847

Date	Employee Code	Employee Name		
2018.11.30	4463	Charles Dyer		
Project/Phase Number	**Client/Job Name**	**Contact Name:**	**John Emerson**	**Client P.O.#**
221832.09/SVC	City of Portland DPW	**Contact Tel.#:**		

Purpose of service: SCADA Service

Notes:

Trip Start:	7:30	**Trip End:**	12:00	**Travel Time:**	0 h 00
Onsite:	7:30	**Offsite:**	12:00	**Onsite Time:**	4 h 30
				Total Time:	4 h 30
Start Mileage:	0	**End Mileage:**		**Total Mileage:**	0

Work Performed: City of Portland. Fixed issues at North Baxter. Added programming and wired in new Flow meters for Riverside. Added new flow meters to SCADA screen.

Material Used:

NOTE:

TERMS & CONDITIONS

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5. Consultant agrees to indemnify and hold Client harmless from and against all claims, damages, causes of actions, and fines to the extent such claims, damages, causes of action and fines are based on or arise out of Consultant's negligent acts or negligent
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7. This Agreement shall be governed and construed in accordance with the laws of the state where the project is located.

Client Signature — Date

(If client not available) Charles Dyer — 2018.11.30
W&C Employee Signature — Date

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

March 3, 2017

John Emerson
Wastewater Facilities Coordinator
Department of Public Services
City of Portland
109 District Road
Portland, ME 04102

Re: Proposal for SCADA TRM (Troubleshoot, Repair, Maintain) Services

Dear John:

Woodard & Curran recently completed a SCADA Review in accordance with our proposal executed by the City on February 7, 2017. As a result of that SCADA Review, we identified maintenance, repair and troubleshooting issues that Woodard & Curran believes will improve the instrumentation and controls systems and therefore the operational efficiencies of the facilities. The list, hereinafter referred to as the TRM List (Troubleshooting, Repair & Maintain) has been developed by W&C alongside operations personnel and will serves to define the Scope of Services presented herein.

SCOPE OF SERVICES

Woodard & Curran will provide engineering services to troubleshoot, repair and maintain the City of Portland's SCADA system as determined by the SCADA Review. The recommended TRM tasks are broken out below by location.

RADIO MASTER CONTROL PANEL (To be relocated under separate project)

- UPS and Smart Relay Card replacement for UPS Failure / Low Battery indications.
- PLC/OIT Date/Time Synchronization.

GOWEN HILL REPEATER

- Review with Electrical Contractor water tight sealing from control panel conduit, particularly radio coax, and inspection (Electrical Contactor provided by City)
- Review with Electrical Contractor power distribution of control panel and addition of Generator Power circuit for portable back-up power during extended power outage. (Electrical Contactor provided by City)
- PLC/OIT Date/Time Synchronization.

PARTRIDGE

- Electrical Contractor to review conduit seals and debris removal from panel. (Electrical Contactor provided by City)
- Motor amperage monitoring with 1762-IF4 analog input card.
- PLC/OIT Date/Time Synchronization.

FRANKLIN ST

- Modify three pump control mode capabilities (lead/lag/lag-lag) for ease of operations.
- Program and test flow matching of VFDs onsite
- Pump 1 Onsite commissioning and testing once replaced by City
- Onsite investigation of Sluice Gate control and associated level control
- Muffin Monster jammed alarm integration from Siemens S7-200 PLC panel. (Electrical Contactor provided by City)
- Intrusion switch replacement and testing (Wiring and Installation by Electrical Contractor).
- PLC/OIT Date/Time Synchronization.

LINDEN/ASHMONT

- Review with Electrical contractor water tight sealing from control panel conduit, particularly radio coax, and inspection
- Pump motor amperage monitoring with 1762-IF4 analog input expansion card (Installation and wiring of CT Monitoring Switch by Electrical Contactor provided by City)
- Intrusion switch installation and testing (Wiring and Installation by Electrical Contractor).
- PLC/OIT Date/Time Synchronization.

PENNEL

- PLC/OIT Date/Time Synchronization.
- Pump motor amperage monitoring with 1762-IF4 analog input expansion card (Installation and wiring of CT Monitoring Switch by Electrical Contractor)

CURTIS

- PLC/OIT Date/Time Synchronization.

HOPE

- Generator running alarm PLC programming modifications.
- PLC/OIT Date/Time Synchronization.
- Pump motor amperage monitoring with 1762-IF4 analog input expansion card (Installation and wiring of CT Monitoring Switch by Electrical Contactor provided by City)

RIVERSIDE

- Integration of flow and/or O2 sensor (future).
- OIT/HMI alarm review and testing.
- Muffin Monster jammed alarm integration from Siemens S7-200 PLC panel. (Wiring of alarm/status by Electrical Contactor provided by City)
- Intrusion switch replacement and testing (Wiring and Installation by Electrical Contractor).
- PLC/OIT Date/Time Synchronization.

RIVERTON

- Intrusion switch replacement and testing (Wiring and Installation by Electrical Contactor provided by City)
- PLC/OIT Date/Time Synchronization.
- Pump motor amperage monitoring with 1762-IF4 analog input expansion card (Installation and wiring of CT Monitoring Switch by Electrical Contractor)

CASTINE

- Change Pump VFD Speed Feedback to Pump Amperage.
- PLC/OIT Date/Time Synchronization.

EAST END

- PLC/OIT Date/Time Synchronization.
- Pump motor amperage monitoring with 1762-IF4 analog input expansion card (Installation and wiring of CT Monitoring Switch by Electrical Contactor provided by City)

RESPONSIBILITY OF OTHERS

- Electrical contractor to provide all necessary wiring and installation for applicable tasks as noted.

DELIVERABLES BY WOODARD & CURRAN

- 12 Current Transformers for monitoring pump amperage
- 6 Analog Input Modules for PLC Expansion for amperage
- 6 Intrusion Switch Replacements
- UPS Relay hardware
- Provide up to 8 hours of training on any resulting changes from the preceding task list.
- Modifications of panel drawings as required.
- SCADA file system backups as required.
- O&M modifications as required.

CLARIFICATIONS

The City shall be responsible for providing access to all control equipment and documentation; provide site specific safety hazards and training; attending meetings and providing feedback; and providing a list of known issues, desired improvements, and modifications to the controls prior to the site visit.

SCHEDULE

Woodard & Curran is prepared to initiate our work immediately upon Notice to Proceed and assuming Notice to Proceed prior to DATE, anticipates completing this work prior to June 1, 2017.

FEE PROPOSAL

Woodard & Curran proposes to complete the work described herein on a Lump Sum basis in the amount of $23,375, to be billed monthly based upon percentage of work complete, including reimbursable expenses.

TERMS AND CONDITIONS

Terms and Conditions of this work will be per the executed *Agreement between the City of Portland and Woodard & Curran, dated March 18, 2014*. If this proposal is acceptable to you, please indicate your agreement by signing this letter and returning a copy for our records. We can begin our work upon an email authorization, with the understanding that an executed copy of this agreement will be forthcoming. Any Purchase Order issued by the City in connection herewith shall be for accounting purposes only and shall incorporate the terms and conditions of this proposal by reference. The terms and conditions of this proposal shall prevail over any terms and conditions of a purchase order issued in connection herewith

We welcome any questions you may have on this. Please do not hesitate to call us at (207) 774-2112.

Sincerely,

WOODARD & CURRAN INC.

Barry Sheff, P.E.
Senior Vice President

JT Trinward
Technical Manager

Accepted this _____ Day of _____, 2017

By: _____

Title:_____

Dirigo Wireless, Inc.
349 Middle Road
Falmouth, ME 04105
(207)513-1110
Service@dirigowireless.com
http://www.dirigowireless.com

JAN 05 2018

DIRIGO WIRELESS

INVOICE

BILL TO
John Emerson
Water Resources
55 Portland St
Portland, Maine 04101

SHIP TO
John Emerson
Water Resources
55 Portland St
Portland, Maine 04101

INVOICE # 3704
DATE 10/27/2017
DUE DATE 11/26/2017
TERMS Net 30

JOB	PURCHASE ORDER#	CONTACT
Munjoy SCADA		John Emerson

ACTIVITY	QTY	RATE	AMOUNT
Title Install customer supplied antenna on Munjoy Fire Station Tower. Installed new collar mount midway up the tower with a 3' sidearm on the western face of the tower per TDS. Ran customer supplied LMR600 cable to Comm room, terminated at supplied polyphaser, and installed supplied ground kits. Complete sweep of system to ensure performance.	1	0.00	0.00
Tower Crew Tower Crew	1	4,625.00	4,625.00

Thank you for your patronage! Please visit us at www.DirigoWireless.com

BALANCE DUE **$4,625.00**

570 3112 500 4020

Monday, January 8, 2018

Dirigo Wireless Invoice #3704

SCADA Communication difficulties necessitated the installation of an antenna on the Munjoy Hill Fire Station tower. The height of the tower and antenna permits communication with our (under the hill) facility at 109 District Road. Dirigo Wireless is the antenna installation vendor that works with both Woodard and Curran and TCS Communications. Both of the aforementioned entities provide all of our SCADA installation and maintenance needs.

These communication issues were unanticipated and the antenna installation was not included as part of the broader SCADA system upgrade performed by Woodard and Curran. I authorized the installation of the antenna on a time and materials basis due to the need to expedite the installation and sustain uninterrupted communication with our pump station and storage tank systems. The need to expedite the installation was driven, in part, by the rehabilitation of the office facilities at 55 Portland Street. One of those repurposed offices housed our SCADA master computer and antenna signal feeds.

John Emerson

Water Resources Facility Coordinator

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Use PO 44208

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

January 25, 2018
Project No: 0221832.06
Invoice No: 146846

Project 0221832.06 PORTLAND, ME, CITY OF - SCADA TRM SERVICES

Professional Services for the period ending January 12, 2018

Phase 001 ENGINEERING 2017
PO #43893

Fee Total	3,386.00			
Percent Complete	100.00	Total Earned	3,386.00	
		Previous Fee Billing	3,386.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**

Phase 002 EXPENSES 2017
PO #43893

Fee Total	2,949.00			
Percent Complete	100.00	Total Earned	2,949.00	
		Previous Fee Billing	2,949.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**

Phase 003 ENGINEERING FY 2018
PO #44217

Fee Total	26,047.70			
Percent Complete	70.00	Total Earned	18,233.39	
		Previous Fee Billing	15,628.62	
		Current Fee Billing	2,604.77	
		Fee Total		**2,604.77**

Please include our invoice number in your remittance. Thank you.

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

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INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Project	0221832.06	PORTLAND, ME, CITY OF - SCADA TRM SERVIC	Invoice	146846
			Total this Phase	**$2,604.77**

Phase 004 EXPENSES FY 2018
PO ~~#44217~~ 44208

Fee Total	8,032.00			
Percent Complete	30.00	Total Earned	2,409.60	
		Previous Fee Billing	1,606.40	
		Current Fee Billing	803.20	
		Fee Total		**803.20**
			Total this Phase	**$803.20**
			Total this Invoice	**$3,407.97**

Outstanding Invoices

Number	**Date**	**Balance**
145791	12/19/2017	2,604.77
Total		**2,604.77**

Approved by:

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD
&CURRAN

Via Regular US Mail

February 20, 2018

FEB 22 2018

Mr. John Emerson
Wastewater Facilities Coordinator
City of Portland Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland SCADA TRM Services
Invoice No. 147451
PO No. 44217

Dear John,

Enclosed please find invoice #147451 in the amount of $5,209.54 for professional services rendered for the above-referenced project through the period ending February 9, 2018. Tasks are summarized below:

- Worked with Stevens Electric regarding generator status at Riverside Pump Station
- Troubleshoot Franklin St. intrusion alarms
- Installed VGA to HDMI adapter to SCADA at District Road office
- Installed new PS and EPort
- Revised drawings
- Project Administration

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos, PMP
Project Manager
Woodard & Curran

JWC 3-6-18

WC No. 0221832.06

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
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Boston, MA 02205-5008

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T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

February 16, 2018
Project No: 0221832.06
Invoice No: 147451

Project 0221832.06 PORTLAND, ME, CITY OF - SCADA TRM SERVICES

Professional Services for the period ending February 9, 2018

Phase 001 ENGINEERING 2017
PO #43893

Fee Total	3,386.00			
Percent Complete	100.00	Total Earned	3,386.00	
		Previous Fee Billing	3,386.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
		Total this Phase		**0.00**

Phase 002 EXPENSES 2017
PO #43893

Fee Total	2,949.00			
Percent Complete	100.00	Total Earned	2,949.00	
		Previous Fee Billing	2,949.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
		Total this Phase		**0.00**

Phase 003 ENGINEERING FY 2018
PO ~~#44217~~ 44208

570-3112-500-35.00

Fee Total	26,047.70			
Percent Complete	90.00	Total Earned	23,442.93	
		Previous Fee Billing	18,233.39	
		Current Fee Billing	5,209.54	
		Fee Total		**5,209.54**

Please include our invoice number in your remittance. Thank you.

JWE 3-6-18

WOODARD &CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
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F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Project	0221832.06	PORTLAND, ME, CITY OF - SCADA TRM SERVIC	Invoice	147451
			Total this Phase	**$5,209.54**

Phase 004 EXPENSES FY 2018
PO ~~#44217~~ 44208

Fee Total	8,032.00			
Percent Complete	30.00	Total Earned	2,409.60	
		Previous Fee Billing	2,409.60	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**
			Total this Invoice	**$5,209.54**

Outstanding Invoices

Number	Date	Balance
146846	1/25/2018	2,604.77
Total		**2,604.77**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

JWE 3-6-18

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD &CURRAN

Via Regular US Mail

March 26, 2018

Mr. John Emerson
Wastewater Facilities Coordinator
City of Portland Department of Public Works
55 Portland Street
Portland, ME 04101

MAR 29 2018

PO 44208

Re: City of Portland SCADA TRM Services
Invoice No. 147451
PO No. 44217

Dear John,

Enclosed please find invoice #148424 in the amount of $2,604.77 for professional services rendered for the above-referenced project through the period ending March 9, 2018. Tasks are summarized below:

- TRM, purchasing and coordination with Steven's Electric
- Project Administration

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos, PMP
Project Manager
Woodard & Curran

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
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Boston, MA 02205-5008

T 800.426.4262
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F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

March 23, 2018
Project No: 0221832.06
Invoice No: 148424

Project 0221832.06 PORTLAND, ME, CITY OF - SCADA TRM SERVICES

Professional Services for the period ending March 9, 2018

Phase 001 ENGINEERING 2017
PO #43893

Fee Total	3,386.00			
Percent Complete	100.00	Total Earned	3,386.00	
		Previous Fee Billing	3,386.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
		Total this Phase		**0.00**

Phase 002 EXPENSES 2017
PO #43893

Fee Total	2,949.00			
Percent Complete	100.00	Total Earned	2,949.00	
		Previous Fee Billing	2,949.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
		Total this Phase		**0.00**

Phase 003 ENGINEERING FY 2018
PO #44217

Fee Total	26,047.70			
Percent Complete	100.00	Total Earned	26,047.70	
		Previous Fee Billing	23,442.93	
		Current Fee Billing	2,604.77	
		Fee Total		**2,604.77**

Please include our invoice number in your remittance. Thank you.

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Project	0221832.06	PORTLAND, ME, CITY OF - SCADA TRM SERVIC	Invoice	148424
			Total this Phase	**$2,604.77**

Phase 004 EXPENSES FY 2018
PO #44217

Fee Total	9,392.00			
Percent Complete	25.6559	Total Earned	2,409.60	
		Previous Fee Billing	2,409.60	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**
			Total this Invoice	**$2,604.77**

Outstanding Invoices

PJ 803.20

Number	Date	Balance
146846	1/25/2018	2,604.77 ??
147451	2/16/2018	5,209.54 ✓
Total		**7,814.31**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

WOODARD
&CURRAN

Via Regular US Mail

April 27, 2018

APR 30 2018

Mr. John Emerson
Wastewater Facilities Coordinator
City of Portland Department of Public Works
55 Portland Street
Portland, ME 04101

Re: City of Portland SCADA TRM Services
Invoice No. 149427
PO No. 44217

Dear John,

Enclosed please find invoice #149427 in the amount of $6,982.40 for professional services rendered for the above-referenced project through the period ending April 13, 2018. Tasks are summarized below:

- Installed new door intrusion switch at Franklin pump station on wet side door
- Expenses
- Project Administration

If you have any questions or if I can be of further assistance, please feel free to contact me at (207) 558.3687 or email pandromalos@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Peter Andromalos, PMP
Project Manager
Woodard & Curran

WC No. 0221832.06

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

John Emerson
Wastewater Facilities Coordinator
Portland, ME, City of
Department of Public Works
55 Portland Street
Portland, ME 04101

April 26, 2018
Project No: 0221832.06
Invoice No: 149427

Project 0221832.06 PORTLAND, ME, CITY OF - SCADA TRM SERVICES

Professional Services for the period ending April 13, 2018

Phase 001 ENGINEERING 2017
PO #43893

Fee Total	3,386.00			
Percent Complete	100.00	Total Earned	3,386.00	
		Previous Fee Billing	3,386.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**

Phase 002 EXPENSES 2017
PO #43893

Fee Total	2,949.00			
Percent Complete	100.00	Total Earned	2,949.00	
		Previous Fee Billing	2,949.00	
		Current Fee Billing	0.00	
		Fee Total		**0.00**
			Total this Phase	**0.00**

Phase 003 ENGINEERING FY 2018
PO #44217

Fee Total	26,047.70			
Percent Complete	100.00	Total Earned	26,047.70	
		Previous Fee Billing	26,047.70	
		Current Fee Billing	0.00	
		Fee Total		**0.00**

Please include our invoice number in your remittance. Thank you.

WOODARD & CURRAN

COMMITMENT & INTEGRITY
DRIVE RESULTS

Remit to:
PO Box 55008
Boston, MA 02205-5008

T 800.426.4262
T 207.774.2112
F 207.774.6635

INVOICE

TD BANK
Electronic Transfer:
⑆211274450⑆ 2427662596⑈

Project	0221832.06	PORTLAND, ME, CITY OF - SCADA TRM SERVIC	Invoice	149427
			Total this Phase	**0.00**

Phase 004 EXPENSES FY 2018
PO #44217

Fee Total	9,392.00			
Percent Complete	100.00	Total Earned	9,392.00	
		Previous Fee Billing	2,409.60	
		Current Fee Billing	6,982.40	
		Fee Total		**6,982.40**
			Total this Phase	**$6,982.40**
			Total this Invoice	**$6,982.40**

Outstanding Invoices

Number	Date	Balance
146846	1/25/2018	2,604.77
Total		**2,604.77**

Approved by: _____

Peter Andromalos, PMP
Project Manager
Woodard & Curran

Please include our invoice number in your remittance. Thank you.

Powsland & Mitton St
Sewer Replacement

City of Portland
Department of Public Services
Engineering Division

Payment - # 3

R.E Coleman, Inc.
126 Industrial Way
Portland, ME 04103

Account No(s):	Project Code(s):	Amount	
370-3100-500.70-10	C15501	$ 346,265.00	**Line Item 1**
300-3100-492.70-10	C17102	$ 97,500.00	**Line Item 2**
571-3140-500.70-10		$ 27,640.00	**Line Item 3**
3130218108-DPW Con	C18108	$ 103,250.00	**Line Item 4**

Payment Period:
June 19, 2018
Through
August 31, 2018

Purchase Order No.: 044424

ITEM #	DESCRIPTION	CA #	FUNDING SOURCE	EST QTY	UNIT	UNIT PRICE	ESTIMATED AMOUNT	Previous Amount: PREV QTY	Previous Amount: PREVIOUS REQUESTED	Pay Req 3: QTY REQ	Pay Req 3: AMOUNT REQUESTED	QTY TO DATE	AMOUNT TO DATE	% COMP
202.11	Removal of Cobbles/Concrete	BB	City	45	SY	$35.00	$1,575.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
202.2	Remove Existing Bit. Concrete Pavement	BB	City	6500	SY	$4.60	$29,900.00	2152.00	$9,899.20	3400.00	$15,640.00	5552.00	$25,539.20	85%
203.2	Common Excavation	BB	City	700	CY	$24.00	$16,800.00	205.00	$4,920.00	283.33	$6,799.92	488.33	$11,719.92	70%
203.25	Granular Borrow	BB	City	100	CY	$20.00	$2,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
203.28	Test Pit Excavation	BB	City	20	VF	$50.00	$1,000.00	28.00	$1,400.00	0.00	$0.00	28.00	$1,400.00	140%
203.31	Crushed Stone (Overdepth)	BB	City	100	CY	$25.00	$2,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
206.061	Earth Excavation (Overdepth)	BB	City	100	CY	$16.00	$1,600.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
206.07	Structural Rock Excavation	BB	City	10	CY	$20.00	$200.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
304.1	Agg. Subbase Course - Gravel Type "D"	BB	City	475	CY	$32.00	$15,200.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
304.15	Agg. Base Course - Crushed Type "B"	BB	City	740	CY	$34.00	$25,160.00	1.00	$34.00	0.00	$0.00	1.00	$34.00	0%
403.208	Hot Mix Asphalt - Grading - 12.5 MM	BB	City	740	TON	$73.00	$54,020.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
403.209	Hot Mix Asphalt - 9.5 MM (Sidewalks, Drives)	BB	City	15	TON	$140.00	$2,100.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
403.21	Hot Mix Asphalt - 9.5 MM	BB	City	550	TON	$76.00	$41,800.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
502.56	Concrete Fill	BB	City	10	CY	$100.00	$1,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
603.131	8" Diameter Sewer/Storm Pipe	BB	City	1320	LF	$68.00	$89,760.00	1295.75	$88,111.00	3.00	$204.00	1298.75	$88,315.00	98%
603.149	10" Diameter Sewer	BB	City	300	LF	$102.00	$30,600.00	289.50	$29,529.00	0.00	$0.00	289.50	$29,529.00	97%
604.15	4' Diameter Manhole	BB	City	7	EA	$4,200.00	$29,400.00	7.00	$29,400.00	0.00	$0.00	7.00	$29,400.00	100%
614.14	Masonry Sewer Plug	BB	City	2	EA	$200.00	$400.00	1.00	$200.00	2.00	$400.00	3.00	$600.00	150%
615.071	Loam, Seed & Mulch	BB	City	1	LS	$10,000.00	$10,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
627.713	White or Yellow Pavement Marking Line	BB	City	60	LF	$5.00	$300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
629.05	Hand Labor, Straight Time	BB	City	10	HR	$35.00	$350.00	10.00	$350.00	0.00	$0.00	10.00	$350.00	100%
629.06	Mason, Straight Time	BB	City	10	HR	$40.00	$400.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.12	All Purpose Excavator (including Operator)	BB	City	10	HR	$160.00	$1,600.00	10.00	$1,600.00	0.00	$0.00	10.00	$1,600.00	100%
631.171	Truck - Small (including Operator)	BB	City	10	HR	$60.00	$600.00	5.00	$300.00	0.00	$0.00	5.00	$300.00	50%
631.22	Front End Loader (including Operator)	BB	City	10	HR	$90.00	$900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.36	Foreman, Straight Time	BB	City	10	HR	$45.00	$450.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
632.04	4" and 6" WYE Connection	BB	City	50	EA	$105.00	$5,250.00	45.00	$4,725.00	1.00	$105.00	46.00	$4,830.00	92%
633.05	4" and 6" Diameter Sewer Lateral	BB	City	1460	LF	$45.00	$65,700.00	1050.00	$47,250.00	200.00	$9,000.00	1250.00	$56,250.00	86%
637.071	Dust Control	BB	City	1	LS	$3,100.00	$3,100.00	0.30	$930.00	0.00	$0.00	0.30	$930.00	30%
652.39	Work Zone Traffic Control	BB	City	1	LS	$5,100.00	$5,100.00	0.50	$2,550.00	0.00	$0.00	0.50	$2,550.00	50%
654.08	Density Test	BB	City	35	EA	$80.00	$2,800.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
656.75	Temp. Soil Erosion & Water Pollution Control	BB	City	1	LS	$2,200.00	$2,200.00	0.50	$1,100.00	0.00	$0.00	0.50	$1,100.00	50%
	Contract Amendment #1													
900.1	Kensington SD Utility Work	1	City	1	LS	$27,640.00	$27,640.00	1.00	$27,640.00	0.00	$0.00	1.00	$27,640.00	100%
	Contract Amendment #2													
900.2	Box Cut Common Ex	2	City	1600	CY	$24.00	$38,400.00	0.00	$0.00	1097.60	$26,342.40	1097.60	$26,342.40	69%
900.3	Box Cut Sub Base Gravels	2	City	1600	CY	$32.00	$51,200.00	0.00	$0.00	1097.60	$35,123.20	1097.60	$35,123.20	69%
900.4	Geotextile for Road	2	City	5200	SY	$1.95	$10,140.00	0.00	$0.00	3400.00	$6,630.00	3400.00	$6,630.00	65%
900.5	Greeley St Millings Resurfacing	2	City	1	LS	$3,510.00	$3,510.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
	Project Total						$574,655.00		$249,938.20		$100,244.52		$350,182.72	61%

Powsland & Mitton St
Sewer Replacement

City of Portland
Department of Public Services
Engineering Division

Payment - # 3

					Base Bid	$32,148.92
PROJECT BASE BID		$443,765.00			CA #2	$68,095.60
CONTRACT AMENDMENT #1		$27,640.00				
CONTRACT AMENDMENT #2		$103,250.00				
PROJECT TOTAL		$574,655.00				
TOTAL THIS ESTIMATE		$100,244.52			10/25/2018	Nathaniel Smith
RELEASE OF RETAINAGE		$0.00			Date	Nathaniel Smith
RESERVE THIS ESTIMATE	5.00%	$5,012.23				Project Engineer
***** TOTAL THIS ESTIMATE ****		$95,232.29				
Purchase Order No.: 044424						
******* PAY THIS ESTIMATE ******	**Line Item 2**	**$27,136.69**	**C15501**			
******* PAY THIS ESTIMATE ******	**Line Item 3**	**$0.00**	**C17102**		Date	Checked By - Eric Stanicki
******* PAY THIS ESTIMATE ******	**Line Item 5**	**$68,095.60**	**C18108**			Associate Engineer
PREVIOUSLY PAID						
PAY REQUISITION #1		$124,795.61				
PAY REQUISITION #2		$112,645.68				
TOTAL PAID TO DATE		$237,441.29			Date	Bill Bradshaw
						R.E. Coleman Inc.
PREVIOUSLY RESERVED						
PAY REQUISITION #1		$6,568.19				
PAY REQUISITION #2		$5,928.72				
TOTAL RESERVE TO DATE		$12,496.91	5.0%	Of Completed Work	Date	Brad Roland
						Sr. Project Engineer
TOTAL PROJECT AMOUNT		$574,655.00				
(-) TOTAL COST TO DATE		$350,182.72				
BALANCE OF CONTRACT		$224,472.28				

Madison, Walnut, Washington
Sewer Separation Project

City of Portland
Department of Public Works
Water Resources

Payment - # 8

D&C Construction
P.O. Box 123
Waterboro, ME 04087

Account No(s):	Project Code(s):	Amount		Payment Period:
370-3100-500.70-10	C17501 - SRF	$1,714,424.75	Line Item 1	November 1, 2018
300-3100-492.70-10	C17104 - CSO InEll	$ 99,499.32	Line Item 2	Through
300-3100-492.70-10	C18105 - CSO InEll	$ 357,504.68	Line Item 3	November 30, 2018
300-3100-492.70-10	C16201 - Sidewalk	$ 100,000.00	Line Item 4	
242-3100-430.70-10	LU1601	$ 80,000.00	Line Item 5	
370-3100-500.70-10	C17501 - SRF	$ 74,354.65	Line Item 6 - CO#1	
3137017501 DPWCON CONSTRUCT	C17501 37531000 407010	$ 66,949.40	Line Item 7 - CO#2 SRF	
3130317104 DPWCON CONSTRUCT	C17104 30031000 407010	$ 32,450.60	Line Item 8 - CO#2	

Purchase Order No.: 044618

ITEM#	DESCRIPTION	CA #	FUNDING SOURCE	EST QTY	UNIT	UNIT PRICE	ESTIMATED AMOUNT	Previous Amount PREV QTY	Previous Amount PREVIOUS REQUESTED	Pay Req 8 QTY REQ	Pay Req 8 AMOUNT REQUESTED	QTY TO DATE	AMOUNT TO DATE	% COMP
202.21	Removal of Cobblestones w/Conc Base), RR Rail&RR Ties	BB	SRF	1700	SY	$17.00	$28,900.00	768.20	$13,059.40	974.00	$16,558.00	1742.20	$29,617.40	102%
202.211	Removal of Cobblestones w/Conc Base), RR Rail&RR Ties - Non SRF	BB	City	4600	SY	$17.00	$78,200.00	530.30	$9,015.10	0.00	$0.00	530.30	$9,015.10	12%
202.15	Remove Existing MH or CB	BB	SRF	3	EA	$500.00	$1,500.00	3.00	$1,500.00	2.00	$1,000.00	5.00	$2,500.00	167%
202.16	Remove Existing Storm/Sewer Pipe	BB	SRF	130	LF	$10.00	$1,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
202.2	Remove Existing Bit. Concrete Pavement	BB	SRF	4350	SY	$1.85	$8,047.50	2800.20	$5,180.37	1217.00	$2,251.45	4017.20	$7,431.82	92%
202.201	Remove Exist Bit. Conc. Pavement -Non SRF	BB	City	3900	SY	$1.85	$7,215.00	2291.50	$4,239.28	0.00	$0.00	2291.50	$4,239.28	59%
203.2	Common Excavation	BB	SRF	150	CY	$11.00	$1,650.00	170.82	$1,879.02	0.00	$0.00	170.82	$1,879.02	114%
203.201	Common Excavation - Non SRF	BB	City	1400	CY	$11.00	$15,400.00	681.48	$7,496.28	0.00	$0.00	681.48	$7,496.28	49%
203.25	Granular Burrow	BB	SRF	1050	CY	$0.01	$10.50	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
203.28	Test Pit Excavation	BB	SRF	15	VF	$50.00	$750.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
203.31	Crushed Stone (Overdepth) 703.31 - Type A	BB	SRF	100	CY	$0.01	$1.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
206.061	Earth Excavation, Below Grade (Overdepth)	BB	SRF	100	CY	$0.01	$1.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
206.07	Structural Rock Excavation	BB	SRF	100	CY	$0.01	$1.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
304.09	Aggregate Base Course - Type B	BB	SRF	430	CY	$36.00	$15,480.00	170.80	$6,148.80	0.00	$0.00	170.80	$6,148.80	40%
304.091	Aggregate Base Course - Type B - Non SRF	BB	City	830	CY	$36.00	$29,880.00	62.70	$2,257.20	0.00	$0.00	62.70	$2,257.20	8%
304.1	Aggregate Subbase - Type D	BB	SRF	1400	CY	$25.00	$35,000.00	1124.05	$28,101.25	378.00	$9,450.00	1502.05	$37,551.25	107%
304.101	Aggregate Subbase - Type D - Non SRF	BB	City	2100	CY	$25.00	$52,500.00	297.90	$7,447.50	0.00	$0.00	297.90	$7,447.50	14%
403.207	Hot Mix Asphalt 19.0MM	BB	SRF	630	T	$96.00	$60,480.00	309.74	$29,735.04	0.00	$0.00	309.74	$29,735.04	49%
403.2071	Hot Mix Asphalt 19.0MM - Non SRF	BB	SRF	640	T	$96.00	$61,440.00	57.71	$5,540.16	0.00	$0.00	57.71	$5,540.16	9%
403.208	Hot Mix Asphalt 12.5MM	BB	SRF	180	T	$90.00	$16,200.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
403.2081	Hot Mix Asphalt 12.5MM - Non SRF	BB	City	430	T	$90.00	$38,700.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
403.21	Hot Mix Asphalt 9.5MM	BB	SRF	150	T	$98.00	$14,700.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
462.3	Ultrathin Bonded Wearing Course - Non SRF	BB	City	2000	SY	$12.00	$24,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
502.65	Flowable Concrete Fill	BB	SRF	6	CY	$150.00	$900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
603.132	10 Inch Sanitary Sewer Pipe	BB	SRF	18	LF	$151.50	$2,727.00	32.50	$4,923.75	0.00	$0.00	32.50	$4,923.75	181%
603.133	12 Inch Sanitary Sewer Pipe	BB	SRF	490	LF	$155.50	$76,195.00	539.00	$83,814.50	0.00	$0.00	539.00	$83,814.50	110%
603.1331	12 Inch Polyethylene Sanitary Sewer Pipe	BB	SRF	590	LF	$190.00	$112,100.00	542.50	$103,075.00	0.00	$0.00	542.50	$103,075.00	92%
603.135	18 Inch Sanitary Sewer Pipe	BB	SRF	930	LF	$164.50	$152,985.00	870.50	$143,197.25	0.00	$0.00	870.50	$143,197.25	94%
603.137	24 Inch Sanitary Sewer Pipe	BB	SRF	27	LF	$175.25	$4,731.75	26.00	$4,556.50	0.00	$0.00	26.00	$4,556.50	96%
603.153	10 Inch Storm Drain Pipe	BB	SRF	400	LF	$156.50	$62,600.00	164.00	$25,666.00	132.00	$20,658.00	296.00	$46,324.00	74%
603.159	12 Inch Storm Drain Pipe	BB	SRF	800	LF	$152.00	$121,600.00	451.75	$68,666.00	444.00	$67,488.00	895.75	$136,154.00	112%
603.1591	12 Inch Polyethylene Storm Drain Pipe	BB	SRF	300	LF	$178.00	$53,400.00	291.00	$51,798.00	0.00	$0.00	291.00	$51,798.00	97%
603.169	15 Inch Storm Drain Pipe	BB	SRF	91	LF	$158.00	$14,378.00	36.50	$5,767.00	98.50	$15,563.00	135.00	$21,330.00	148%
603.1691	15 Inch Polyethylene Storm Drain Pipe	BB	SRF	250	LF	$173.50	$43,375.00	241.00	$41,813.50	0.00	$0.00	241.00	$41,813.50	96%
603.179	18 Inch Storm Drain Pipe	BB	SRF	150	LF	$167.00	$25,050.00	88.50	$14,779.50	61.00	$10,187.00	149.50	$24,966.50	100%

603.99	Trench Dam and Drain	BB	SRF	9	EA	$1,325.00	$11,925.00	9.00	$11,925.00	0.00	$0.00	9.00	$11,925.00	100%
604.072	4 Foot Diameter Catch Basin	BB	SRF	23	EA	$3,250.00	$74,750.00	10.00	$32,500.00	7.00	$22,750.00	17.00	$55,250.00	74%
604.15	4 Foot Diameter Manhole	BB	SRF	38	EA	$4,000.00	$152,000.00	28.00	$112,000.00	7.00	$28,000.00	35.00	$140,000.00	92%
604.167	Alter CB Frame and Grate to Cascade	BB	SRF	2	EA	$500.00	$1,000.00	2.00	$1,000.00	0.00	$0.00	2.00	$1,000.00	100%
604.18	Adjusting Manhole or Catch Basin to Grade	BB	SRF	3	EA	$300.00	$900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
604.19	Core Inlet/Outlet Pipe Hole in CB or MH	BB	SRF	1	EA	$1,000.00	$1,000.00	2.00	$2,000.00	2.00	$2,000.00	4.00	$4,000.00	400%
608.08	Reinforced Concrete Sidewalk	BB	SRF	23	SY	$99.00	$2,277.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.081	Reinforced Concrete Sidewalk - Non SRF	BB	City	65	SY	$99.00	$6,435.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.082	Reinforced Concrete Driveway - Non SRF	BB	City	60	SY	$117.00	$7,020.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.12	Bituminous Driveway Apron - Non SRF	BB	City	300	SY	$55.50	$16,650.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.15	Brick Sidewalk w/Bituminous Base	BB	SRF	250	SY	$134.00	$33,500.00	44.90	$6,016.60	53.29	$7,140.86	98.19	$13,157.46	39%
608.151	Brick Sidewalk w/Bit. Base - Non SRF	BB	City	1100	SY	$134.00	$147,400.00	1.00	$134.00	5.00	$670.00	6.00	$804.00	1%
608.16	Brick Driveway w/Bit. Base - Non SRF	BB	City	210	SY	$134.00	$28,140.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.26	Curb Ramp Detectable Warning Field	BB	SRF	10	SF	$50.00	$500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.261	Curb Ramp Det. Warning Field -Non SRF	BB	City	160	SF	$50.00	$8,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.11	Type 1 Vertical Curb	BB	SRF	350	LF	$30.00	$10,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.111	Type 1 Vertical Curb - Non SRF	BB	City	660	LF	$30.00	$19,800.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.1113	Special Granite Curb, 12" Reveal - Non SRF	BB	City	110	LF	$76.00	$8,360.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.12	Type 1 Vertical Curb (Circular) - Non SRF	BB	City	280	LF	$41.50	$11,620.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.234	Terminal Curb Type 1 - 4 Foot - Non SRF	BB	City	32	EA	$125.75	$4,024.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.237	Terminal Curb Type 1 - 7 Foot - Non SRF	BB	City	6	EA	$222.50	$1,335.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.2371	Terminal Curb Type 1 - 7 Ft - Circ - Non SRF	BB	City	5	EA	$309.00	$1,545.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.38	Remove and Reset Curb Type 1	BB	SRF	1050	LF	$21.00	$22,050.00	236.25	$4,961.25	261.50	$5,491.50	497.75	$10,452.75	47%
609.381	Remove and Reset Curb Type 1 - Non SRF	BB	City	1150	LF	$21.00	$24,150.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.441	Curbing Removed and Stacked - Non SRF	BB	City	300	LF	$10.00	$3,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
614.14	Masonry Plug	BB	SRF	6	EA	$500.00	$3,000.00	1.00	$500.00	1.00	$500.00	2.00	$1,000.00	33%
615.07	Loam, Seed and Mulch	BB	SRF	30	SY	$6.50	$195.00	34.20	$222.30	0.00	$0.00	34.20	$222.30	114%
615.071	Loam, Seed and Mulch - Non SRF	BB	City	1100	LS	$6.50	$7,150.00	86.67	$563.36	0.00	$0.00	86.67	$563.36	8%
627.733	4" White/Yellow Pavement Marking Line	BB	SRF	2900	LF	$0.25	$725.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
627.75	White or Yellow Pavement & Curb Markings	BB	SRF	2050	LF	$2.50	$5,125.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
627.76	Temp. Pavement Marking Line, White/Yellow	BB	SRF	1	LS	$1,000.00	$1,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
629.05	Hand Labor, Straight Time	BB	SRF	20	HR	$40.00	$800.00	12.00	$480.00	0.00	$0.00	12.00	$480.00	60%
629.06	Mason, Straight Time	BB	SRF	20	HR	$55.00	$1,100.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.12	All Purpose Excavator (incl. Operator)	BB	SRF	20	HR	$115.00	$2,300.00	9.25	$1,063.75	4.50	$517.50	13.75	$1,581.25	69%
631.13	Bulldozer (inc. Operator)	BB	SRF	20	HR	$95.00	$1,900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.15	Roller Earth Base CRS (incl. Operator)	BB	SRF	20	HR	$80.00	$1,600.00	4.00	$320.00	0.00	$0.00	4.00	$320.00	20%
631.172	Truck-Large (incl. Operator)	BB	SRF	20	HR	$62.00	$1,240.00	15.75	$976.50	9.00	$558.00	24.75	$1,534.50	124%
631.22	Front End Loader (incl. Operator)	BB	SRF	20	HR	$90.00	$1,800.00	6.00	$540.00	2.50	$225.00	8.50	$765.00	43%
631.36	Foreman, Straight Time	BB	SRF	20	HR	$50.00	$1,000.00	0.00	$0.00	2.50	$125.00	2.50	$125.00	13%
632.04	4 Inch and 6 Inch Wye Connection	BB	SRF	45	EA	$700.00	$31,500.00	32.00	$22,400.00	1.00	$700.00	33.00	$23,100.00	73%
632.041	4" & 6" Inserta Tee Pipe Connections	BB	SRF	25	EA	$255.00	$6,375.00	21.00	$5,355.00	0.00	$0.00	21.00	$5,355.00	84%
633.04	4" & 6" Sanitary/Storm Drain House Laterals	BB	SRF	2100	LF	$147.00	$308,700.00	1263.25	$185,697.75	68.50	$10,069.50	1331.75	$195,767.25	63%
643.62	Rect. Rapid Flashing Beacon-Non SRF	BB	City	4	EA	$7,760.00	$31,040.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
643.621	Remove Exist Beacon&Foundation - Non SRF	BB	City	4	EA	$1,000.00	$4,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
652.36	Maintenance of Traffic Control	BB	SRF	1	LS	$175,000.00	$175,000.00	0.81	$141,750.00	0.11	$19,250.00	0.92	$161,000.00	92%
654.08	Density Test	BB	SRF	40	EA	$40.00	$1,600.00	19.00	$760.00	0.00	$0.00	19.00	$760.00	48%
656.75	Temp Soil Erostion & Water Pollution Control	BB	SRF	1	LS	$5,000.00	$5,000.00	0.60	$3,000.00	0.10	$500.00	0.70	$3,500.00	70%
900.1	Pollution Insurance	1	SRF	1	LS	$6,130.65	$6,130.65	1.00	$6,130.65	0.00	$0.00	1.00	$6,130.65	100%
900.2	Paving Increase due to wage rate increase	1	SRF	1	LS	$22,224.00	$22,224.00	0.25	$5,556.00	0.00	$0.00	0.25	$5,556.00	25%

Madison, Walnut, Washington **City of Portland** **Payment - # 8**

Sewer Separation Project **Department of Public Works**

Water Resources

900.3	Flagging Increase due to wage rate increase	1	SRF	1	LS	$46,000.00	$46,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.4	Temp Pavement - SRF	2	SRF	478.21	Ton	$140.00	$66,949.40	309.51	$43,331.40	111.82	$15,654.80	421.33	$58,986.20	88%
900.5	Temp Pavement - Non SRF	2	City	231.79	Ton	$140.00	$32,450.60	231.79	$32,450.60	0.00	$0.00	231.79	$32,450.60	100%
	Project Total						$2,525,183.40	SRF	$1,222,147.08	SRF	$256,637.61		$1,548,598.17	61%
								City	$69,143.48	City	$670.00			
	PROJECT BASE BID						$2,351,428.75	Total	$1,291,290.56	Total	$257,307.61			
	CONTRACT AMENDMENT #1 -						$74,354.65							
	CONTRACT AMENDMENT #2 - Temp Pavment						$99,400.00							
	PROJECT TOTAL						$2,525,183.40							

Madison, Walnut, Washington
Sewer Separation Project

City of Portland
Department of Public Works
Water Resources

Payment - # 8

TOTAL THIS ESTIMATE - SRF C17501		$256,637.61
RELEASE OF RETAINAGE - SRF		$0.00
RESERVE THIS ESTIMATE - SRF	5.00%	$12,831.88
***** TOTAL THIS ESTIMATE ****		$243,805.73

TOTAL THIS ESTIMATE - CITY		$670.00
RELEASE OF RETAINAGE - CITY		$0.00
RESERVE THIS ESTIMATE - CITY	5.00%	$33.50
***** TOTAL THIS ESTIMATE ****		$636.50

12/14/2018 — Date — Nathaniel Smith, Project Engineer

Purchase Order No.: 044618

******* PAY THIS ESTIMATE ******	**Line Item 1**	**$243,805.73**	**C17501 - SRF**
******* PAY THIS ESTIMATE ******	**Line Item 2**	**$636.50**	**C17104 - CSO InEll**
******* PAY THIS ESTIMATE ******	**Line Item 3**	**$0.00**	**C18105 - CSO InEll**
******* PAY THIS ESTIMATE ******	**Line Item 4**	**$0.00**	**C16201 - Sidewalk**
******* PAY THIS ESTIMATE ******	**Line Item 5**	**$0.00**	**LU1601**
******* PAY THIS ESTIMATE ******	**Line Item 6**	**$0.00**	**C17501 - SRF**
******* PAY THIS ESTIMATE ******	**Line Item 7**	**$0.00**	**C17501 - SRF**
******* PAY THIS ESTIMATE ******	**Line Item 8**		**C17104 - City**
		$244,442.23	

Date — Checked By - Rick Day, Sebago Technics - Inspector

PREVIOUSLY PAID PAY REQ 01	$143,152.87
PREVIOUSLY PAID PAY REQ 02	$38,390.21
PREVIOUSLY PAID PAY REQ 03	$74,163.89
PREVIOUSLY PAID PAY REQ 04	$107,274.00
PREVIOUSLY PAID PAY REQ 05	$306,269.80
PREVIOUSLY PAID PAY REQ 06	$293,877.07
PREVIOUSLY PAID PAY REQ 07	$263,598.20
PAID PAY REQ 08	$244,442.23
TOTAL PAID TO DATE	$1,471,168.27

Date — Checked By - Brad Cleaves, D&C Construction

PREVIOUSLY RESERVED PAY REQ 01	5.00%	$7,534.36
PREVIOUSLY RESERVED PAY REQ 02	5.00%	$2,020.54
PREVIOUSLY RESERVED PAY REQ 03	5.00%	$3,903.36
PREVIOUSLY RESERVED PAY REQ 04	5.00%	$5,646.00
PREVIOUSLY RESERVED PAY REQ 05	5.00%	$16,119.46
PREVIOUSLY RESERVED PAY REQ 06	5.00%	$15,467.21
PREVIOUSLY RESERVED PAY REQ 07	5.00%	$13,873.59
RESERVED PAY REQ 08	5.00%	$12,865.38
TOTAL RESERVE TO DATE		$77,429.90

5.0% Of Completed Work — Date — Brad Roland, Sr. Project Engineer

TOTAL PROJECT AMOUNT	$2,525,183.40
(-) TOTAL COST TO DATE	$1,548,598.17
BALANCE OF CONTRACT	$976,585.23

PURCHASE ORDER

CITY OF PORTLAND, MAINE
City Hall, 389 Congress Street
Portland, Maine 04101
(207) 874-8654

P.O. # 044618
Date: 12/01/17

D & C CONSTRUCTION CO., INC.
P.O. BOX 123
WATERBORO, ME 04087

City of Portland
PUBLIC WORKS ADMIN.
55 PORTLAND STREET
PORTLAND, ME 04101

VENDOR #
5349

DELIVER BY	SHIP VIA	TERMS
12/01/18		NET

CONFIRM BY	CONFIRM TO	REQUISITIONED BY
RENE PERRON	KAREN MARSTON	

FREIGHT	CONTRACT NO.	ACCOUNT NO.	PROJECT	REQ. NO.	REQ. DATE
		SEE BELOW			

LINE #	QUANTITY	UOM	ITEM NO. AND DESCRIPTION	UNIT COST	EXTENDED COST
1	1714424.75	EA	CSO COMP MADISON WALNUT	1.0000	1714424.75
2	99499.32	EA	CSO COMPLIANCE SRF INELIGIBLES	1.0000	99499.32
3	357504.68	EA	CSO - SRF INELIGIBLES	1.0000	357504.68
4	100000.00	EA	SIDEWALK REHAB/ACCESS	1.0000	100000.00
5	80000.00	EA	SUSTAINABLE TRANSPORTATION FUNDS	1.0000	80000.00
				SUB-TOTAL	2351428.75
				TOTAL	2351428.75

REMARKS:
Per your response to the City's Bid #18009 and contract dated 10-06-17.

TERMS & CONDITIONS, AS DEPICTED ON THE REVERSE SIDE OF THIS ORDER, ARE A FORMAL PART OF THIS ORDER

FOR THE CITY OF PORTLAND, MAINE

AUTHORIZED SIGNATURE

AGREEMENT BETWEEN THE
CITY OF PORTLAND
AND
D. & C. CONSTRUCTION CO., INC.

THIS AGREEMENT is entered into this 6th day of October, 2017, by and between the **CITY OF PORTLAND,** a body politic and corporate, (hereinafter the "**CITY**"), and **D. & C. CONSTRUCTION CO., INC.,** a Massachusetts corporation with an address of P. O. Box 123, Waterboro, Maine 04087 (hereinafter the "**CONTRACTOR**").

W I T N E S S E T H:

WHEREAS, the CITY is in need of sewer and stormwater separation on Madison and Walnut Streets and Washington Avenue and did advertise a Request for Bids #18009 dated August 14, 2017 entitled "Madison, Walnut, Washington Sewer Separation" as amended by Addendum No.1 dated August 30, 2017[1], (hereinafter, collectively, the "Request for Bids") a copy of which is attached as Exhibit A and made a part hereof; and

WHEREAS, the CONTRACTOR has the requisite knowledge and technical ability to perform the required services and has submitted a proposal for the provision of such services dated September 7, 2017, (hereinafter, the "Proposal") a copy of which is attached as Exhibit B and made a part hereof; and

WHEREAS, after due consideration of all the Bids, the CITY did award the bid to the CONTRACTOR;

NOW, THEREFORE, in consideration of the mutual promises made by each party to the other, the parties covenant and agree as follows:

1. The CONTRACTOR will furnish the materials, supplies, equipment and labor (hereinafter the "Work") in accordance with the specifications contained in the Request

[1] When Addendum No. 1 was originally published, it inadvertently included the 2007 edition of the Standard General Conditions of the Construction Contract Prepared by Engineers Joint Contract Documents Committee (the "2007 EJCDC General Conditions"), but it should have included the 2013 edition of the Standard General Conditions of the Construction Contract Prepared by Engineers Joint Contract Documents Committee (the "2013 EJCDC General Conditions"). The copy of Addendum No. 1 attached hereto includes the 2013 EJCDC General Conditions, which are incorporated into and made a part of this Agreement. The 2007 EJCDC General Conditions are not included in this Agreement.

for Bids, and also in accordance with the CONTRACTOR's Proposal and with the Plans provided to the Contractor; all of which are made a part of this Contract.

The restatement in this document of any term of the Request for Bids or Proposal shall not be deemed to waive any term not so restated. If any disagreement is found between the Request for Bids or the Proposal and this document, then this document shall govern; and the Request for Bids shall govern over the Proposal, to the extent they disagree; provided, however, that this document and its attachments shall be construed to be supplemental to one another to the extent possible.

2. The CONTRACTOR covenants and agrees that all Work performed and furnished hereunder shall be free from all defects, and that all Work shall be performed in a good workmanlike manner. Unless a longer warranty period is specified in the Exhibits hereto, all Work provided shall be warranted by the CONTRACTOR for one (1) full year from the date of completion of all Work hereunder and acceptance thereof by the CITY. Notwithstanding the foregoing, any longer period specified in the attachments shall stay in effect.

3. Prior to the execution of this Agreement, the CONTRACTOR will procure and maintain occurrence-based Automobile Liability Insurance and Commercial General Liability Insurance coverage in amounts of not less than One Million Dollars ($1,000,000.00) per occurrence for bodily injury, death and property damage, and occurrence based Pollution Liability Insurance coverage in amounts of not less than One Million Dollars ($1,000,000.00) naming the CITY as an additional insured thereon, and also Workers' Compensation Insurance coverage to the extent required by law. With respect to the Automobile, Commercial General, and Pollution Liability Insurance, the CONTRACTOR shall name the CITY as an additional insured for coverage only in those areas where government immunity has been expressly waived by 14 M.R.S. A. § 8104-A, as limited by § 8104-B, and § 8111. This provision shall not be deemed a waiver of any defenses, immunities or limitations of liability or damages available to the CITY under the Maine Tort Claims Act, other Maine statutory law, judicial precedent, common law, or any other defenses, immunities or limitations of liability available to the CITY. Prior to execution of this Agreement, the CONTRACTOR shall furnish the CITY and thereafter maintain certificates evidencing all such coverages, which certificates shall guarantee thirty (30) days' notice to the CITY of termination of insurance from the insurance provider or agent. CONTRACTOR shall also provide a copy of any endorsement naming the CITY as additional insured. A certificate that merely has a box checked under "Addl Insr," or the like, or that merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. Upon CITY'S request, CONTRACTOR shall provide CITY with a complete copy of any of the above-referenced policies. CONTRACTOR shall be responsible for any and all deductibles and/or self-insured retentions.

4. The CONTRACTOR shall furnish to the CITY, upon execution of the Contract, a Contract Performance Bond and a Contract Labor and Materials Payment Bond each for the full amount of the Contract and issued by a surety company or surety companies

authorized to do business in the State of Maine and approved by the CITY. The Bonds shall remain in effect for one year after final acceptance of the Work, and protect the CITY for at least one year of warranty of the Work hereunder, and also shall insure settlement of claims for the payment of all bills for labor, materials and equipment.

5. To the fullest extent permitted by law, the CONTRACTOR shall defend, indemnify and hold harmless the CITY, its officers and employees, from and against all claims, damages, losses, and expenses, just or unjust, including, but not limited to, the costs of defense and attorney's fees arising out of or resulting from the performance of this Agreement, provided that any such claims, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use therefrom, and (2) is caused in whole or in part by any act or omission of the CONTRACTOR, anyone directly or indirectly employed by it, or anyone for whose act it may be liable. Such obligation of indemnification shall not be construed to negate or abridge any other obligation of indemnification running to the CITY which otherwise exists. The extent of the indemnification provision shall not be limited by the provision for insurance in this Agreement. CONTRACTOR's obligations under this paragraph shall survive termination of this Agreement.

6. Prior to any payment, the CITY reserves the right to require Waivers of Lien for materials and labor from the CONTRACTOR and its subcontractors and suppliers guaranteeing One Hundred Percent (100%) performance, free and clear from all liens and encumbrances. Any mechanic's lien or any other lien which may be filed against the premises which are the subject of this Agreement by reason of the Work described herein shall be defended (by counsel reasonably acceptable to the CITY) and promptly discharged by the CONTRACTOR at its own expense. The CITY may require the CONTRACTOR to provide a bond satisfactory to the CITY to indemnify it against any lien and as a substitution in place of a lien. If the CONTRACTOR should fail either to defend the CITY against the lien or to discharge it, then the CITY may do so at the CONTRACTOR's expense. In the event of such an undertaking by the CITY, the CONTRACTOR will promptly reimburse the CITY for all its costs and expenses in so doing, including, but not limited to, reimbursement of the CITY's reasonable counsel fees, as well as costs which may be incurred by it in substituting a bond in place of a lien. CONTRACTOR's obligations under this paragraph shall survive termination of this Agreement.

7. The CONTRACTOR shall perform the work to the satisfaction of the responsible CITY official who will have the right of inspection at all times, and whose approval and acceptance of the work will be a condition precedent to payments by the CITY under this Contract. CITY inspectors will have the authority to stop work in progress if such work is being done contrary to the plans, specifications or engineering practice. CONTRACTOR acknowledges and agrees that such inspection is for purposes of approving payment alone and such inspection shall not be deemed to impose any duty or liability upon the CITY to supervise any aspect of or approve the quality of the Work.

8. Time is of the essence in the performance of this Agreement. Upon receipt of executed contracts and insurance as required, the CITY will promptly send an executed CITY contract to the CONTRACTOR, which will commence work upon receipt. All Utility

work must be complete by August 31, 2018 and the street must be base paved December 1, 2018, Final paving shall be complete by: 6/15/2019.

9. In the event of any dispute as to the amount, nature or scope of the work required under this Contract, the design and judgment of the Director of the Department of Public Works or his or her designee (hereinafter, the "Director") will be final and binding.

10. For performance of all the terms and conditions of this Agreement, the CITY will pay the CONTRACTOR Two Million Three Hundred Fifty-One Thousand Four Hundred Twenty-Eight Dollars and Seventy-Five Cents ($2,351,428.75) based on the rates set forth in the Proposal.

11. The CITY shall have the right to retain ten percent (10 %) of each invoice amount as retainage until the Work is completed and accepted by the CITY.

12. The CONTRACTOR shall keep accurate records of all services performed under this Agreement and shall submit such information to the CITY on a monthly basis. Payment for such Work shall be made to the CONTRACTOR not more than thirty (30) days after receipt of an invoice and acceptance of the Work by the Director.

13. The CITY may terminate this Agreement for cause by written notice to the CONTRACTOR. In the event of such termination, the CONTRACTOR shall not be entitled to any further payment under this Agreement from the date of receipt of said notice.

14. The CITY shall have the right to terminate this Agreement at any time for its convenience on thirty (30) days' prior written notice to the CONTRACTOR. If the Agreement is terminated by the CITY for convenience, the CITY shall pay the CONTRACTOR for all Work performed and all materials purchased pursuant to this Agreement prior to receipt of such notice.

15. Out of concern for the public, CITY employees and the CONTRACTOR's employees, all work performed by the CONTRACTOR shall be in conformance with pertinent OSHA, local, state and federal government regulations.

16. No waiver of any breach of any one or more of the conditions of this Agreement by the CITY shall be deemed to imply or constitute a waiver of any succeeding or other breach hereunder.

17. This Agreement and its attachments represents the entire and complete agreement and understanding between the parties and supersedes any prior agreement or understanding, written or oral, between the parties with respect to the subject matter of this Agreement. This Agreement cannot be amended except by written instrument executed by the CITY and CONTRACTOR.

18. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for

all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the obligations hereunder, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court.

19. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement. A signature in a pdf or electronic document shall be considered the equivalent of an original signature.

20. CONTRACTOR warrants and represents that it has the full right and authority to enter into this Agreement, that there is no impediment that would inhibit its ability to perform their respective obligations under this Agreement, and that the person signing this Agreement on behalf of CONTRACTOR has the authority to do so.

IN WITNESS WHEREOF, the said **CITY OF PORTLAND** has caused this Agreement to be signed and sealed by Jon P. Jennings, its City Manager, thereunto duly authorized, **D. & C. CONSTRUCTION CO., INC.** has caused this Agreement to be signed and sealed by Rene L. Perron, its CONSTRUCTION MANAGER, thereunto duly authorized, the day and date first above written.

WITNESS:

Sonia Bean

CITY OF PORTLAND

By: _____
for Jon P. Jennings
Its City Manager

WITNESS:

Tammy Lanctot

D. & C. CONSTRUCTION CO., INC.

By: Rene L. Perron

Print or type name: RENE L. PERRON

Its: CONSTRUCTION MANAGER

Approved as to form:

_____
City Corporation Counsel's Office

Approved as to funds:

_____
City Finance Director

EXHIBIT A

Bid #18009

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

CONTRACT, NOTICE AND SPECIFICATIONS

for

MADISON, WALNUT, WASHINGTON
SEWER SEPARATION

Bid Number: 18009

Dated: August 14, 2017

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ADVERTISEMENT NOTICE TO CONTRACTORS

Bid No. 18009
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

Project Name: Madison, Walnut, Washington Sewer Separation and Water Renewal

Sealed bids for the above project, addressed to Purchasing office, City Hall, Room 103, 389 Congress Street, Portland, Maine 04101, and clearly marked on the outside of the envelope with the name of the bidder, project title and bid number, will be received **until 3:00 PM on Thursday, September 7, 2017**, at which time they will be publicly opened. Late, unsigned bids or bids submitted electronically shall not be accepted. Bids shall remain open to acceptance for ninety (90) days from their opening. Each bid shall be submitted on the forms provided and in an envelope plainly marked on the outside with the bid's title and number. Bids from vendors not registered with the Purchasing Office may be rejected; receipt of this document directly from the City of Portland indicates registration. Should a vendor receive this Request from a source other than the City, please contact 207-874-8654 to ensure that your firm is listed as a vendor for this Bid.

Location: Located on the following streets:

- Walnut Street, beginning at the Washington Avenue intersection, for approximately 600 feet to the North Street intersection.
- North Street, beginning at the Walnut Street intersection for approximately 450 feet to the Melbourne Street intersection.
- Washington Avenue, beginning at Fox Street intersection for approximately 1600 feet to the Cumberland Avenue intersection.

OUTLINE OF WORK: The project involves the sewer and storm drain separation for the aforementioned streets as part of an ongoing agreement between the City of Portland and the Maine Department of Environmental Protection (DEP).

Walnut Street and North Street includes the following work:

1. Full depth reconstruction of Walnut Street and North Street within the project limits.
2. Installation and replacement of approximately 1,150 linear feet of storm drain and 1,000 linear feet of sewer, respectively.
3. Reconstruction of the pedestrian ramps at the intersection of Walnut Street and North Street to meet ADA standards.

Washington Avenue includes the following work:

1. Road restoration of Washington Avenue within the project limits.
2. Installation and replacement of approximately 600 linear feet of storm drain and 1,000 linear feet of sewer, respectively
3. Construction of the pedestrian ramps/bump-outs at Fox Street and Monroe Street.

Water renewal includes the following work:

1. Renewal of approximately 2,560 linear feet of 12-inch water main, 450 linear feet of 8 inch water main, and service renewals and appurtenances on Washington Ave, Walnut Street, and North Street.

Bid Notes:

Contract shall be awarded to the responsible bidder whose bid, complying with conditions and requirements provided in this Notice and bid form, is the **lowest total bid** as identified on the total bid form which will be the total sum from the SRF bid form and the PWD bid form.

The Contractor is required to complete all utility pipe work with binder course pavement by December 1, 2017. Final Surface paving must be complete by July 1, 2018 and the entire project ready for owner acceptance.

The contactor shall coordinate, cooperate and schedule all work between the City of Portland and Portland Water District to ensure sewer separation work and water renewal work is completed in accordance with both the City of Portland and Portland Water District requirements.

MANDATORY PRE-BID CONFERENCE

A MANDATORY PRE-BID MEETING WILL BE HELD IN CONFERENCE ROOM 24, LOCATED NEAR THE MYRTLE STREET ENTRANCE OF PORTLAND CITY HALL, 389 CONGRESS STREET, PORTLAND, MAINE ON THURSDAY, AUGUST 24, 2017 AT 10:00 A.M. Firms not represented at this meeting or firms arriving late to this meeting will not be allowed to bid on this project. For your convenience, you may parking in the Elm Street Parking Garage and get your parking stamp validated here at City Hall.

This Project is being funded in part by the Clean Water State Revolving Loan Fund Administered by the Maine DEP and the Maine Municipal Bond Bank. As such, the following additional requirements will apply to the contract:

BID BOND

A bid must be accompanied by Bid security made payable to the City in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 60 days after receipt of bids unless released by the Owner.

SRF DISADVANTAGED BUSINESS ENTERPRISES PROGRAM

The contractor must comply with the Disadvantaged Business Enterprises (DBE) SRF special requirements contained in the CWSRF Supplementary Conditions.

FEDERAL REQUIREMENTS

The contractor must comply with all Federal Requirements per the CWSRF Supplementary Conditions, including submittal of pre-award certification regarding Lobbying.

DAVIS-BACON AND RELATED ACTS

The contractor must comply with Davis-Bacon (DB) and Davis-Bacon Related Acts (DBRA) as stated in the CWSRF Supplementary Conditions. All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in the bidding documents. Any laborers and mechanics not listed in the wage determination shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in the bidding documents.

AMERICAN IRON AND STEEL

The Contractor shall comply with the Use of American Iron and Steel requirements on this project.

GENERAL INFORMATION

Plans, specifications and proposal forms are available by contacting the Purchasing Office either by phone 207-874-8654, fax 207-874-8652 or e-mail jrl@portlandmaine.gov. Plans and proposal books are also available electronically. Each prospective bidder will be required to obtain from the City each copy of the proposal form and plan set. Partial sets will not be issued.

Bids from vendors not registered with the Purchasing Office may be rejected; receipt of this document directly from the City of Portland indicates registration. Should a vendor receive this Invitation from a source other than the City, please contact 207-874-8654 to ensure that your firm is listed as a vendor for this bid.

It is the custom of the City of Portland, Maine, to pay its bills 30 days after completion and acceptance of the work, and the receipt of properly documented invoices for that work covered under the contract. In submitting applications under these specifications, applicants should take into account all discounts, both trade and time, allowed in accordance with this payment policy and quote a net price.

CITY OF PORTLAND, MAINE by: Office of Budget & Purchasing

NOTICE TO BIDDERS

Bid No. 18009
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

Project Name: Madison, Walnut, Washington Sewer Separation

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Location: Located on the following streets:

- Walnut Street, beginning at the Washington Avenue intersection, for approximately 600 feet to the North Street intersection.
- North Street, beginning at the Walnut Street intersection for approximately 450 feet to the Melbourne Street intersection.
- Washington Avenue, beginning at Fox Street intersection for approximately 1600 feet to the Cumberland Avenue intersection.

OUTLINE OF WORK: The project involves the sewer and storm drain separation for the aforementioned streets as part of an ongoing agreement between the City of Portland and the Maine Department of Environmental Protection (DEP).

Walnut Street and North Street includes the following work:

1. Full depth reconstruction of Walnut Street and North Street within the project limits.
2. Installation and replacement of approximately 1,100 linear feet of storm drain and 1,000 linear feet of sewer, respectively.
3. Reconstruction of the pedestrian ramps at the intersection of Walnut Street and North Street to meet ADA standards.

Washington Avenue includes the following work:

4. Road restoration of Washington Avenue within the project limits.
5. Installation and replacement of approximately 600 linear feet of storm drain and 1,000 linear feet of sewer, respectively
6. Construction of the pedestrian ramps/bump-outs at Fox Street and Monroe Street.

Water renewal includes the following work:

1. Renewal of approximately 2,560 linear feet of 12-inch water main, 450 linear feet of 8 inch water main, and service renewals and appurtenances on Washington Ave, Walnut Street, and North Street.

MANDATORY PRE-BID CONFERENCE

A MANDATORY PRE-BID MEETING WILL BE HELD IN CONFERENCE ROOM 24, LOCATED NEAR THE MYRTLE STREET ENTRANCE OF PORTLAND CITY HALL, 389 CONGRESS STREET, PORTLAND, MAINE ON THURSDAY, AUGUST 24, 2017 AT 10:00 A.M. Firms not represented at this meeting or firms arriving late to this meeting will not be allowed to bid on this project. For your convenience, you may parking in the Elm Street Parking Garage and get your parking stamp validated here at City Hall.

BID BOND

A bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 60 days after receipt of bids unless released by the Owner.

AGENCY NOT A PARTY

This contract is expected to be funded in whole or in part by the State of Maine Department of Environmental Protection (DEP) Clean Water State Revolving Loan Fund (CWSRF) program. Neither the State of Maine nor any of its departments, agencies, or employees is or will be a party to this contract. The word "agency" in the contract documents refers to the DEP and all other involved funding agencies.

PERFORMANCE AND PAYMENT BOND

The successful bidder must submit Performance and Payment Bonds to the City prior to contract award. Detail information can be found in the General Conditions.

INSURANCE

The Successful Contractor will procure and maintain Automobile Insurance and General Public Liability Insurance coverage in amounts of not less than Four Hundred Thousand Dollars ($400,000.00) per occurrence for bodily injury, death and property damage, naming the City as an additional insured thereon, and also Workers' Compensation Insurance coverage to the extent required by law. With respect to the General Liability and Automobile Liability Insurance, the Successful Contractor shall name the City as an additional insured for coverage only in those areas where government immunity has been expressly waived by 14 M.R.S. A. § 8104-A, as limited by § 8104-B, and § 8111. This provision shall not be deemed a waiver of any defenses, immunities or limitations of liability or damages available under the Maine Tort Claims Act, other Maine statutory law, judicial precedent or common law. With respect to the Liability Insurance, the Successful Contractor will provide the City a certificate of insurance evidencing such coverage, in this way: certificate must say either: A) "the policy has been endorsed to name the City of Portland as an Additional Insured" and a copy of the endorsement must come to the City of Portland with the certificate, or B) "the policy already includes an endorsement, such as the General Liability Extension Endorsement, by which the City of Portland is automatically made an additional insured." A Certificate which merely has a box checked under "Addl Insr," or the like, or which merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. The Successful Contractor shall furnish the City and thereafter maintain certificates evidencing all such coverages, which certificates shall guarantee thirty (30) days' notice to the City of termination of insurance from insurance provider or agent.

BASIS OF AWARD

Contract shall be awarded to the responsible bidder whose bid, complying with conditions and requirements provided in this Notice and bid form, is the lowest total bid as identified on the total bid form.

CONTRACT TIME

All utility work done in 2017 shall be complete and street shall be base paved by December 1, 2017. Remaining utility work shall be complete by June 30, 2018. Final Paving shall be complete after utility work has had a winter cycle: 2018 or 2019.

TAXES

The City is exempt from Maine state sales and use taxes on all materials to be incorporated in the work. Said taxes shall not be included in the bid. Detailed information can be found in the General Conditions and the CWSRF General Conditions.

AMERICAN IRON AND STEEL

The Contractor shall comply with the Use of American Iron and Steel in accordance with Public Law 113-76, Section 436. The law and its requirements and guidance, including certification forms, can be found in the SRF supplementary conditions.

SRF DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 40 CFR part 33, Disadvantaged Business Enterprises (DBE), in the award and administration of subcontracts. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

1. During the bidding period, the Contractor is required to make the good faith efforts as described in the CWSRF Supplementary Conditions if they will be awarding subcontracts. Contractors should initiate solicitation efforts early in the bidding period.

2. The Contractor must comply with the following provisions when submitting their bid:

   (a) The contractor must complete and submit EPA Form 6100–4, 'DBE Program Subcontractor Utilization Form' (**copy attached**) as part of the prime contractor's bid or proposal package to the Owner. Note, only DBE subcontractors should be listed. If no DBE subcontractors are to be used, the contractor must still complete and submit the form.

   (b) The contractor must have each of its proposed DBE subcontractors complete the EPA Form 6100–3, 'DBE Program Subcontractor Performance Form' (**copy attached**). The completed forms must be submitted as part of the prime contractor's bid or proposal package to the Owner.

3. Prior to contract award, as the Successful Bidder, the Contractor must comply with the following provisions:

   (a) The contractor must submit to the Owner documentation of its good faith efforts (such as copies of solicitation letters and emails) and data relied upon in formulating its fair share objectives. Solicitation documentation must include proof of receipt. The records must be submitted to the Owner even if the goals were met.

(b) The contractor must submit to the Owner a bidders list of all firms that bid or quote on subcontracts, including both MBE/WBEs and non-MBE/WBEs. The purpose of a bidders list is to provide contractors who conduct competitive bidding with as accurate a database as possible about the universe of MBE/WBE and non-MBE/WBE subcontractors. The list must include the following information:

(1) Entity's name with point of contact;
(2) Entity's mailing address, telephone number, and e-mail address;
(3) The procurement on which the entity bid or quoted, and when; and
(4) Entity's status as an MBE/WBE or non-MBE/WBE.

Additional information and forms may be found in the CWSRF Supplementary Conditions.

SUSPENSION AND DEBARMENT

The eligibility of successful bidder will be verified through the federal government's Excluded Parties List System prior to Maine Department of Environmental Protection approval of the contract award. Furthermore, by entering into the contract, the contractor shall certify that no part of the contract shall be subcontracted to a Debarred or Suspended person or firm. Detailed information may be found in the CWSRF Supplementary Conditions.

RESTRICTIONS ON LOBBYING

The successful bidder must submit certification regarding Lobbying (EPA form 6600-06) to the Owner prior to contract award. If applicable, the contractor shall also complete and submit the Disclosure of Lobbying Activities form (EPA Standard Form LLL) to the Owner prior to contract award. Detailed information and forms can be found in the CWSRF Supplementary Conditions.

DAVIS-BACON AND RELATED ACTS

The contractor must comply with Davis-Bacon (DB) and Davis-Bacon Related Acts (DBRA). All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in these bidding documents. Any laborers and mechanics not listed in the wage determination but employed by the contractor and subcontractors on this project shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in these bidding documents. A form 1444 submission will be required to obtain additional employee rate classifications, after contract award. No allowances or extra considerations on behalf of any contractor or subcontractor will be permitted subsequently by reason of error or oversight on account of Department of Labor wage determinations. The contractor and subcontractors shall pay all employees weekly. The contractor and subcontractors shall submit weekly certified payrolls to the owner or designated representative, including a payroll summary with signed certification form WH-347. Detailed information and forms can be found in the CWSRF Supplementary Conditions.

FEDERAL REQUIREMENTS

The contractor must comply with all Federal requirements found in the CWSRF Supplementary Conditions.

STATE MINIMUM WAGES

All laborers and mechanics employed or working upon the construction site of the project shall be paid not less than the prevailing State minimum wage rate regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

BID PROTESTS

All protests arising from the Owner's procurement practices must be submitted to the Owner as soon as practical. The Owner will investigate the basis for the protest, seek the advice of legal counsel, document all meetings and actions, and attempt to resolve the protest promptly and equitably.

COORDINATION OF CITY AND PWD RENEWAL WORK

Bidders are required to complete the Portland Water District bid forms as provided in the Portland Water District Contract Documents. The selected Contractor will be required to enter into a separate contract with the Portland Water District and shall complete the required work in accordance with the Portland Water District Contract documents. The contactor shall coordinate, cooperate and schedule all work between the City of Portland and Portland Water District to ensure sewer separation work and water renewal work is completed in accordance with both the City of Portland and Portland Water District requirements.

The contractor shall be responsible for any and all work requirements including any specialized work requirements necessary for project construction which shall be considered incidental to the construction cost.

SUBMISSION OF BIDS

All Bids shall be submitted on the attached form and are to remain open for sixty (60) days after their opening. Late bids, bids without the required amount or form of surety, bids not signed and facsimile bids will not be accepted.

REJECTION OF BID

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees. Bidders who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset which shall be established by the contract which shall be issued to the successful bidder.

EQUAL OPPORTUNITY PROVISIONS

Vendor shall comply fully with the Nondiscrimination and Equal Opportunity Provisions of the Workforce Investment Act of 1998, as amended (WIA, 29 CFR part 37); the Nontraditional Employment for Women Act of 1991; title VI of the Civil Rights Act of 1964, as amended; section 504 of the Rehabilitation Act of 1973, as amended; the Age Discrimination Act of 1975, as amended; title IX of the Education Amendments of 1972, as amended; and with all applicable requirements imposed by or pursuant to regulations implementing those laws, including but not limited to 29 CFR part 37.

LIEN WAIVERS

Prior to any payment by the City, the Contractor may be required to supply the City with a Waiver of Lien – Material and Labor for the total awarded contract cost, guaranteeing payment in full for all labor and materials used or required in connection with the work described in this bid. The City may also require waivers of lien, signed by individual subcontractors and materials suppliers, with requests for progress payments.

Any mechanic's lien or any other lien which may be filed against the premises which are the subject of the contract by reason of the work described herein shall be defended (by counsel reasonably acceptable to the City) and promptly discharged by the Contractor at its own expense. If the Contractor should fail either to defend the City against the lien or to discharge it, then the City may do so at the Contractor's expense. In the event of such an undertaking by the City, the Contractor will promptly

reimburse the City for all its costs and expenses in so doing including, but not limited to, reimbursement of the City's reasonable counsel fees and costs which may be incurred by it in substituting a bond in place of the lien.

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees. Bidders who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset which shall be established by the contract which shall be issued to the successful bidder.

It is the custom of the City of Portland, Maine to pay its bills 30 days following equipment delivery and acceptance, and following the receipt of correct invoices for all items covered by the purchase order. If your organization prefers to receive payment via electronic transfer rather than by check, please see the web link below* and include that EFT form with your bid submission. In submitting bids under these specifications, bidders should take into account all discounts; both trade and time allowed in accordance with this payment policy and quote a net price. The City is exempt from the State's sales and use tax as well as all Federal excise taxes.

* http://www.portlandmaine.gov/DocumentCenter/Home/View/817

CONTRACTOR RESPONSIBILITIES

The Contractor shall furnish all labor, materials, fixtures, supplies, equipment and transportation necessary to do the work as specified. Work shall be conducted in an orderly manner and all work shall be performed in accordance with best trade policy and in conformance with pertinent OSHA, Local, State and Federal Government regulations. Contractors will be responsible for acquiring all necessary permits, licenses and pay all associated fees (including dump disposal fees and disposal taxes, if applicable), unless otherwise specified herein.
The Contractor shall erect, and maintain at all times, any and all safeguards necessary for the protection of life and property of all maritime, pedestrian and vehicular traffic, where applicable.

GENERAL INFORMATION

All questions shall be directed in writing ONLY to the Purchasing Office at the above address and be received at least five business days prior to the bid opening date (FAX 207-874-8652, or E-mail jrl@portlandmaine.gov). Questions received after this time will not be addressed. Responses from the City that substantially alter this bid will be issued in the form of a written addendum to all bid holders registered in the Purchasing Office. Oral explanations or interpretations given before the award of the contract will not be binding.

DISCLAIMER

The City disclaims any and all responsibility for injury to contractors, their agents or others while examining the job or at any other time.

August 14, 2017

Matthew Fitzgerald
Purchasing Manager

BID

Bid No.18009

CITY OF PORTLAND, MAINE

DEPARTMENT OF PUBLIC WORKS

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Proposal of _____

Name

Address _____

The name and address shown on the above lines shall be the official name and address of the person, partnership or corporation submitting this bid and shall agree with the "Signature of Bidder" in the case of an individual, the "Name of Firm or Partnership" in the case of a firm or partnership, or the "Name of Bidder" in the case of a corporation.

TO: Matthew Fitzgerald, Purchasing Manager
City Hall, Room 103
389 Congress Street
Portland, ME 04101

Dear Mr. Fitzgerald:

The undersigned, having carefully examined the site of the work, the Plans, the Standard Specifications, including all current amendments or revisions thereof, the Supplemental Specifications, Special Provisions, Contract Agreement and Contract Bonds contained herein for the MADISON, WALNUT, WASHINGTON SEWER SEPARATION PROJECT, do(es) hereby propose and offer to enter into a contract to supply all the materials, tools, equipment and labor required to perform and construct the whole of the work in strict accordance with the terms and conditions of this contract at the unit prices stated in the following “Schedule of Items” submitted by the undersigned.

This Bid may be accepted by the City of Portland at any time within sixty (60) calendar days after opening of the bids.

(Fill out prices in ink, in writing and in figures; in case of a discrepancy between prices in writing and prices in figures, the writing shall govern. In case of discrepancy between total of items and total of bid amount stated, total of items shall govern. Use the pages in this document when submitting proposal and submit contract document intact.)

Any pay items with quantities marked with an asterisk (*) on the bid sheets are not anticipated at time of bid and therefore are indeterminate. These items are part of the Contract Proposal and will also be used should any extra work be necessary. Actual quantities will be measured in the field or calculated from the contract drawings. The unit bid prices will be used to calculate payment amounts regardless of final quantities.

SAMPLE SOLICITATION LETTER TO MBE/WBE FIRMS *(See *)*

Date: _____

From: _____ (Name of Contractor)

_____ _____
(Street Address) (Fax #)

_____ _____
(City, State and Zip Code) (E-mail Address)

To: _____ (Name of MBE or WBE firm)

_____ _____
(Street Address of MBE or WBE firm) (Fax #)

_____ _____
(City, State and Zip Code) (E-mail Address)

Please be advised that the City of Portland, Maine; Department of Public Works, has solicited contractor's bids for the construction of the Project: _____
(Project Name)

The City of Portland will open bids for said project on: _____
(Bid Opening Date)

We hereby invite you and solicit from you, as an MBE or WBE subcontractor and/or materialman, a sub-bid and/or materials price quote for all labor, services and/or materials which you are capable of providing to us for said project. We expect the amount of any such sub-bid and/or materials price quote to be both reasonable and competitive or we will not accept it.

Our name, business address and phone number are shown above. You may review the plans, specifications and other pertinent Contract Documents at our offices at above address at any time, during usual business hours, prior to the bid opening date.

We must receive your sub-bid and/or materials price quote, in writing, early enough, prior to the bid opening date, to permit us to reasonable review it and to act upon it.

If you need any information pertaining to the project or to a sub-bid and/or materials price quote to be submitted, please contact:

_____at our offices during
usual business hours. (Contact & Phone Number)

* If letter is mailed it must be sent USPS Certified Mail

Please respond by fax or email back to this office as soon as possible.

_____ ___will ___will not be bidding on the above referenced project.
(Name of Bidder)

By: _____
(Signature) (Printed Name) (Date)

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	**Quantity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
202.21	SY 1700	REMOVE COBBLESTONES (W/ CONCRETE BASE), RAILROAD RAILS, AND RAILROAD TIES @_____ _____ Per Square Yard				
202.211	SY 4600	REMOVE COBBLESTONES (W/ CONCRETE BASE), RAILROAD RAILS, AND RAILROAD TIES – NON SRF @_____ _____ Per Square Yard				
202.15	EA 3	REMOVE EXISTING MANHOLE OR CATCH BASIN @_____ _____ Per Each				
202.16	LF 130	REMOVE EXISTING PIPE @_____ _____ Per Linear Foot				
202.20	SY 4350	REMOVE BITUMINOUS CONCRETE PAVEMENT @_____ _____ Per Square Yard				
202.201	SY 3900	REMOVE BITUMINOUS CONCRETE PAVEMENT – NON SRF @_____ _____ Per Square Yard				
203.20	CY 150	COMMON EXCAVATION @_____ _____ Per Cubic Yard				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	**Quantity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
203.201	CY 1400	COMMON EXCAVATION – NON SRF @_____ _____ Per Cubic Yard				
203.25*	CY 1050	GRANULAR BORROW @_____ _____ Per Cubic Yard				
203.28	VF 15	TEST PIT EXCAVATION @_____ _____ Per Vertical Foot				
203.31*	CY 100	CRUSHED STONE 703.31 – TYPE "A" (OVERDEPTH) @_____ _____ Per Cubic Yard				
206.061*	CY 100	EARTH EXCAVATION, BELOW GRADE (OVERDEPTH) @_____ _____ Per Cubic Yard				
206.07*	CY 100	STRUCTURAL ROCK EXCAVATION @_____ _____ Per Cubic Yard				
304.09	CY 430	AGGREGATE BASE COURSE – TYPE B @_____ _____ Per Cubic Yard				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
304.091	CY 830	AGGREGATE BASE COURSE – TYPE B – NON SRF @_____ _____ Per Cubic Yard				
304.10	CY 1400	AGGREGATE SUBBASE COURSE - TYPE D @_____ _____ Per Cubic Yard				
304.101	CY 2100	AGGREGATE SUBBASE COURSE - TYPE D – NON SRF @_____ _____ Per Cubic Yard				
403.207	T 630	HOT MIX ASPHALT 19.0 MM NOMINAL MAXIMUM SIZE @_____ _____ Per Ton				
403.2071	T 640	HOT MIX ASPHALT 19.0 MM NOMINAL MAXIMUM SIZE – NON SRF @_____ _____ Per Ton				
403.208	T 180	HOT MIX ASPHALT 12.5 MM NOMINAL MAXIMUM SIZE @_____ _____ Per Ton				
403.2081	T 430	HOT MIX ASPHALT 12.5 MM NOMINAL MAXIMUM SIZE – NON SRF @_____ _____ Per Ton				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
403.210	T 150	HOT MIX ASPHALT 9.5 MM NOMINAL MAXIMUM SIZE @_____ _____ Per Ton				
462.30	SY 2000	ULTRATHIN BONDED WEARING COURSE – NON SRF @_____ _____ Per Square Yard				
502.65	CY 6	FLOWABLE CONCRETE FILL @_____ _____ Per Cubic Yard				
603.132	LF 18	10 INCH SANITARY SEWER PIPE @_____ _____ Per Linear Foot				
603.133	LF 490	12 INCH SANITARY SEWER PIPE @_____ _____ Per Linear Foot				
603.1331	LF 590	12 INCH POLYETHYLENE SANITARY SEWER PIPE @_____ _____ Per Linear Foot				
603.135	LF 930	18 INCH SANITARY SEWER PIPE @_____ _____ Per Linear Foot				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
603.137	LF	24 INCH SANITARY SEWER PIPE @_____				
	27	_____ Per Linear Foot				
603.153	LF	10 INCH STORM DRAIN PIPE @_____				
	400	_____ Per Linear Foot				
603.159	LF	12 INCH STORM DRAIN PIPE @_____				
	800	_____ Per Linear Foot				
603.1591	LF	12 INCH POLYETHYLENE STORM DRAIN PIPE @_____				
	300	_____ Per Linear Foot				
603.169	LF	15 INCH STORM DRAIN PIPE @_____				
	91	_____ Per Linear Foot				
603.1691	LF	15 INCH POLYETHYLENE STORM DRAIN PIPE @_____				
	250	_____ Per Linear Foot				
603.179	LF	18 INCH STORM DRAIN PIPE @_____				
	150	_____ Per Linear Foot				
603.99	EA	TRENCH DAM AND DRAIN @_____				
	9	_____ Per Each				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
604.072	EA 23	4 FOOT DIAMETER CATCH BASIN @_____ _____ Per Each				
604.15	EA 38	4 FOOT DIAMETER MANHOLE @_____ _____ Per Each				
604.167	EA 2	ALTER CATCH BASIN FRAME AND GRATE TO CASCADE @_____ _____ Per Each				
604.18	EA 3	ADJUSTING MANHOLE OR CATCH BASIN TO GRADE @_____ _____ Per Each				
604.19	EA 1	CORE INLET/OUTLET PIPE HOLE IN CATCH BASIN OR MANHOLE @_____ _____ Per Each				
608.08	SY 23	REINFORCED CONCRETE SIDEWALK @_____ _____ Per Square Yard				
608.081	SY 65	REINFORCED CONCRETE SIDEWALK – NON SRF @_____ _____ Per Square Yard				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
608.082	SY	REINFORCED CONCRETE DRIVEWAY – NON SRF				
	60	@_____ _____ Per Square Yard				
608.120	SY	BITUMINOUS DRIVEWAY APRON - NON SRF				
	300	@_____ _____ Per Square Yard				
608.15	SY	BRICK SIDEWALK W/ BITUMINOUS BASE				
	250	@_____ _____ Per Square Yard				
608.151	SY	BRICK SIDEWALK W/ BITUMINOUS BASE – NON SRF				
	1100	@_____ _____ Per Square Yard				
608.160	SY	BRICK DRIVEWAY W/ BITUMINOUS BASE – NON SRF				
	210	@_____ _____ Per Square Yard				
608.26	SF	CURB RAMP DETECTABLE WARNING FIELD				
	10	@_____ _____ Per Square Foot				
608.261	SF	CURB RAMP DETECTABLE WARNING FIELD – NON SRF				
	160	@_____ _____ Per Square Foot				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
609.11	LF 350	TYPE 1 VERTICAL CURB @_____ _____ Per Linear Foot				
609.111	LF 660	TYPE 1 VERTICAL CURB – NON SRF @_____ _____ Per Linear Foot				
609.1113	LF 110	SPECIAL GRANITE CURB, 12” REVEAL – NON SRF @_____ _____ Per Linear Foot				
609.120	LF 280	TYPE 1 VERTICAL CURB (CIRCULAR) - NON SRF @_____ _____ Per Linear Foot				
609.234	EA 32	TERMINAL CURB TYPE 1 – 4 FOOT – NON SRF @_____ _____ Per Each				
609.237	EA 6	TERMINAL CURB TYPE 1 – 7 FOOT – NON SRF @_____ _____ Per Each				
609.2371	EA 5	TERMINAL CURB TYPE 1 – 7 FOOT – CIRCULAR - NON SRF @_____ _____ Per Each				

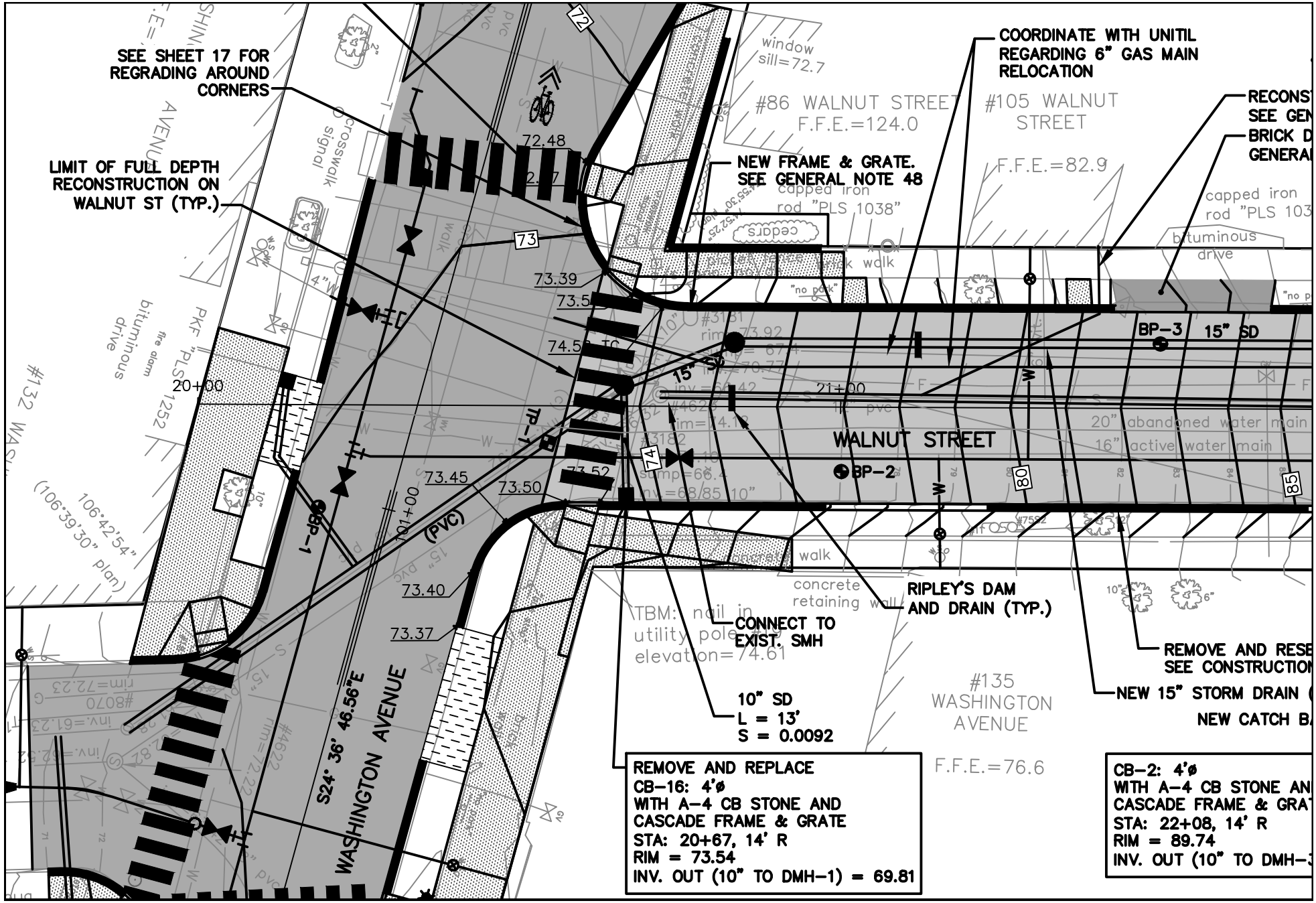
MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	**Quantity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
609.38	LF 1050	REMOVE AND RESET CURB TYPE 1 @_____ _____ Per Linear Foot				
609.381	LF 1150	REMOVE AND RESET CURB TYPE 1 – NON SRF @_____ _____ Per Linear Foot				
609.441	LF 300	CURBING REMOVED AND STACKED – NON SRF @_____ _____ Per Linear Foot				
614.14	EA 6	MASONRY PLUG @_____ _____ Per Each				
615.07	SY 30	LOAM, SEED, AND MULCH @_____ _____ Per Square Yard				
615.071	SY 1100	LOAM, SEED, AND MULCH – NON SRF @_____ _____ Per Square Yard				
627.733	LF 2900	4" WHITE OR YELLOW PAVEMENT & CURB MARKING LINE @_____ _____ Per Linear Foot				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
627.75	SF 2050	WHITE OR YELLOW PAVEMENT & CURB MARKINGS @_____ _____ Per Square Foot				
627.76	LS 1	TEMPORARY PAVEMENT MARKING LINE, WHITE OR YELLOW @_____ _____ Per Lump Sum				
629.05*	HR 20	HAND LABOR, STRAIGHT TIME @_____ _____ Per Hour				
629.06*	HR 20	MASON, STRAIGHT TIME @_____ _____ Per Hour				
631.12*	HR 20	ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR) @_____ _____ Per Hour				
631.13*	HR 20	BULLDOZER (INCLUDING OPERATOR) @_____ _____ Per Hour				
631.15*	HR 20	ROLLER EARTH BASE CRS (INCLUDING OPERATOR) @_____ _____ Per Hour				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
631.172*	HR 20	TRUCK-LARGE (INCLUDING OPERATOR) @_____ _____ Per Hour				
631.22*	HR 20	FRONT END LOADER (INCLUDING OPERATOR) @_____ _____ Per Hour				
631.36*	HR 20	FOREMAN, STRAIGHT TIME @_____ _____ Per Hour				
632.04*	EA 45	FOUR INCH AND SIX INCH WYE SANITARY/STORM DRAIN PIPE SECTIONS @_____ _____ Per Each				
632.041*	EA 25	FOUR INCH AND SIX INCH INSERTA TEE SANITARY/STORM DRAIN PIPE SECTIONS @_____ _____ Per Each				
633.04*	LF 2100	FOUR INCH AND SIX INCH SANITARY/STORM DRAIN HOUSE LATERALS @_____ _____ Per Linear Foot				
643.62	EA 4	RECTANGULAR RAPID FLASHING BEACON - NON SRF @_____ _____ Per Each				

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	**Quantity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
643.621	EA 4	REMOVE EXISTING BEACON AND FOUNDATION - NON SRF @_____ _____ Per Each				
652.36*	LS 1	MAINTENANCE OF TRAFFIC CONTROL @_____ _____ Per Lump Sum				
654.08	EA 40	DENSITY TEST @_____ _____ Per Each				
656.75*	LS 1	TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL @_____ _____ Per Lump Sum				
Total of SRF/Non-SRF Improvements Bid Written in Numbers			**$**			
Total of PWD Improvements Bid Written in Numbers			**$**			
TOTAL: BASIS OF AWARD			**$**			

Any pay items with quantities marked with an asterisk (*) on the bid sheets are not anticipated at time of bid and therefore are indeterminate. These items are part of the Contract Proposal and will also be used should any extra work be necessary. Actual quantities will be measured in the field or calculated from the contract drawings. The unit bid prices will be used to calculate payment amounts regardless of final quantities.



Design: OCC		Date: AUG 2017	
Draft: LAN		Job No.: 2835.13	
Checked: WCH		Scale: 1"=20'	
File Name: 2835.13-PBASE.dwg			

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Drawing Name: Revised Grading (Sheet 12 Of 38)

Project: MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Figure SK-1

EXHIBIT B

Bid #18009

BID

Bid No.18009

CITY OF PORTLAND, MAINE

DEPARTMENT OF PUBLIC WORKS

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Proposal of D+C CONSTRUCTION COMPANY, INC.
Name

Address P.O. BOX 123 WATERBORO, ME. 04087

The name and address shown on the above lines shall be the official name and address of the person, partnership or corporation submitting this bid and shall agree with the "Signature of Bidder" in the case of an individual, the "Name of Firm or Partnership" in the case of a firm or partnership, or the "Name of Bidder" in the case of a corporation.

TO: Matthew Fitzgerald, Purchasing Manager
City Hall, Room 103
389 Congress Street
Portland, ME 04101

Dear Mr. Fitzgerald:

The undersigned, having carefully examined the site of the work, the Plans, the Standard Specifications, including all current amendments or revisions thereof, the Supplemental Specifications, Special Provisions, Contract Agreement and Contract Bonds contained herein for the MADISON, WALNUT, WASHINGTON SEWER SEPARATION PROJECT, do(es) hereby propose and offer to enter into a contract to supply all the materials, tools, equipment and labor required to perform and construct the whole of the work in strict accordance with the terms and conditions of this contract at the unit prices stated in the following "Schedule of Items" submitted by the undersigned.

This Bid may be accepted by the City of Portland at any time within sixty (60) calendar days after opening of the bids.

(Fill out prices in ink, in writing and in figures; in case of a discrepancy between prices in writing and prices in figures, the writing shall govern. In case of discrepancy between total of items and total of bid amount stated, total of items shall govern. Use the pages in this document when submitting proposal and submit contract document intact.)

Any pay items with quantities marked with an asterisk (*) on the bid sheets are not anticipated at time of bid and therefore are indeterminate. These items are part of the Contract Proposal and will also be used should any extra work be necessary. Actual quantities will be measured in the field or calculated from the contract drawings. The unit bid prices will be used to calculate payment amounts regardless of final quantities.

SAMPLE SOLICITATION LETTER TO MBE/WBE FIRMS *(See *)*

Date: _____

From: _____ (Name of Contractor)

_____ (Street Address) _____ (Fax #)

_____ (City, State and Zip Code) _____ (E-mail Address)

To: _____ (Name of MBE or WBE firm)

_____ (Street Address of MBE or WBE firm) _____ (Fax #)

_____ (City, State and Zip Code) _____ (E-mail Address)

Please be advised that the City of Portland, Maine; Department of Public Works, has solicited contractor's bids for the construction of the Project: _____ (Project Name)

The City of Portland will open bids for said project on: _____ (Bid Opening Date)

We hereby invite you and solicit from you, as an MBE or WBE subcontractor and/or materialman, a sub-bid and/or materials price quote for all labor, services and/or materials which you are capable of providing to us for said project. We expect the amount of any such sub-bid and/or materials price quote to be both reasonable and competitive or we will not accept it.

Our name, business address and phone number are shown above. You may review the plans, specifications and other pertinent Contract Documents at our offices at above address at any time, during usual business hours, prior to the bid opening date.

We must receive your sub-bid and/or materials price quote, in writing, early enough, prior to the bid opening date, to permit us to reasonable review it and to act upon it.

If you need any information pertaining to the project or to a sub-bid and/or materials price quote to be submitted, please contact:

_____at our offices during usual business hours. (Contact & Phone Number)

* If letter is mailed it must be sent USPS Certified Mail

Please respond by fax or email back to this office as soon as possible.

_____ (Name of Bidder) ___will ___will not be bidding on the above referenced project.

By: _____

(Signature) (Printed Name) (Date)

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
202.21	SY 1700	REMOVE COBBLESTONES (W/ CONCRETE BASE), RAILROAD RAILS, AND RAILROAD TIES @ SEVENTEEN DOLLARS Per Square Yard 00/100	17.	00	28,900.	00
202.211	SY 4600	REMOVE COBBLESTONES (W/ CONCRETE BASE), RAILROAD RAILS, AND RAILROAD TIES – NON SRF @ SEVENTEEN DOLLARS Per Square Yard 00/100	17.	00	78,200.	00
202.15	EA 3	REMOVE EXISTING MANHOLE OR CATCH BASIN @ FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	1,500.	00
202.16	LF 130	REMOVE EXISTING PIPE @ TEN DOLLARS Per Linear Foot 00/100	10.	00	1,300.	00
202.20	SY 4350	REMOVE BITUMINOUS CONCRETE PAVEMENT @ ONE DOLLAR, EIGHTY FIVE CENTS Per Square Yard	1.	85	8,047.	50
202.201	SY 3900	REMOVE BITUMINOUS CONCRETE PAVEMENT – NON SRF @ ONE DOLLAR, EIGHTY FIVE CENTS Per Square Yard	1.	85	7,215.	00
203.20	CY 150	COMMON EXCAVATION @ ELEVEN DOLLARS Per Cubic Yard 00/100	11.	00	1,650.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
203.201	CY 1400	COMMON EXCAVATION – NON SRF @ ELEVEN DOLLARS Per Cubic Yard 00/100	11.	00	15,400	00
203.25*	CY 1050	GRANULAR BORROW @ ONE CENT Per Cubic Yard		.01	10.	50
203.28	VF 15	TEST PIT EXCAVATION @ FIFTY DOLLARS Per Vertical Foot 00/100	50.	00	750.	00
203.31*	CY 1000	CRUSHED STONE 703.31 – TYPE "A" (OVERDEPTH) @ ONE CENT Per Cubic Yard		.01	1.	00
206.061*	CY 100	EARTH EXCAVATION, BELOW GRADE (OVERDEPTH) @ ONE CENT Per Cubic Yard		.01	1.	00
206.07*	CY 100	STRUCTURAL ROCK EXCAVATION @ ONE CENT Per Cubic Yard		.01	1.	00
304.09	CY 430	AGGREGATE BASE COURSE – TYPE B @ THIRTY SIX DOLLARS Per Cubic Yard 00/100	36.	00	15,480.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
304.091	CY 830	AGGREGATE BASE COURSE – TYPE B – NON SRF @ THIRTY SIX DOLLARS Per Cubic Yard 00/100	36.	00	29,880.	00
304.10	CY 1400	AGGREGATE SUBBASE COURSE - TYPE D @ TWENTY FIVE DOLLARS Per Cubic Yard 00/100	25.	00	35,000.	00
304.101	CY 2100	AGGREGATE SUBBASE COURSE - TYPE D – NON SRF @ TWENTY FIVE DOLLARS Per Cubic Yard 00/100	25.	00	52,500	00
403.207	T 630	HOT MIX ASPHALT 19.0 MM NOMINAL MAXIMUM SIZE @ NINETY SIX DOLLARS Per Ton 00/100	96.	00	60,480.	00
403.2071	T 640	HOT MIX ASPHALT 19.0 MM NOMINAL MAXIMUM SIZE – NON SRF. @ NINETY SIX DOLLARS Per Ton 00/100	96.	00	61,440.	00
403.208	T 180	HOT MIX ASPHALT 12.5 MM NOMINAL MAXIMUM SIZE @ NINETY DOLLARS Per Ton 00/100	90	00	16,200	00
403.2081	T 430	HOT MIX ASPHALT 12.5 MM NOMINAL MAXIMUM SIZE – NON SRF @ NINETY DOLLARS Per Ton 00/100	90.	00	38,700	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
403.210	T 150	HOT MIX ASPHALT 9.5 MM NOMINAL MAXIMUM SIZE @NINETY EIGHT DOLLARS Per Ton 00/100	98	00	14,700	00
462.30	SY 2000	ULTRATHIN BONDED WEARING COURSE – NON SRF @TWELVE DOLLARS Per Square Yard 00/100	12.	00	24,000	00
502.65	CY 6	FLOWABLE CONCRETE FILL @ONE HUNDRED FIFTY DOLLARS Per Cubic Yard 00/100	150.	00	900.	00
603.132	LF 18	10 INCH SANITARY SEWER PIPE @ONE HUNDRED FIFTY ONE DOLLARS, FIFTY CENTS Per Linear Foot	151.	50	2,727.	00
603.133	LF 490	12 INCH SANITARY SEWER PIPE @ONE HUNDRED FIFTY FIVE DOLLARS FIFTY CENTS Per Linear Foot	155.	50	76,195.	00
603.1331	LF 590	12 INCH POLYETHYLENE SANITARY SEWER PIPE @ONE HUNDRED NINETY DOLLARS Per Linear Foot 00/100	190.	00	112,100.	00
603.135	LF 930	18 INCH SANITARY SEWER PIPE @ONE HUNDRED SIXTY FOUR DOLLARS FIFTY CENTS Per Linear Foot	164.	50	152,985.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
603.137	LF 27	24 INCH SANITARY SEWER PIPE @ONE HUNDRED SEVENTY FIVE DOLLARS TWENTY FIVE CENTS Per Linear Foot	175.	25	4,731.	75
603.153	LF 400	10 INCH STORM DRAIN PIPE @ONE HUNDRED FIFTY SIX DOLLARS FIFTY CENTS Per Linear Foot	156.	50	62,600.	00
603.159	LF 800	12 INCH STORM DRAIN PIPE @ONE HUNDRED FIFTY TWO DOLLARS Per Linear Foot 00/100	152.	00	121,600.	00
603.1591	LF 300	12 INCH POLYETHYLENE STORM DRAIN PIPE @ONE HUNDRED SEVENTY EIGHT DOLLARS Per Linear Foot 00/100	178.	00	53,400.	00
603.169	LF 91	15 INCH STORM DRAIN PIPE @ONE HUNDRED FIFTY EIGHT DOLLARS Per Linear Foot 00/100	158.	00	14,378.	00
603.1691	LF 250	15 INCH POLYETHYLENE STORM DRAIN PIPE @ONE HUNDRED SEVENTY THREE DOLLARS, FIFTY CENTS Per Linear Foot	173.	50	43,375.	00
603.179	LF 150	18 INCH STORM DRAIN PIPE @ONE HUNDRED SIXTY SEVEN DOLLARS Per Linear Foot 00/100	167.	00	25,050.	00
603.99	EA 9	TRENCH DAM AND DRAIN @ONE THOUSAND, THREE HUNDRED TWENTY FIVE DOLLARS Per Each 00/100	1,325.	00	11,925.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
604.072	EA 23	4 FOOT DIAMETER CATCH BASIN @THREE THOUSAND, TWO HUNDRED FIFTY DOLLARS Per Each 00/100	3,250.	00	74,750.	00
604.15	EA 38	4 FOOT DIAMETER MANHOLE @FOUR THOUSAND DOLLARS Per Each 00/100	4,000.	00	152,000.	00
604.167	EA 2	ALTER CATCH BASIN FRAME AND GRATE TO CASCADE @FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	1,000.	00
604.18	EA 3	ADJUSTING MANHOLE OR CATCH BASIN TO GRADE @THREE HUNDRED DOLLARS Per Each 00/100	300.	00	900.	00
604.19	EA 1	CORE INLET/OUTLET PIPE HOLE IN CATCH BASIN OR MANHOLE @ONE THOUSAND DOLLARS Per Each 00/100	1,000.	00	1,000.	00
608.08	SY 23	REINFORCED CONCRETE SIDEWALK @NINETY NINE DOLLARS Per Square Yard 00/100	99.	00	2,277.	00
608.081	SY 65	REINFORCED CONCRETE SIDEWALK – NON SRF @NINETY NINE DOLLARS Per Square Yard 00/100	99.	00	6,435.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
608.082	SY 60	REINFORCED CONCRETE DRIVEWAY – NON SRF @ ONE HUNDRED SEVENTEEN DOLLARS Per Square Yard 00/100	117.	00	7020.	00
608.120	SY 300	BITUMINOUS DRIVEWAY APRON - NON SRF @ FIFTY FIVE DOLLARS, FIFTY CENTS Per Square Yard	55.	50	16,650.	00
608.15	SY 250	BRICK SIDEWALK W/ BITUMINOUS BASE @ ONE HUNDRED THIRTY FOUR DOLLARS. Per Square Yard 00/100	134.	00	33,500.	00
608.151	SY 1100	BRICK SIDEWALK W/ BITUMINOUS BASE – NON SRF @ ONE HUNDRED THIRTY FOUR DOLLARS Per Square Yard 00/100	134.	00	147,400.	00
608.160	SY 210	BRICK DRIVEWAY W/ BITUMINOUS BASE – NON SRF @ ONE HUNDRED THIRTY FOUR DOLLARS Per Square Yard 00/100	134.	00	28,140	00
608.26	SF 10	CURB RAMP DETECTABLE WARNING FIELD @ FIFTY DOLLARS Per Square Foot 00/100	50.	00	500.	00
608.261	SF 160	CURB RAMP DETECTABLE WARNING FIELD – NON SRF @ FIFTY DOLLARS Per Square Foot 00/100	50.	00	8,000.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
609.11	LF 350	TYPE 1 VERTICAL CURB @ THIRTY DOLLARS Per Linear Foot 00/100	30.	00	10,500.	00
609.111	LF 660	TYPE 1 VERTICAL CURB – NON SRF @ THIRTY DOLLARS Per Linear Foot 00/100	30.	00	19,800.	00
609.1113	LF 110	SPECIAL GRANITE CURB, 12" REVEAL – NON SRF @ SEVENTY SIX DOLLARS Per Linear Foot 00/100	76.	00	8,360.	00
609.120	LF 280	TYPE 1 VERTICAL CURB (CIRCULAR) - NON SRF @ FORTY ONE DOLLARS, FIFTY CENTS Per Linear Foot	41.	50	11,620	00
609.234	EA 32	TERMINAL CURB TYPE 1 – 4 FOOT – NON SRF @ ONE HUNDRED TWENTY FIVE DOLLARS SEVENTY FIVE CENTS Per Each	125.	75	4,024.	00
609.237	EA 6	TERMINAL CURB TYPE 1 – 7 FOOT – NON SRF @ TWO HUNDRED TWENTY TWO DOLLARS FIFTY CENTS Per Each	222.	50	1,335.	00
609.2371	EA 5	TERMINAL CURB TYPE 1 – 7 FOOT – CIRCULAR - NON SRF @ THREE HUNDRED NINE DOLLARS Per Each 00/100	309.	00	1,545.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
609.38	LF 1050	REMOVE AND RESET CURB TYPE 1 @ TWENTY ONE DOLLARS Per Linear Foot 00/100	21.	00	22,050.	00
609.381	LF 1150	REMOVE AND RESET CURB TYPE 1 – NON SRF @ TWENTY ONE DOLLARS Per Linear Foot 00/100	21.	00	24,150.	00
609.441	LF 300	CURBING REMOVED AND STACKED – NON SRF @ TEN DOLLARS Per Linear Foot 00/100	10	00	3,000	00
614.14	EA 6	MASONRY PLUG @ FIVE HUNDRED DOLLARS Per Each 00/100	500	00	3,000.	00
615.07	SY 30	LOAM, SEED, AND MULCH @ SIX DOLLARS, FIFTY CENTS Per Square Yard	6.	50	195.	00
615.071	SY 1100	LOAM, SEED, AND MULCH – NON SRF @ SIX DOLLARS, FIFTY CENTS Per Square Yard	6.	50	7,150.	00
627.733	LF 2900	4" WHITE OR YELLOW PAVEMENT & CURB MARKING LINE @ TWENTY FIVE CENTS Per Linear Foot		.25	725.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION

Item No.	Quantity	Item with Unit Bid Price Written in Words	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL PRICE Dollars	TOTAL PRICE Cents
627.75	SF 2050	WHITE OR YELLOW PAVEMENT & CURB MARKINGS @ TWO DOLLARS, FIFTY CENTS Per Square Foot	2.	50	5,125.	00
627.76	LS 1	TEMPORARY PAVEMENT MARKING LINE, WHITE OR YELLOW @ ONE THOUSAND DOLLARS Per Lump Sum	1,000	00	1,000.	00
629.05*	HR 20	HAND LABOR, STRAIGHT TIME @ FORTY DOLLARS Per Hour 00/100	40	00	800.	00
629.06*	HR 20	MASON, STRAIGHT TIME @ FIFTY FIVE DOLLARS Per Hour 00/100	55	00	1,100.	00
631.12*	HR 20	ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR) @ ONE HUNDRED FIFTEEN DOLLARS Per Hour 00/100	115	00	2,300.	00
631.13*	HR 20	BULLDOZER (INCLUDING OPERATOR) @ NINETY FIVE DOLLARS Per Hour 00/100	95.	00	1,900.	00
631.15*	HR 20	ROLLER EARTH BASE CRS (INCLUDING OPERATOR) @ EIGHTY DOLLARS. Per Hour 00/100	80.	00	1,600.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
631.172*	HR 20	TRUCK-LARGE (INCLUDING OPERATOR) @ SIXTY TWO DOLLARS Per Hour 00/100	62.	00	1,240.	00
631.22*	HR 20	FRONT END LOADER (INCLUDING OPERATOR) @ NINETY DOLLARS Per Hour 00/100	90.	00	1,800	00
631.36*	HR 20	FOREMAN, STRAIGHT TIME @ FIFTY DOLLARS Per Hour 00/100	50.	00	1,000	00
632.04*	EA 45	FOUR INCH AND SIX INCH WYE SANITARY/STORM DRAIN PIPE SECTIONS @ SEVEN HUNDRED DOLLARS Per Each 00/100	700.	00	31,500.	00
632.041*	EA 25	FOUR INCH AND SIX INCH INSERTA TEE SANITARY/STORM DRAIN PIPE SECTIONS @ TWO HUNDRED FIFTY FIVE DOLLARS Per Each 00/100	255.	00	6,375.	00
633.04*	LF 2100	FOUR INCH AND SIX INCH SANITARY/STORM DRAIN HOUSE LATERALS @ ONE HUNDRED FORTY SEVEN DOLLARS Per Linear Foot 00/100	147.	00	308,700.	00
643.62	EA 4	RECTANGULAR RAPID FLASHING BEACON - NON SRF @ SEVEN THOUSAND, SEVEN HUNDRED SIXTY DOLLARS Per Each 00/100	7,760	00	31,040.	00

MADISON, WALNUT, WASHINGTON SEWER SEPARATION						
			UNIT PRICE		TOTAL PRICE	
Item No.	Quantity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
643.621	EA 4	REMOVE EXISTING BEACON AND FOUNDATION - NON SRF @ONE THOUSAND DOLLARS Per Each 00/100	1,000.	00	4,000.	00
652.36*	LS 1	MAINTENANCE OF TRAFFIC CONTROL @ONE HUNDRED SEVENTY FIVE THOUSAND DOLLARS Per Lump Sum 00/100	175,000.	00	175,000.	00
654.08	EA 40	DENSITY TEST @FORTY DOLLARS Per Each 00/100	40.	00	1,600	00
656.75*	LS 1	TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL @FIVE THOUSAND DOLLARS Per Lump Sum 00/100	5,000.	00	5,000.	00
Total of SRF/Non-SRF Improvements Bid Written in Numbers			$ 2,351,428. 75			
Total of PWD Improvements Bid Written in Numbers			$ 1,042,611. 00			
TOTAL: BASIS OF AWARD			$ 3,394,039. 75			

Any pay items with quantities marked with an asterisk (*) on the bid sheets are not anticipated at time of bid and therefore are indeterminate. These items are part of the Contract Proposal and will also be used should any extra work be necessary. Actual quantities will be measured in the field or calculated from the contract drawings. The unit bid prices will be used to calculate payment amounts regardless of final quantities.

Water Main Bid

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-1	550 l.f.	8-inch Ductile Iron Water Main @ONE HUNDRED THIRTY THREE DOLLARS Per Linear Foot 00/100	133.	00	73,150.	00
W-2	2,560 l.f.	12-inch Ductile Iron Water Main @ONE HUNDRED FORTY NINE DOLLARS Per Linear Foot 00/100	149.	00	381,440.	00
W-3	2 ea	Offset 8-inch Ductile Iron Water Main @TWO THOUSAND SEVEN HUNDRED TWENTY FIVE DOLLARS Each 00/100	2,725.	00	5,450.	00
W-4	2 ea	Offset 12-inch Ductile Iron Water Service @FOUR THOUSAND ONE HUNDRED THIRTY EIGHT DOLLARS Each 00/100	4,138	00	8,276.	00
W-5	1 ea.	8-inch X 4-inch Tee @FIVE HUNDRED EIGHTY FIVE DOLLARS Per Each 00/100	585	00	585.	00
W-6	2 ea.	8-inch X 8-inch Tee @EIGHT HUNDRED SEVENTY FIVE DOLLARS Per Each 00/100	875.	00	1,750.	00
W-7	1 ea.	8-inch X 6-inch Swivel Tee @SIX HUNDRED FORTY DOLLARS Per Each 00/100	640.	00	640.	00
W-8	2 ea.	12-inch X 4-inch Tee @NINE HUNDRED NINETY DOLLARS Per Each 00/100	990.	00	1,980.	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-9	1 ea.	12-inch X 4-inch Swivel Tee @ONE THOUSAND FIFTY DOLLARS Per Each 00/100	1,050	00	1,050.	00
W-10	3 ea.	12-inch X 8-inch Tee @ONE THOUSAND SIXTY DOLLARS Per Each 00/100	1,060	00	3,180.	00
W-11	2 ea.	12-inch X 6-inch Swivel Tee @ONE THOUSAND FIFTY DOLLARS Per Each 00/100	1,050	00	2,100.	00
W-12	3 ea.	12-inch X 8-inch Swivel Tee @ONE THOUSAND ONE HUNDRED TEN DOLLARS Per Each 00/100	1,110.	00	3,330.	00
W-13	5 ea.	12-inch X 12-inch Tee @ONE THOUSAND, THREE HUNDRED, SIXTEEN DOLLARS Per Each 00/100	1,316.	00	6,580.	00
W-14	1 ea.	8-inch X 6-inch Reducer @FOUR HUNDRED NINETY FIVE DOLLARS Per Each 00/100	495.	00	495.	00
W-15	1 ea.	12-inch X 6-inch Reducer @SIX HUNDRED FORTY DOLLARS Per Each 00/100	640.	00	640.	00
W-16	1 ea.	12-inch X 8-inch Reducer @SIX HUNDRED SIXTY DOLLARS Per Each 00/100	660	00	660.	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-17	1 ea.	20-inch X 12-inch Reducer @ONE THOUSAND SIX HUNDRED SIXTY TWO DOLLARS Per Each 00/100	1,662	00	1,662.	00
W-18	2 ea.	8" 22.5° Bend @ FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	1,000.	00
W-19	3 ea.	12" 22.5° Bend @ EIGHT HUNDRED DOLLARS Per Each 00/100	800.	00	2,400.	00
W-20	2 ea.	4-inch Solid Sleeve @ THREE HUNDRED NINETY FIVE DOLLARS Per Each 00/100	395	00	790.	00
W-21	2 ea.	6-inch Solid Sleeve @ FOUR HUNDRED FIFTY DOLLARS Per Each 00/100	450.	00	900.	00
W-22	5 ea.	8-inch Solid Sleeve @ FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	2,500.	00
W-23	4 ea.	12-inch Solid Sleeve @ SEVEN HUNDRED EIGHTY DOLLARS Per Each 00/100	780.	00	3,120.	00
W-24	4 ea	4-inch Gate Valve @ ONE THOUSAND, TWO HUNDRED TEN DOLLARS Per Each 00/100	1,210	00	4,840.	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-25	4 ea	6-inch Gate Valve @ONE THOUSAND THREE HUNDRED FIFTY FIVE DOLLARS Per Each 00/100	1,355.	00	5,420.	00
W-26	2 ea	6-inch Cut-in Gate Valve @TWO THOUSAND, NINE HUNDRED FIFTY FIVE DOLLARS Per Each 00/100	2,955	00	5,910.	00
W-27	6 ea.	8-inch Gate Valve @ONE THOUSAND EIGHT HUNDRED DOLLARS Per Each 00/100	1,800	00	10,800	00
W-28	2 ea.	8-inch Insertion Valve @SEVEN THOUSAND SEVEN HUNDRED SEVENTY FIVE DOLLARS Per Each 00/100	7,775.	00	15,550.	00
W-29	10 ea.	12-inch Gate Valve @TWO THOUSAND, NINE HUNDRED THIRTY FIVE DOLLARS Per Each 00/100	2,935.	00	29,350.	00
W-30	5 ea	12-inch Cut-In Gate Valve @FOUR THOUSAND, EIGHT HUNDRED TWENTY FIVE DOLLARS Per Each 00/100	4,825	00	24,125.	00
W-31	1 ea	12-inch Insertion Valve @FIFTEEN THOUSAND DOLLARS Per Each 00/100	15,000	00	15,000.	00
W-32	1 ea.	20-inch Butterfly Cut-in Valve @TWELVE THOUSAND DOLLARS. Per Each 00/100	12,000	00	12,000.	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price		Amount	
			Dollars	Cents	Dollars	Cents
W-33	6 ea	Hydrant Assembly @ SEVEN THOUSAND THREE HUNDRED SEVENTY FIVE DOLLARS Per Each 00/100	7,375.	00	44,250.	00
W-34	7 ea.	1-inch Air Release Valve @ EIGHT HUNDRED FIFTY DOLLARS Per Each 00/100	850	00	5,950.	00
W-35	27 ea.	1-inch Copper Service - Shortside @ THREE THOUSAND TWO HUNDRED DOLLARS Per Each 00/100	3,200	00	86,400.	00
W-36	15 ea	1-inch Copper Service - Longside @ FOUR THOUSAND ONE HUNDRED FIFTY DOLLARS Per Each 00/100	4,150.	00	62,250	00
W-37	1 ea	1 1/2-inch Copper Service - Shortside @ FOUR THOUSAND TWO HUNDRED DOLLARS Per Each 00/100	4,200	00	4,200.	00
W-38	2 ea	2-inch Copper Service - Shortside @ FOUR THOUSAND TWO HUNDRED FIFTY DOLLARS Per Each 00/100	4,250.	00	8,500.	00
W-39	1 ea	2-inch Copper Service - Longside @ FIVE THOUSAND FIVE HUNDRED SEVENTY DOLLARS Per Each 00/100	5,570.	00	5,570.	00
W-40	1 ea	4-inch Ductile Iron Service -Shortside @ FOUR THOUSAND, SIX HUNDRED TWENTY FIVE DOLLARS Per Each 00/100	4,625	00	4,625	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-41	1 ea	Reconnect Services @FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	500.	00
W-42	2 ea	Reconnect 1 1/2" Services @FIVE HUNDRED DOLLARS Per Each 00/100	500.	00	1,000.	00
W-43	45 lf	4-inch Ductile Iron Fire Service @ONE HUNDRED THIRTY SIX DOLLARS Per Linear Feet 00/100	136.	00	6,120	00
W-44	55 lf	6-inch Ductile Iron Fire Service @ONE HUNDRED TWENTY SIX DOLLARS Per Each 00/100	126	00	6,930.	00
W-45	100 c.y.	Gravel Borrow @ ONE CENT Per Cubic Yard		.01	1.	00
W-46	100 lf	Trolley Rails @ SEVENTEEN DOLLARS Per Linear Feet 00/100	17	00	1,700.	00
W-47	100 c.y.	Rock Excavation @ ONE CENT Per Cubic Yard		.01	1.	00
W-48	100 c.y.	Unsuitable Material Excavated Below Grade @ ONE CENT Per Cubic Yard		.01	1.	00
Amount Carried Forward						

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-49	1,530 c.y.	Aggregate Subbase Type D @ TWENTY FIVE DOLLARS Per Cubic Yard 00/100	25.	00	38,250	00
W-50	275 c.y.	Aggregate Base Type B @ THIRTY SIX DOLLARS Per Cubic Yard 00/100	36	00	9,900.	00
W-51	475 T	Hot Mix Asphalt Binder Grading B @ NINETY SIX DOLLARS Per Ton 00/100	96.	00	45,600	00
W-52	330 T	Hot Mix Asphalt Surface CourseGrading C @ NINETY DOLLARS Per Ton 00/100	90.	00	29,700	00
W-53	220 sy	Brick Sidewalk @ ONE HUNDRED THIRTY FOUR DOLLARS Per Square Yard 00/100	134.	00	29,480.	00
W-54	60 sy	Reinforced Concrete Sidewalk @ NINETY NINE DOLLARS Per Square Yard 00/100	99.	00	5,940.	00
W-55	500 hr.	Flagger @ THIRTY ONE DOLLARS Per Hour 00/100	31.	00	15,500	00
W-56	10 hr	Foreman @ FIFTY DOLLARS Per Hour 00/100	50.	00	500.	00
		Amount Carried Forward				

Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-57	10 hr	Laborer @ FORTY DOLLARS Per Hour 00/100	40.	00	400.	00
W-58	10 hr	Excavator w/Operator @ ONE HUNDRED FIFTEEN DOLLARS Per Hour 00/100	115.	00	1,150.	00
W-59	10 hr	Loader w/Operator @ NINETY DOLLARS Per Hour 00/100	90.	00	900.	00
W-60	10 hr	Dump Truck w/Driver @ SIXTY TWO DOLLARS Per Hour 00/100	62.	00	620.	00
TOTAL AMOUNTOF BASE BID WRITTEN IN WORDS AND IN NUMBERS BASED ON ESTIMATE OF QUANTITIES ONE MILLION, FORTY TWO THOUSAND, SIX HUNDRED, ~~SIXTY~~ ELEVEN DOLLARS (Written In Words) 00/100					1,042,611.	00

BID ALTERNATE						
SUBSTITUTE 20" LINE STOP FOR 20" BUTTERFLY CUT IN VALVE						
Item No.	Estimated Quantity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
W-32	1 ea	Deduct 20" Butterfly Cut-in Valve @ SEVEN THOUSAND ONE HUNDRED EIGHTY FOUR DOLLARS Per Each 00/100	7,184	00	7,184.	00
W-61	1 ea	Add 20" Line Stop @ TWENTY EIGHT THOUSAND, ONE HUNDRED SEVENTY FIVE DOLLARS Per Each 00/100	28,175	00	28,175	00
TOTAL CHANGE FOR BID ALTERNATE						
				+	20,991.	00
BID ALTERNATE TOTAL AMOUNT: BASE BID PLUS CHANGE FOR BID ALTERNATE WRITTEN IN WORDS AND NUMBERS THREE MILLION, FOUR HUNDRED FIFTEEN THOUSAND, THIRTY DOLLARS SEVENTY FIVE CENTS (Written In Words)					3,415,030.	75

BASE BID FORM MADISON, WALNUT, WASHINGTON SEWER SEPARATION PROJECT PORTLAND, MAINE	
Total of Madison, Walnut, Washington Sewer Separation Bid	2,351,428.75
Total of Madison, Walnut, Washington Water Main Bid	1,042,611.00
Total of Sewer Separation and Water Main Bids (Base Bid & Basis of Award)	3,394,039.75

The undersigned also agrees as follows:

FIRST: To do any extra work, not covered by the above schedule of items, which may be ordered, and to accept as full compensation therefore such prices as may be agreed upon in writing by the Engineer and the Contractor; or in case no agreement is made, to accept as full compensation the amount determined upon a "force account" basis as provided in the State of Maine Department of Transportation Standard Specifications, Revision of December 2002, including all current additions or modifications thereof .

SECOND: To begin work on the date specified in the Engineer's "Notice to Commence Work" and to prosecute said work in such a manner as to complete all underground utility work, sidewalk and curb installation, and paving by **June 30, 2018.** or within the time limits given in the Special Provisions.

THIRD: That this offer is to continue open to acceptance until the formal contract is executed by the successful bidder of this work, and the City may at any time without notice accept this proposal whether any other proposal has previously been accepted or not. Provided, however, that the City will accept, in writing, one of the proposals made, or reject all proposals made, within sixty (60) calendar days after the date of opening of the proposals.

The undersigned as Bidder, declares that the only persons or parties interested in this Proposal are those named herein; that the bidder is not financially interested in, or otherwise affiliated in a business way with any other bidder on this contract; and that this Proposal is made without collusion with any other person, firm or corporation.

"The undersigned declares that any person(s) employed by the City of Portland, Maine, who has direct or indirect personal or financial interest in this proposal or in any portion of the profits which may be derived therefrom, has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of. An example of a direct interest would be a City employee who would be paid to perform services under this proposal. An example of an indirect interest would be a City employee who is related to any officers, employees, principal or shareholders of your firm or you.) If in doubt as to status or interest, please disclose to the extent known."

Respectfully submitted this 7TH day of SEPTEMBER, 2017

Acknowledgement of Receipt of Addenda:

Addendum No.	Addendum Date
# 1	8/30/17

IF AN INDIVIDUAL, SIGN HERE

Signature of Bidder_____

Address_____

_____

Phone # _____

Email Address_____

Social Security Number_____

(Signatures for a Firm, Partnership or Corporation on next page.)

IF A FIRM OR PARTNERSHIP, SIGN HERE

Signature of Bidder_____

Name of Firm or Partnership_____

Business Address_____

Telephone Number_____ Fax Number_____

Email Address_____ SS No. or Tax I.D. Number_____

Names and Addresses of Members of Firm or Partnership:

_____

_____

_____

IF A CORPORATION, SIGN HERE

Name of Bidder D+C CONSTRUCTION COMPANY, INC.

Authorized Signature Rene L. Perron (Name) C.M (Title)

Business Address PO. BOX 415, ROCKLAND, MA 02370

Telephone Number 207-247-6023 Fax Number 207-247-6013

Email Address tlanctotb@yahoo.com SS No. or Tax I.D. Number 139-384-408

Incorporated under the Laws of the State of MASSACHUSETTS

Names and Addresses of Officers of the Corporation:

President BRADFORD S. CLEAVES

Secretary ANTONIO DI GIACOMO

Treasurer BRADFORD S. CLEAVES ss

Before me, personally appeared RENE L. PERRON and acknowledged that the signature to the preceding bid is his/her signature in his/her official capacity.

Date: 9/7/17

Tammy Lanctot
Notary Public - Signature and Seal

TAMMY LANCTOT
NOTARY PUBLIC
STATE OF MAINE
MY COMM. EXP. SEPTEMBER 4, 2023

ALL CORPORATIONS MUST SIGN THIS FORM
AND SUBMIT WITH THE BID PROPOSAL

(Insert copy of that part of the records of the corporation wherein authority is given to the officer of that corporation to sign this bid on behalf of the corporation.)

SEE ATTACHED LIST

9/7/17
(date)

The above is a true copy of the records of the D+C CONSTRUCTION CO.

Corporation, which records are in my legal custody.

RENE L. PERRON
Officer having custody of the records

_____ ss

Before me appeared, RENE L. PERRON, CONSTRUCTION MANAGER of the D+C CONSTRUCTION COMPANY Corporation, and made oath that the above statement is true.

Tammy Lanctot
Notary Public - Signature and Seal

TAMMY LANCTOT
NOTARY PUBLIC
STATE OF MAINE
MY COMM. EXP. SEPTEMBER 4, 2023

NOTICE

(This Must Be Filled Out)

The full names and residences of all persons interested in this bid as principals are as follows: (In case of Corporation, include and identify President, Treasurer, Manager)

SEE ATTACHED LIST

ALL CONTRACTORS SHALL FILL IN THE FOLLOWING INFORMATION BEFORE SUBMITTING BID

	Name and Address of Materials Supplier	Materials to be Supplied
1	EJP	PIPE
2	GEORGE ROBERTS	STRUCTURES
3	PORTLAND SAND + GRAVELS	AGGREGATES
4		
5		
6		
7		

	Name and Address of Contractor	Service or Trades to be Supplied	Anticipated $ Amount
1	DAYTON SAND DAYTON, ME	PAVING	250,000.00
2	GRANITE STATE N.H.	CURB	125,000.00
3	PETER LYFORD GORHAM ME.	LANDSCAPE	2,000.00
4	ZEBRA STRIPING SCARBOROUGH ME.	PAVEMENT MARKING	4,000.00
5	THIRSTY TURF GORHAM, ME.	TEMPORY WATER	39,000.00
6	PLOWMAN CONST WINDHAM ME	FLAGGING	75,000.00
7	A.D. ELECTRIC	FLASHING BEACONS	25,000.00

WAIVER OF LIEN - MATERIAL OR LABOR

State of _____

County of _____

To all whom it may concern:

The undersigned _____ has been employed to furnish _____ for the project known as _____,

City of Portland, County of Cumberland, State of Maine.

The undersigned for and in consideration of the sum of $ _____ and other good and valuable consideration the receipt whereof is hereby acknowledged, do hereby waive and release any and all rights and liens, or claim of right to lien on said above described project under the statutes of the State of Maine relating to Mechanic's Lien on account of Labor or Material or both furnished or which may be furnished by the undersigned to or on account of said _____ for said building and premises.

This Waiver of Lien shall become effective upon the issuance of a check by the City of Portland payable to _____ and _____ in the amount of _____.

Given under oath, my hand and seal this _____ day of _____, 20 _____.

By:_____

_____

(Print or type name)

Its_____

Notarized: _____ this _____ day of _____, 20 _____.

My commission expires

D&C Construction Company, Inc.

Postal Box 123
Waterboro, Maine 04087
P: 207-247-6023
F: 207-247-6013

CERTIFICATE OF VOTE

I, Antonio DiGiacomo, hereby certify that I am the duly-qualified and acting Secretary of D&C Construction Company, Inc., a corporation incorporated in the Commonwealth of Massachusetts, Federal Identification Number 04-2857181. I further certify that at a meeting of the Directors of D&C Construction Company, Inc., duly called and held on April 11th, 2014, at which time all Directors were present and voted, the following was unanimously passed :

VOTED : TO AUTHORIZE AND EMPOWER

Bradford S. Cleaves, President and Treasurer
Antonio DiGiacomo, Secretary/Clerk
Giuseppe DiGiacomo, Director
Duncan S. Peterson, Vice President
Rene Perron, Project Manager

Any one of these individuals may act singly to execute Forms for General Bid, Sub-Bids, Contracts or Bonds on behalf of D&C Construction Company, Inc.. I further certify that the above vote is still in effect and has not changed nor been modified in any respect as of this signing.

By : Antonio DiGiacomo
Antonio DiGiacomo, Secretary

Date : 8/11/17

A true copy :

TAMMY LANCTOT
NOTARY PUBLIC
STATE OF MAINE
MY COMM. EXP. SEPTEMBER 4, 2023

Attest: Tammy Lanctot

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name (WBE) ACE DETECTIVE & SECURITY AGENCY		Project Name MADISON, WALNUT, WASHINGTON SEWER SEPARATION
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address 11 BELLEGARDE AVE., LEWISTON, MAINE 04240		
Telephone No.		Email Address acedetsec@aol.com
Prime Contractor Name D&C CONSTRUCTION COMPANY, INC.		Issuing/Funding Entity:

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
	FLAGGING	2600 or after 8 hrs

DBE Certified By: ✓ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Rene L. Perron	Rene L. Perron
Title	**Date**
Construction Manager	8/29/17

Subcontractor Signature	Print Name
Cathy Grondin	Cathy Grondin
Title	**Date**
Office Manager	8/30/17

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/ 13/ 2013
Approval Expires: 8/ 31/ 2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name (WBE) MJ OUELLETTE & DAUGHTERS		Project Name MADISON, WALNUT, WASHINTON SEWER SEPARATION
Bid/ Proposal No. 18009	Assistance Agreement ID No. (if known)	Point of Contact
Address 315 COLBY SIDING ROAD, WOODLAND, MAINE 04736		
Telephone No.		Email Address MKNH@MAINE.RR.COM
Prime Contractor Name D&C CONSTRUCTION COMPANY, INC.		Issuing/Funding Entity:

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
	PIPE SUPPLIER	

DBE Certified By: ✓ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

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United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Rene L. Perron	Rene L. Perron
Title	**Date**
Construction Manager	8/29/17

Subcontractor Signature	Print Name
Kathy P. Ouellette	President
Title	**Date**
President	8/31/17

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

09/01/17 11:19AM HPFAX 2074933077 Page 3

Disadvantaged Business Enterprise Program (DBE) Subcontractor

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name
D+C CONSTRUCTION COMPANY, INC		MADISON, WALNUT, WASHINGTON SEWER SEPARATION
Bid /Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
18009		RENE L. PERRON.
Address		
P.O. BOX 123, WATERBORO, ME. 04087		
Telephone No.		Email Address
207-247-6023		TLANCTOTD@YAHOO.COM
Issuing/Funding Entity:		

I have identified potential DBE certified subcontractors	✓ YES	____NO
If yes, please complete the table below. If no, please explain:		

Subcontractor Name/ Company Name	Company Address/Phone/Email	Est. Dollar Amt.	Currently DBE Certified?

Continue on back if needed

[1]A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2]Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award or financial assistance

Disadvantaged Business Enterprise Program (DBE) Subcontractor

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Section 33.202 (c).

Prime Contractor Signature	Print Name
Rene L. Perron	RENE L. PERRON
Title	**Date**
C.M. / P.M.	9/7/17

BID BOND

Conforms with The American Institute of Architects, A.I.A. Document No. A-310

KNOW ALL BY THESE PRESENTS, That we, **D & C Construction Co., Inc.**

415 V.F.W. Drive, Rockland, MA 02370

as Principal, hereinafter called the Principal,

and the **Western Surety Company**,

of **53 State Street, Suite 510, Boston, MA 02109**, a corporation duly organized under

the laws of the State of **South Dakota**, as Surety, hereinafter called the Surety, are held and firmly bound unto

City of Portland, Maine as Obligee, hereinafter called the Obligee,

in the sum of **Five Percent of Bid Amount**

Dollars ($ **5% of Bid Amount**), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for **MADISON, WALNUT, WASHINGTON SEWER SEPARATION PROJECT**

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this **7th** day of **September**, **2017**.

Witness

D & C Construction Co., Inc. (Seal)
Principal

Gene L. Gerron C.M.
Title

Witness

Western Surety Company

By Martin L. Donovan
Martin L. Donovan, Attorney-in-Fact

S-0054/GEEF 12/00

FRP

Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

George G Powers, Martin L Donovan, Timothy P Lyons, Claire A Cavanaugh, John C Driscoll, Dennis Driscoll, Individually

of Norwell, MA, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 1st day of September, 2016.

WESTERN SURETY COMPANY

Paul T. Bruflat, Vice President

State of South Dakota
County of Minnehaha } ss

On this 1st day of September, 2016, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires
June 23, 2021

J. MOHR
NOTARY PUBLIC
SOUTH DAKOTA

J. Mohr, Notary Public

CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 7th day of September, 2017

WESTERN SURETY COMPANY

L. Nelson, Assistant Secretary

Form F4280-7-2012

Authorizing By-Law

ADOPTED BY THE SHAREHOLDERS OF WESTERN SURETY COMPANY

This Power of Attorney is made and executed pursuant to and by authority of the following By-Law duly adopted by the shareholders of the Company.

Section 7. All bonds, policies, undertakings, Powers of Attorney, or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, and Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or agents who shall have authority to issue bonds, policies, or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PENAL SUM FORM

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*: GORHAM SAND & GRAVEL, INC.
939 Parker Farm Road
Buxton, ME 04093

SURETY *(Name, and Address of Principal Place of Business)*: HARTFORD FIRE INSURANCE COMPANY
Agency: P.O. Box 511
Concord, NH 03302-0511

OWNER *(Name and Address)*: CITY OF PORTLAND
389 Congress Street
Portland, ME 04101

BID

Bid Due Date: September 7th, 2017

Description *(Project Name— Include Location)*: BID # 18009, MADISON, WALNUT, WASHINGTON SEWER SEPARATION AND WATER RENEWAL, PORTLAND, MAINE

BOND

Bond Number: N/A

Date: September 7th, 2017

Penal sum FIVE PERCENT OF AMOUNT BID (Words) $ 5% OF AMOUNT BID (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
GORHAM SAND & GRAVEL, INC. (Seal)	HARTFORD FIRE INSURANCE COMPANY (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: Signature	By: Signature (Attach Power of Attorney)
JAMES W SHAW Print Name	Michael P. O'Brien Print Name
VICE PRESIDENT Title	Attorney-In-Fact Title
Attest: Signature	Attest: Signature
ESTIMATOR Title	V.P. Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

POWER OF ATTORNEY

THE HARTFORD
Bond T-4
One Hartford Plaza
Hartford, Connecticut 06155
call: **888-266-3488** *or fax:* **860-757-5835)**

KNOW ALL PERSONS BY THESE PRESENTS THAT: **Agency Code:** 04-040492

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of*** Unlimited :

Paula J. Cantara, Cary S. Chapin, Daniel E. Church, John M. Harbottle, Christine M. Hosmer, Bruce H. Langley, Gary P. LaPierre, Michael P. O'Brien, Ryan M. Stevens, John P. Timmeny, William Ver Planck, John T. Whiting of CONCORD, New Hampshire

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on August 1, 2009, the Companies have caused these presents to be signed by its Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher, Vice President

STATE OF CONNECTICUT
COUNTY OF HARTFORD } ss. Hartford

On this 12th day of July, 2012, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

CERTIFICATE

Kathleen T. Maynard
Notary Public
My Commission Expires July 31, 2016

I, the undersigned, Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of September 7th, 2017.
Signed and sealed at the City of Hartford.

Gary W. Stumper, Vice President

OA 2012

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 10/19/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Peggi Buckler
The Driscoll Agency 93 Longwater Circle Norwell MA 02061	PHONE (A/C, No, Ext): 781-681-6656 FAX (A/C, No): 781-681-6686 E-MAIL ADDRESS: pbuckler@driscollagency.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Continental Casualty Company	20443
INSURER B : Transportation Insurance Company	20494
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED	3165
D & C Construction Company, Inc. Norwell Equipment Company, Inc 415 VFW Drive PO Box 415 Rockland MA 02370-0415	

COVERAGES **CERTIFICATE NUMBER:** 512360576 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			C4026801963	1/1/2017	1/1/2018	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $100,000 $15,000 $1,000,000 $2,000,000 $2,000,000 $
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			C4026801929	1/1/2017	1/1/2018	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $ $
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $ 10,000			C4026801915	1/1/2017	1/1/2018	EACH OCCURRENCE AGGREGATE	$7,000,000 $7,000,000 $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory In NH) Y/N N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		WC4026801932	1/1/2017	1/1/2018	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
B	Installation Floater Leased/Rented Equipment			C4026801963	1/1/2017	1/1/2018	Installation Limit L/R Equip Limit Deductible	$100,000 $500,000 $1,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

City Of Portland is included as Additional Insured for General Liability and Excess (Umbrella) Liability as required by a signed written contract or agreement with the Named Insured and
are included as Additional Insured for Automobile Liability on a Primary Basis for the conduct of the (Named) Insured, but only to the extent of that liability.

Notice of cancellation provision is 30 days, except 10 days applies for non-payment of premium.

CERTIFICATE HOLDER

City Of Portland
55 Portland St.
Attn: Carol Merritt
Portland ME 04101

CANCELLATION 30

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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The ACORD name and logo are registered marks of ACORD

(2) Your "employee" if the covered "auto" is owned by that "employee" or a member of his or her household.

(3) Someone using a covered "auto" while he or she is working in a business of selling, servicing, repairing, parking or storing "autos" unless that business is yours.

(4) Anyone other than your "employees," partners (if you are a partnership), members (if you are a limited liability company) or a lessee or borrower or any of their "employees," while moving property to or from a covered "auto."

(5) A partner (if you are a partnership) or a member (if you are a limited liability company) for a covered "auto" owned by him or her or a member of his or her household.

c. Anyone liable for the conduct of an "insured" described above but only to the extent of that liability.

2. **Coverage Extensions**

a. **Supplementary Payments**

We will pay for the "insured":

(1) All expenses we incur.

(2) Up to $2,000 for cost of bail bonds (including bonds for related traffic law violations) required because of an "accident" we cover. We do not have to furnish these bonds.

(3) The cost of bonds to release attachments in any "suit" against the "insured" we defend, but only for bond amounts within our Limit of Insurance.

(4) All reasonable expenses incurred by the "insured" at our request, including actual loss of earnings up to $250 a day because of time off from work.

(5) All court costs taxed against the "insured" in any "suit" against the "insured" we defend. However, these payments do not include attorneys' fees or attorneys' expenses taxed against the "insured."

(6) All interest on the full amount of any judgment that accrues after entry of the judgment in any "suit" against the "insured" we defend, but our duty to pay interest ends when we have paid, offered to pay or deposited in court the part of the judgment that is within our Limit of Insurance.

These payments will not reduce the Limit of Insurance.

b. **Out-of-state Coverage Extensions**

While a covered "auto" is away from the state where it is licensed we will:

(1) Increase the Limit of Insurance for Liability Coverage to meet the limits specified by a compulsory or financial responsibility law of the jurisdiction where the covered "auto" is being used. This extension does not apply to the limit or limits specified by any law governing motor carriers of passengers or property.

(2) Provide the minimum amounts and types of other coverages, such as no-fault, required of out-of-state vehicles by the jurisdiction where the covered "auto" is being used.

We will not pay anyone more than once for the same elements of loss because of these extensions.

B. **Exclusions**

This insurance does not apply to any of the following:

1. **Expected Or Intended Injury**

"Bodily injury" or "property damage" expected or intended from the standpoint of the "insured."

2. **Contractual**

Liability assumed under any contract or agreement.

But this exclusion does not apply to liability for damages:

a. Assumed in a contract or agreement that is an "insured contract" provided the "bodily injury" or "property damage" occurs subsequent to the execution of the contract or agreement; or

b. That the "insured" would have in the absence of the contract or agreement.

3. **Workers' Compensation**

Any obligation for which the "insured" or the "insured's" insurer may be held liable under any workers' compensation, disability benefits or unemployment compensation law or any similar law.

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 Copyright Insurance Services Office, Inc., 2009

The Condition entitled **Duties In The Event of Occurrence, Offense, Claim or Suit** is amended with the addition of the following:

Any additional insured pursuant to this endorsement will as soon as practicable:

1. give the Insurer written notice of any **claim**, or any **occurrence** or offense which may result in a **claim**;
2. except as provided in Paragraph IV. of this endorsement, agree to make available any other insurance the additional insured has for any loss covered under this **coverage part**;
3. send the Insurer copies of all legal papers received, and otherwise cooperate with the Insurer in the investigation, defense, or settlement of the **claim**; and
4. tender the defense and indemnity of any **claim** to any other insurer or self insurer whose policy or program applies to a loss that the Insurer covers under this **coverage part**. However, if the **written contract** requires this insurance to be primary and non-contributory, this paragraph **4** does not apply to insurance on which the additional insured is a named insured.

The Insurer has no duty to defend or indemnify an additional insured under this endorsement until the Insurer receives written notice of a **claim** from the additional insured.

VI. Solely with respect to the insurance granted by this endorsement, the section entitled **DEFINITIONS** is amended to add the following definition:

Written contract means a written contract or written agreement that requires the **Named Insured** to make a person or organization an additional insured on this **coverage part**, provided the contract or agreement:

A. is currently in effect or becomes effective during the term of this policy; and

B. was executed prior to:

1. The **bodily injury** or **property damage**; or
2. The offense that caused the **personal and advertising injury**

for which the additional insured seeks coverage.

Any coverage granted by this endorsement shall apply solely to the extent permissible by law.

All other terms and conditions of the Policy remain unchanged.

This endorsement, which forms a part of and is for attachment to the Policy issued by the designated Insurers, takes effect on the effective date of said Policy at the hour stated in said Policy, unless another effective date is shown below, and expires concurrently with said Policy.

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ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/19/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
The Driscoll Agency
93 Longwater Circle
Norwell MA 02061

CONTACT NAME: Peggi Buckler
PHONE (A/C, No, Ext): 781-681-6656 FAX (A/C, No): 781-681-6686
E-MAIL ADDRESS: pbuckler@driscollagency.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Continental Casualty Company	20443
INSURER B : Transportation Insurance Company	20494
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED 3165
D & C Construction Company, Inc.
Norwell Equipment Company, Inc
415 VFW Drive
PO Box 415
Rockland MA 02370-0415

COVERAGES **CERTIFICATE NUMBER:** 512360576 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X COMMERCIAL GENERAL LIABILITY			C4026801963	1/1/2017	1/1/2018	EACH OCCURRENCE	$1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$100,000
							MED EXP (Any one person)	$15,000
							PERSONAL & ADV INJURY	$1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$2,000,000
	POLICY X PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$2,000,000
	OTHER:							$
B	AUTOMOBILE LIABILITY			C4026801929	1/1/2017	1/1/2018	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
A	X UMBRELLA LIAB X OCCUR			C4026801915	1/1/2017	1/1/2018	EACH OCCURRENCE	$7,000,000
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$7,000,000
	DED X RETENTION $ 10,000							$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			WC4026801932	1/1/2017	1/1/2018	X PER STATUTE / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N	N / A					E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000
B	Installation Floater Leased/Rented Equipment			C4026801963	1/1/2017	1/1/2018	Installation Limit L/R Equip Limit Deductible	$100,000 $500,000 $1,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

City Of Portland is included as Additional Insured for General Liability and Excess (Umbrella) Liability as required by a signed written contract or agreement with the Named Insured and
are included as Additional Insured for Automobile Liability on a Primary Basis for the conduct of the (Named) Insured, but only to the extent of that liability.

Notice of cancellation provision is 30 days, except 10 days applies for non-payment of premium.

CERTIFICATE HOLDER

City Of Portland
55 Portland St.
Attn: Carol Merritt
Portland ME 04101

CANCELLATION 30

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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19	Mobile Equipment Subject To Compulsory Or Financial Responsibility Or Other Motor Vehicle Insurance Law Only	Only those "autos" that are land vehicles and that would qualify under the definition of "mobile equipment" under this policy if they were not subject to a compulsory or financial responsibility law or other motor vehicle insurance law where they are licensed or principally garaged.

B. Owned Autos You Acquire After The Policy Begins

1. If Symbols **1, 2, 3, 4, 5, 6** or **19** are entered next to a coverage in Item Two of the Declarations, then you have coverage for "autos" that you acquire of the type described for the remainder of the policy period.
2. But, if Symbol **7** is entered next to a coverage in Item Two of the Declarations, an "auto" you acquire will be a covered "auto" for that coverage only if:
   a. We already cover all "autos" that you own for that coverage or it replaces an "auto" you previously owned that had that coverage; and
   b. You tell us within 30 days after you acquire it that you want us to cover it for that coverage.

C. Certain Trailers, Mobile Equipment And Temporary Substitute Autos

If Liability Coverage is provided by this coverage form, the following types of vehicles are also covered "autos" for Liability Coverage:

1. "Trailers" with a load capacity of 2,000 pounds or less designed primarily for travel on public roads.
2. "Mobile equipment" while being carried or towed by a covered "auto."
3. Any "auto" you do not own while used with the permission of its owner as a temporary substitute for a covered "auto" you own that is out of service because of its:
   a. Breakdown;
   b. Repair;
   c. Servicing;
   d. "Loss"; or
   e. Destruction.

SECTION II – LIABILITY COVERAGE

A. Coverage

We will pay all sums an "insured" legally must pay as damages because of "bodily injury" or "property damage" to which this insurance applies, caused by an "accident" and resulting from the ownership, maintenance or use of a covered "auto."

We will also pay all sums an "insured" legally must pay as a "covered pollution cost or expense" to which this insurance applies, caused by an "accident" and resulting from the ownership, maintenance or use of covered "autos." However, we will only pay for the "covered pollution cost or expense" if there is either "bodily injury" or "property damage" to which this insurance applies that is caused by the same "accident."

We have the right and duty to defend any "insured" against a "suit" asking for such damages or a "covered pollution cost or expense." However, we have no duty to defend any "insured" against a "suit" seeking damages for "bodily injury" or "property damage" or a "covered pollution cost or expense" to which this insurance does not apply. We may investigate and settle any claim or "suit" as we consider appropriate. Our duty to defend or settle ends when the Liability Coverage Limit of Insurance has been exhausted by payment of judgments or settlements.

1. Who Is An Insured

The following are "insureds":

a. You for any covered "auto."

b. Anyone else while using with your permission a covered "auto" you own, hire or borrow except:

   (1) The owner or anyone else from whom you hire or borrow a covered "auto."

   This exception does not apply if the covered "auto" is a "trailer" connected to a covered "auto" you own.

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(2) Your "employee" if the covered "auto" is owned by that "employee" or a member of his or her household.

(3) Someone using a covered "auto" while he or she is working in a business of selling, servicing, repairing, parking or storing "autos" unless that business is yours.

(4) Anyone other than your "employees," partners (if you are a partnership), members (if you are a limited liability company) or a lessee or borrower or any of their "employees," while moving property to or from a covered "auto."

(5) A partner (if you are a partnership) or a member (if you are a limited liability company) for a covered "auto" owned by him or her or a member of his or her household.

c. Anyone liable for the conduct of an "insured" described above but only to the extent of that liability.

2. **Coverage Extensions**

a. **Supplementary Payments**

We will pay for the "insured":

(1) All expenses we incur.

(2) Up to $2,000 for cost of bail bonds (including bonds for related traffic law violations) required because of an "accident" we cover. We do not have to furnish these bonds.

(3) The cost of bonds to release attachments in any "suit" against the "insured" we defend, but only for bond amounts within our Limit of Insurance.

(4) All reasonable expenses incurred by the "insured" at our request, including actual loss of earnings up to $250 a day because of time off from work.

(5) All court costs taxed against the "insured" in any "suit" against the "insured" we defend. However, these payments do not include attorneys' fees or attorneys' expenses taxed against the "insured."

(6) All interest on the full amount of any judgment that accrues after entry of the judgment in any "suit" against the "insured" we defend, but our duty to pay interest ends when we have paid, offered to pay or deposited in court the part of the judgment that is within our Limit of Insurance.

These payments will not reduce the Limit of Insurance.

b. **Out-of-state Coverage Extensions**

While a covered "auto" is away from the state where it is licensed we will:

(1) Increase the Limit of Insurance for Liability Coverage to meet the limits specified by a compulsory or financial responsibility law of the jurisdiction where the covered "auto" is being used. This extension does not apply to the limit or limits specified by any law governing motor carriers of passengers or property.

(2) Provide the minimum amounts and types of other coverages, such as no-fault, required of out-of-state vehicles by the jurisdiction where the covered "auto" is being used.

We will not pay anyone more than once for the same elements of loss because of these extensions.

B. **Exclusions**

This insurance does not apply to any of the following:

1. **Expected Or Intended Injury**

"Bodily injury" or "property damage" expected or intended from the standpoint of the "insured."

2. **Contractual**

Liability assumed under any contract or agreement.

But this exclusion does not apply to liability for damages:

a. Assumed in a contract or agreement that is an "insured contract" provided the "bodily injury" or "property damage" occurs subsequent to the execution of the contract or agreement; or

b. That the "insured" would have in the absence of the contract or agreement.

3. **Workers' Compensation**

Any obligation for which the "insured" or the "insured's" insurer may be held liable under any workers' compensation, disability benefits or unemployment compensation law or any similar law.

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CNA	CNA PARAMOUNT **Blanket Additional Insured - Owners, Lessees or Contractors - with Products-Completed Operations Coverage - Limited Liability Endorsement**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

It is understood and agreed as follows:

I. The **WHO IS AN INSURED** section is amended to add as an **Insured** any person or organization whom the **Named Insured** is required by **written contract** to add as an additional insured on this **Coverage Part;** including any such person or organization, if any, specifically set forth on the Schedule attachment to this endorsement. However, such person or organization is an **Insured** only with respect to such person or organization's liability for:

A. **bodily injury, property damage**, or **personal and advertising injury** to the extent caused by:

1. the **Named Insured's** acts or omissions; or

2. the acts or omissions of those acting on the **Named Insured's** behalf,

in the performance of the **Named Insured's** ongoing operations specified in the **written contract**; or

B. **bodily injury** or **property damage** to the extent caused by **your work** specified in the **written contract** and included in the **products-completed operations hazard**, and only if

1. the **written contract** requires the **Named Insured** to provide the additional insured such coverage; and

2. this coverage **part** provides such coverage.

II. Subject always to the terms and conditions of this policy, including the limits of insurance, the insurer will not provide such additional insured with:

A. coverage broader than required by the **written contract**; or

B. a higher limit of insurance than required by the **written contract**.

III. The insurance granted by this endorsement to the additional insured does not apply to **bodily injury, property damage**, or **personal and advertising injury** arising out of:

A. acts or omissions of the additional insured, or of anyone acting on the additional insured's behalf; or

B. the rendering of, or the failure to render, any professional architectural, engineering, or surveying services, including:

1. the preparing, approving, or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; and

2. supervisory, inspection, architectural or engineering activities; or

C. any premises or work for which the additional insured is specifically listed as an additional insured on another endorsement attached to this **coverage part**.

IV. Notwithstanding anything to the contrary in the section entitled **COMMERCIAL GENERAL LIABILITY CONDITIONS,** the Condition entitled **Other Insurance**, this insurance is excess of all other insurance available to the additional insured whether on a primary, excess, contingent or any other basis. However, if this insurance is required by **written contract** to be primary and non-contributory, this insurance will be primary and non-contributory relative solely to insurance on which the additional insured is a named insured.

V. Solely with respect to the insurance granted by this endorsement, the section entitled **COMMERCIAL GENERAL LIABILITY CONDITIONS** is amended as follows:

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The Condition entitled **Duties In The Event of Occurrence, Offense, Claim or Suit** is amended with the addition of the following:

Any additional insured pursuant to this endorsement will as soon as practicable:

1. give the Insurer written notice of any **claim**, or any **occurrence** or offense which may result in a **claim**;
2. except as provided in Paragraph IV. of this endorsement, agree to make available any other insurance the additional insured has for any loss covered under this **coverage part**;
3. send the Insurer copies of all legal papers received, and otherwise cooperate with the Insurer in the investigation, defense, or settlement of the **claim**; and
4. tender the defense and indemnity of any **claim** to any other insurer or self insurer whose policy or program applies to a loss that the Insurer covers under this **coverage part**. However, if the **written contract** requires this insurance to be primary and non-contributory, this paragraph **4** does not apply to insurance on which the additional insured is a named insured.

The Insurer has no duty to defend or indemnify an additional insured under this endorsement until the Insurer receives written notice of a **claim** from the additional insured.

VI. Solely with respect to the insurance granted by this endorsement, the section entitled **DEFINITIONS** is amended to add the following definition:

Written contract means a written contract or written agreement that requires the **Named Insured** to make a person or organization an additional insured on this **coverage part**, provided the contract or agreement:

A. is currently in effect or becomes effective during the term of this policy; and

B. was executed prior to:

1. The **bodily injury** or **property damage**; or
2. The offense that caused the **personal and advertising injury**

for which the additional insured seeks coverage.

Any coverage granted by this endorsement shall apply solely to the extent permissible by law.

All other terms and conditions of the Policy remain unchanged.

This endorsement, which forms a part of and is for attachment to the Policy issued by the designated Insurers, takes effect on the effective date of said Policy at the hour stated in said Policy, unless another effective date is shown below, and expires concurrently with said Policy.

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ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 11/28/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
The Driscoll Agency, Inc.
93 Longwater Circle
Norwell MA 02061

CONTACT NAME:
PHONE (A/C, No, Ext): 781-681-6656 FAX (A/C, No): 781-681-6686
E-MAIL ADDRESS: jbd@driscollagency.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Illinois Union Ins. Co.	
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED 215070
D & C Construction Company, Inc.
415 VFW Drive
PO Box 415
Rockland MA 02370-0415

COVERAGES **CERTIFICATE NUMBER:** 728242688 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	CLAIMS-MADE / OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	POLICY / PRO-JECT / LOC						PRODUCTS - COMP/OP AGG	$
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	ANY AUTO						BODILY INJURY (Per person)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB / OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB / CLAIMS-MADE						AGGREGATE	$
	DED / RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						PER STATUTE / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N/A						E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Project Specific Pollution Liability			CPYG46839432001	11/21/2017	11/21/2018	Per Pollution Conditn Total Aggregate Limit General Retention	$1,000,000 $1,000,000 $2,500

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Contracting operations performed by or on behalf of the Named Insured for the Madison, Walnut, Washington Streets, Sewer Separation Project, Portland, ME

The City of Portland, ME is included as Additional Insureds for Pollution Liability as required by a signed written contract or agreement with See Attached...

CERTIFICATE HOLDER

City Of Portland
55 Portland St.
Attn: Carol Merritt
Portland ME 04101

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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AGENCY CUSTOMER ID: 215070

LOC #:

ADDITIONAL REMARKS SCHEDULE

AGENCY The Driscoll Agency, Inc.	NAMED INSURED D & C Construction Company, Inc. 415 VFW Drive PO Box 415 Rockland MA 02370-0415
POLICY NUMBER	
CARRIER / NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 FORM TITLE: CERTIFICATE OF LIABILITY INSURANCE

the Named Insured.

Notice of cancellation provision is 30 days, except 10 days applies for non-payment of premium.

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Bond No. 30017404

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Performance Bond

CONTRACTOR:
(Name, legal status and address)

D & C Construction Co., Inc.
415 V.F.W. Drive,
Rockland, MA 02370

SURETY:
(Name, legal status and principal place of business)

Western Surety Company
333 S. Wabash,
Chicago, IL 60604

Mailing Address for Notices

Western Surety Company
333 S. Wabash,
Chicago, IL 60604

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)

City of Portland
55 Portland Street,
Portland, ME 04101

CONSTRUCTION CONTRACT
Date: **10/6/2017**

Amount: **Two Million Three Hundred Fifty-one Thousand Four Hundred Twenty-eight And 75/100THS DOLLARS, ($2,351,428.75)**

Description:
(Name and location) **Sewer Separation Project Madison, Walnut, Washington Sewer Separation Bid #18009**

BOND
Date: **10/10/2017**

(Not earlier than Construction Contract Date)

Amount: **Two Million Three Hundred Fifty-one Thousand Four Hundred Twenty-eight And 75/100THS DOLLARS, ($2,351,428.75)**

Modifications to this Bond: ☒ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*
D & C Construction Co., Inc.

Signature: Rene L. Perron
Name and Title: RENE L. PERRON CONSTRUCTION MANAGER

SURETY
Company: *(Corporate Seal)*
Western Surety Company

Signature:
Name and Title: **Martin L. Donovan, Attorney-In-Fact**

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

The Driscoll Agency
93 Longwater Circle,
Norwell, MA 02061
781.681.6656

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

S-1852/AS 8/10

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- **.1** the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- **.2** the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- **.3** the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- **.1** After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- **.2** Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- **.1** the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- **.2** additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- **.3** liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature: _____

Name and Title:

Address

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and Title:

Address

Bond No. 30017404

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Payment Bond

CONTRACTOR:
(Name, legal status and address)

D & C Construction Co., Inc.
415 V.F.W. Drive,
Rockland, MA 02370

SURETY:
(Name, legal status and principal place of business)

Western Surety Company
333 S. Wabash,
Chicago, IL 60604

Mailing Address for Notices

Western Surety Company
333 S. Wabash,
Chicago, IL 60604

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)

City of Portland
55 Portland Street,
Portland, ME 04101

CONSTRUCTION CONTRACT
Date: **10/6/2017**

Amount: **Two Million Three Hundred Fifty-one Thousand Four Hundred Twenty-eight And 75/100THS DOLLARS, ($2,351,428.75)**

Description:
(Name and location) **Sewer Separation Project Madison, Walnut, Washington Sewer Separation Bid #18009**

BOND
Date: **10/10/2017**
(Not earlier than Construction Contract Date)

Amount: **Two Million Three Hundred Fifty-one Thousand Four Hundred Twenty-eight And 75/100THS DOLLARS, ($2,351,428.75)**

Modifications to this Bond: [X] None [ ] See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

D & C Construction Co., Inc.

Signature: Rene L. Perron
Name and Title: RENE L. PERRON CONSTRUCTION MANAGER

SURETY
Company: *(Corporate Seal)*

Western Surety Company

Signature: Martin L. Donovan
Name and Title: **Martin L. Donovan, Attorney-In-Fact**

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

The Driscoll Agency
93 Longwater Circle, Norwell, MA 02061
781.681.6656

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- **.1** have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- **.2** have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	
Address		Address	

Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

George G Powers, Martin L Donovan, Timothy P Lyons, Claire A Cavanaugh, John C Driscoll, Dennis Driscoll, Individually

of Norwell, MA, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 1st day of September, 2016.

WESTERN SURETY COMPANY

Paul T. Bruflat, Vice President

State of South Dakota
County of Minnehaha } ss

On this 1st day of September, 2016, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires
June 23, 2021

J. MOHR
NOTARY PUBLIC SOUTH DAKOTA

J. Mohr, Notary Public

CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 10 day of October, 2017.

WESTERN SURETY COMPANY

L. Nelson, Assistant Secretary

Form F4280-7-2012

SEWER WORK REMAINING 2019
Deerfield and Belmeade:
10" Sewer: 522 LF = $51,350
4' Manholes: 2 Ea = $8,000
Lateral Estimate: 250 LF = $22,500
Total 2019 Sewer Work Remaining: $81,850

Bedford and Durham Street THRU OCTOBER 2018 (NO SEWER WORK IN NOV/DEC):
8" SEWER: 2,068.50 LF = $198,369.15
4/6" Laterals: 242.50 LF = $21,825
4' Manholes: 10 Each = $40,000
Total 2018 Sewer Rehab: $260,194.15

Bedford Street Sewer Separation Project
Shaw Brothers Construction, Inc.
PO BOX 69, 341 Mosher Rd.
Gorham, ME
Purchase Order No.: 044992
Account No.
375-3100.500

ent of Public Works
ring

Payment 7

Payment Period **10/1/2018-10/31/2018**
Submitted: **13-Nov-18**
Processed: **19-Dec-18**

Sewer Separation Base Bid

Item No	Description	Unit	EST QTY	UNIT PRICE	EST AMT	Payment 7 QTY REQ	Payment 7 AMOUNT REQUESTED	PRI QT				% PLETE
201.24	Remove Tree and Stamp	EA	4.00	$650.00	$2,600.00	0.00	$0.00	2.00	$1,300.00	2.00	$1,300.00	50%
202.15	Remove Existing Manhole or Catch Basin	EA	6	$450.00	$2,700.00	0.00	$0.00	7.00	$3,150.00	7.00	$3,150.00	117%
202.20	Remove Bituminous Concrete Pavement	SY	20,970	$3.50	$73,395.00	0.00	$0.00	6,859.72	$24,009.02	6859.72	$24,009.02	33%
202.60	Remove Storm Drain or Sewer Pipe	LF	82	$30.00	$2,460.00	0.00	$0.00	30.00	$900.00	30.00	$900.00	37%
202.70	Remove Subsurface Cobblestones with Concrete Base	SY	2,740	$13.00	$35,620.00	0.00	$0.00	85.44	$1,110.72	85.44	$1,110.72	3%
202.90	Remove Subsurface Rail Line	LF	920	$7.20	$6,624.00	0.00	$0.00	94.00	$676.80	94.00	$676.80	10%
203.20	Common Excavation	CY	4,840	$19.50	$94,380.00	0.00	$0.00	3,761.60	$73,351.20	3761.60	$73,351.20	78%
203.25	Granular Borrow	CY	340	$25.00	$8,500.00	0.00	$0.00	472.54	$11,813.50	472.54	$11,813.50	139%
203.28	Test Pits	VF	70	$86.50	$6,055.00	0.00	$0.00	42.30	$3,658.95	42.30	$3,658.95	60%
203.35	Crushed Stone (Overdepth)	CY	140	$35.00	$4,900.00	0.00	$0.00	4.44	$155.40	4.44	$155.40	3%
206.061	Structural Earth Excavation (Overdepth)	CY	140	$20.00	$2,800.00	0.00	$0.00	4.44	$88.80	4.44	$88.80	3%
206.07	Structural Rock Excavation	CY	1,620	$0.01	$16.20	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
304.10	Aggregate Subbase Course Type D	CY	6,010	$27.00	$162,270.00	0.00	$0.00	3,356.16	$90,616.32	3356.16	$90,616.32	56%
304.15	Aggregate Base Course Type B	CY	1,140	$36.00	$41,040.00	0.00	$0.00	557.91	$20,084.76	557.91	$20,084.76	49%
312.10	Bituminous Driveway/Apron	SY	563	$49.00	$27,587.00	0.00	$0.00	275.00	$13,475.00	275.00	$13,475.00	49%
403.207	Hot Mix Asphalt 19mm	TON	2,280	$87.00	$198,360.00	0.00	$0.00	860.12	$74,830.44	860.12	$74,830.44	38%
403.208	Hot Mix Asphalt 12.5mm	TON	2,440	$89.00	$217,160.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
603.132	8 Inch PVC SDR35 Storm Drain/Sewer Pipe	LF	2,140	$95.90	$205,226.00	19.00	$1,822.10	2,049.50	$196,547.05	2068.50	$198,369.15	97%
603.142	10 Inch PVC SDR35 Storm Drain/Sewer Pipe	LF	1,150	$98.30	$113,045.00	0.00	$0.00	258.00	$25,361.40	258.00	$25,361.40	22%
603.159	12 Inch PVC or HDPE Storm Drain Pipe	LF	1,150	$95.00	$109,250.00	17.00	$1,615.00	103.00	$9,785.00	120.00	$11,400.00	10%
603.179	18 Inch Diameter Storm Drain Pipe	LF	390	$140.00	$54,600.00	0.00	$0.00	114.00	$15,960.00	114.00	$15,960.00	29%
603.199	24 Inch Diameter Storm Drain Pipe	LF	1,870	$150.60	$281,622.00	154.00	$23,192.40	869.00	$130,871.40	1023.00	$154,063.80	55%
603.209	30 Inch Diameter PVC or HDPE Storm Draine Pipe	LF	765	$160.50	$122,782.50	0.00	$0.00	543.50	$87,231.75	543.50	$87,231.75	71%
603.219	36 Inch Diameter PVC or HDPE Storm Drain Pipe	LF	300	$160.00	$48,000.00	0.00	$0.00	297.50	$47,600.00	297.50	$47,600.00	99%
603.229	42 Inch Diameter PVC or HDPE Storm Drain Pipe	LF	320	$180.00	$57,600.00	0.00	$0.00	330.00	$59,400.00	330.00	$59,400.00	103%
603.239	48 Inch Diameter PVC or HDPE Storm Drain Pipe	LF	710	$227.50	$161,525.00	0.00	$0.00	708.00	$161,070.00	708.00	$161,070.00	100%
603.259	60 Inch Diameter PVC or HDPE Storm Drain Pipe	LF	220	$280.50	$61,710.00	0.00	$0.00	225.50	$63,252.75	225.50	$63,252.75	103%
603.829	42 Inch Diameter DIP, Class 250, Storm Drain Pipe	LF	90	$459.00	$41,310.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
603.91	30 Inch Diameter Check Valve	EA	1	$12,750.00	$12,750.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
603.93	42 Inch Diameter Check Valve	EA	2	$24,750.00	$49,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
604.131	4 Foot Diameter Catch Basin	EA	44	$3,800.00	$167,200.00	0.00	$0.00	12.00	$45,600.00	12.00	$45,600.00	27%
604.15	4 Foot Diameter Manhole	EA	21	$4,000.00	$84,000.00	0.00	$0.00	13.00	$52,000.00	13.00	$52,000.00	62%
604.153	5 Foot Diameter Manhole	EA	23	$6,045.00	$139,035.00	1.00	$6,045.00	6.00	$36,270.00	7.00	$42,315.00	30%
604.154	6 Foot Diameter Manhole	EA	7	$7,800.00	$54,600.00	0.00	$0.00	4.00	$31,200.00	4.00	$31,200.00	57%
604.156	8 Foot Diameter Manhole	EA	4	$15,000.00	$60,000.00	0.00	$0.00	8.00	$120,000.00	8.00	$120,000.00	200%
604.159	14 Foot x 5 Foot Vault Structure	EA	1	$33,125.00	$33,125.00	0.00	$0.00	1.00	$33,125.00	1.00	$33,125.00	100%
604.161	Modify Structure	EA	8	$1,500.00	$12,000.00	0.00	$0.00	5.00	$7,500.00	5.00	$7,500.00	63%
604.18	Adjusting Manhole or Structure to Grade	EA	7	$750.00	$5,250.00	0.00	$0.00	1.00	$750.00	1.00	$750.00	14%
608.08	Reinforced Concrete Sidewalk	SY	302	$89.00	$26,878.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.081	Reinforced Concrete Driveway	SY	77	$110.00	$8,470.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.15	Brick Sidewalk with Bituminous Base	SY	20	$115.00	$2,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
608.26	Curb Ram Detectable Warning Field	SF	12	$100.00	$1,200.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.15	Sloped Curb Type 1	LF	472	$35.00	$16,520.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.151	Sloped Curb Type 1 - Cir.	LF	58	$50.00	$2,900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
609.38	Remove and Reset Granite Curb	LF	770	$28.00	$21,560.00	355.50	$9,954.00	187.50	$5,250.00	543.00	$15,204.00	71%
610.08	Plain Riprap	CY	456	$70.00	$31,920.00	0.00	$0.00	281.61	$19,712.70	281.61	$19,712.70	62%
614.14	Masonry Plug	EA	28	$450.00	$12,600.00	0.00	$0.00	9.00	$4,050.00	9.00	$4,050.00	32%
614.16	Flowable Concrete Fill	CY	30	$175.00	$5,250.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%

615.072	Loam, Seed, and Mulch	SY	390	$10.00	$3,900.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
621.712	Harbacceous Perennial (No. 1 Count) Group A	EA	58	$25.00	$1,450.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
627.733	4 Inch White or Yellow Pavement Marking Line	LF	9,590	$0.30	$2,877.00	0.00	$0.00	3,742.00	$1,122.60	3742.00	$1,122.60	39%
627.744	6 Inch White or Yellow Pavement Marking Line	LF	3,820	$0.50	$1,910.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
627.75	White or Yellow Pavement & Curb Marking	LF	2,530	$2.00	$5,060.00	0.00	$0.00	814.00	$1,628.00	814.00	$1,628.00	32%
627.82	Directional Arrow & Bike Symbol	EA	44	$35.00	$1,540.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
629.05	Hand Labor, Straight Time	HR	40	$45.00	$1,800.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
629.06	Mason, Straight Time	HR	40	$45.00	$1,800.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.105	Air Tool and Compressor (incl. Operator)	HR	40	$50.00	$2,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.12	All Purpose Excavator (incl. Operator)	HR	40	$170.00	$6,800.00	0.00	$0.00	2.00	$340.00	2.00	$340.00	5%
631.121	Heavy Duty Excavator (incl. Operator)	HR	40	$210.00	$8,400.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.13	Bulldozer (incl. Operator)	HR	40	$125.00	$5,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.172	Truck - Large or Small (incl. Operator)	HR	40	$90.00	$3,600.00	0.00	$0.00	2.00	$180.00	2.00	$180.00	5%
631.22	Front End Loader (incl. Operator)	HR	40	$100.00	$4,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
631.36	Foreman, Straight Time	HR	40	$80.00	$3,200.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
632.043	10 Inch Inserta-Tee Section	EA	6	$500.00	$3,000.00	0.00	$0.00	5.00	$2,500.00	5.00	$2,500.00	83%
632.08	4"/6" x 8" WYE Section	EA	19	$200.00	$3,800.00	0.00	$0.00	17.00	$3,400.00	17.00	$3,400.00	89%
633.05	4"/6" Sewer Laterals	LF	919	$90.00	$82,710.00	116.00	$10,440.00	126.50	$11,385.00	242.50	$21,825.00	26%
637.071	Dust Control	LS	1	$5,000.00	$5,000.00	0.00	$0.00	0.60	$3,000.00	0.60	$3,000.00	60%
645.106	Demount and Reinstall Sign	LS	1	$2,500.00	$2,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
645.107	Furnish & Install New Reg, Warning, Conf. & Route Sign	LS	1	$2,500.00	$2,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
652.38	Flagger	EA	1	$113,750.00	$113,750.00	0.05	$5,687.50	0.65	$73,937.50	0.70	$79,625.00	70%
652.39	Work Zone Traffic Control	LS	1	$1,747,000.00	$1,747,000.00	0.05	$87,350.00	0.70	$1,222,900.00	0.75	$1,310,250.00	75%
654.08	Density Test	EA	43	$75.00	$3,225.00	0.00	$0.00	16.00	$1,200.00	16.00	$1,200.00	37%
656.75	Temporary Soil Erosion and Water Pollution Control	LS	1	$13,000.00	$13,000.00	0.00	$0.00	0.50	$6,500.00	0.50	$6,500.00	50%
670.06	NSBB-6-12 Nutrient Baffle Box	EA	1	$70,070.00	$70,070.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
670.1	NSBB-10-16 Nutrient Baffle Box	EA	1	$122,020.00	$122,020.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.401	Water Quality Swale 1	EA	1	$5,300.00	$5,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.402	Water Quality Swale 2	EA	1	$5,300.00	$5,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.403	Water Quality Swale 3	EA	1	$5,300.00	$5,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.404	Water Quality Swale 4	EA	1	$6,400.00	$6,400.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.405	Water Quality Swale 5	EA	1	$8,500.00	$8,500.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
900.406	Water Quality Swale 6	EA	1	$6,400.00	$6,400.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
901.501	Filtera 6 x 10	EA	1	$28,300.00	$28,300.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
901.502	Filtera 4 x 8	EA	1	$21,400.00	$21,400.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
999	Belmeade Outfall Completion Date	LS	1	-$75,000.00	-$75,000.00	0.00	$0.00	0.00	$0.00	0.00	$0.00	0%
999.1	Clerical Error on Proposal	LS	1	$28.00	$28.00	0.00	$0.00	1.00	$28.00	1.00	$28.00	100%
999.2	Thames Street Test Pits	LS	1	-	-	1.00	$4,360.00	0.00	$0.00	1.00	$4,360.00	100%
Sewer Separation Total					**$5,124,035.70**		**$150,466.00**		**$2,799,879.06**		**$2,950,345.06**	**58%**

Change Order #1 -DMH-4 RESET

Item No	Description	Unit	EST QTY	UNIT PRICE	EST AMT	QTY REQ	AMOUNT REQUESTED	PREV QTY	AMOUNT REQUESTED	QTY TO DATE	AMOUNT TO DATE	% COMPLETE
CO # 1	DMH-4 Reset	LS	1.00	$18,318.00	$18,318.00	0.00	$0.00	1.00	$18,318.00	1.00	$18,318.00	100%
CO # 1 Total					**$18,318.00**		**$0.00**		**$18,318.00**		**$18,318.00**	**100%**

	Total Value	Pyament 7	Previous	To Date	
Project Totals	$5,142,353.70	$150,466.00	$2,818,197.06	$2,968,663.06	58%

Bedford Street Sewer Separation	$5,124,035.70
CO # 1- DMH-4 Reset	$18,318.00
Project Total	$5,142,353.70

TOTAL THIS ESTIMATE		$150,466.00
RETAINAGE (5%) - LINE ITEM 1 - MM1310		$7,523.30
****** PAY THIS ESTIMATE ******		$142,942.70
Purchase Order:	44992	
PAY THIS ESTIMATE	MM1310 LINE ITEM 1	$142,942.70
PAY THIS ESTIMATE	MM1310 LINE ITEM 2	$0.00
	TOTAL PAYMENT	$142,942.70

PAID	
PAY REQUISITION 1	$472,209.57
PAY REQUISITION 2	$1,496.25
PAY REQUISITION 3	$440,819.66
PAY REQUISITION 4	$415,336.88
PAY REQUISITION 5	$961,662.18
PAY REQUISITION 6	$385,762.67
PAY REQUISITION 7	$142,942.70
TOTAL PAID TO DATE	$2,820,229.91
RETAINAGE	
PAY REQUISITION 1	$24,853.14
PAY REQUISITION 2	$78.75
PAY REQUISITION 3	$23,201.03
PAY REQUISITION 4	$21,859.84
PAY REQUISITION 5	$50,613.80
PAY REQUISITION 6	$20,303.30
PAY REQUISITION 7	$7,523.30
TOTAL RETAINAGE TO DATE	$148,433.15
TOTAL PROJECT AMOUNT	$5,142,353.70
(-) TOTAL COST TO DATE	$2,968,663.06
BALANCE OF CONTRACT	$2,173,690.64

19-Dec-18
Date

Brad A. Roland, P.E.
Senior Project Engineer
City of Portland Public Works

Project Engineer - Justin R. Pellerin, P.E.
City of Portland Public Works

Checked By - Tim Michaud for Tim Michaud
City Inspector- Wood.

Chris Dyer
Shaw Brothers, Project Manager

AGREEMENT BETWEEN THE
CITY OF PORTLAND
AND
SHAW BROTHERS CONSTRUCTION, INC.

THIS AGREEMENT is entered into this 9th day of April, 2018, by and between the **CITY OF PORTLAND,** a body politic and corporate, (hereinafter the "**CITY**"), and **SHAW BROTHERS CONSTRUCTION, INC.,** a Maine corporation with a mailing address of P.O. Box 69, 341 Mosher Road, Gorham, ME 04038 (hereinafter the "**CONTRACTOR**").

W I T N E S S E T H:

WHEREAS, the CITY is in need of sewer and stormwater separation on Bedford Street and did advertise its original request for bids #18056 dated February 16, 2018 entitled "Bedford Street Sewer Separation," as amended by Addenda No. 1 dated February 26, 2018, No. 2 dated March 7, 2018 and No. 3 dated February March 12, 2018; and

WHEREAS, the CONTRACTOR has the requisite knowledge and technical ability to perform the required services and has submitted a proposal for the provision of such services dated March 15, 2018 (hereinafter, the "Proposal") a copy of which is attached as Exhibit B and made a part hereof; and

WHEREAS, after due consideration, the CITY did award the bid to the CONTRACTOR;

NOW, THEREFORE, in consideration of the mutual promises made by each party to the other, the parties covenant and agree as follows:

1. Due to the substantial changes made to the original bid documents by virtue of the above-referenced addenda, the CITY created a revised request for bids by replacing in the original request for bids the pages changed by the addenda. A copy of the revised request for bids, which includes the changes made by the addenda and the Contract Drawings for the Bedford Street Sewer Separation Project (collectively, the "Request for Bids") is attached hereto as Exhibit A and incorporated herein by reference. The parties acknowledge and agree that Exhibit A supersedes and replaces the original request for bids and the addenda referenced in the first "whereas" clause above.

The CONTRACTOR will furnish the materials, supplies, equipment and labor and will perform all work required to construct separated storm and sewer infrastructure (hereinafter the "Work"), in accordance with the specifications contained in the Request for Bids and also in accordance with CONTRACTOR's Proposal.

The restatement in this document of any term of the Request for Bids or Proposal shall not be deemed to waive any term not so restated. If any disagreement is found between Request for Bids or the Proposal and this document, then this document shall govern; and the Request for Bids shall govern over the Proposal, to the extent they disagree; provided, however, that this document and its attachments shall be construed to be supplemental to one another to the extent possible.

2. CONTRACTOR covenants and agrees that all work performed and materials used shall be free from all defects, and that all work shall be performed in a good workmanlike manner. Unless a longer warranty period is specified in the attachments hereto, all Work provided hereunder shall be warranted by CONTRACTOR for one (1) full year from the date of completion of all Work hereunder and acceptance thereof by the CITY. Notwithstanding the foregoing, any longer period specified in the attachments shall stay in effect. CONTRACTOR shall perform in compliance with all applicable federal, state and local laws and rules and shall obtain at its own cost all necessary permits.

3. CONTRACTOR shall procure and maintain occurrence-based Automobile Liability Insurance and Commercial General Liability Insurance coverage (including completed operations coverage for at least 36 months after completion of the Work), and Pollution Liability Insurance coverage in amounts of not less than Three Million Dollars ($3,000,000.00) per occurrence for bodily injury, death and property damage, naming the CITY as an additional insured thereon. CONTRACTOR shall maintain Workers' Compensation Insurance coverage to the extent required by law. With respect to the Automobile, Commercial General, and Pollution Liability Insurance, the CONTRACTOR shall name the CITY as an additional insured for coverage only in those areas where government immunity has been expressly waived by 14 M.R.S. A. § 8104-A, as limited by § 8104-B, and § 8111. This provision shall not be deemed a waiver of any defenses, immunities or limitations of liability or damages available to the CITY under the Maine Tort Claims Act, other Maine statutory law, judicial precedent, common law, or any other defenses, immunities or limitations of liability available to the CITY. CONTRACTOR shall maintain certificates evidencing all such coverages, which certificates shall guarantee thirty (30) days' notice to the CITY of termination of insurance from the insurance provider or agent. CONTRACTOR shall also provide a copy of any endorsement naming the CITY as additional insured. A certificate that merely has a box checked under "Addl Insr," or the like, or that merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. Upon CITY'S request, CONTRACTOR shall provide CITY with a complete copy of any of the above-referenced policies. CITY's acceptance or lack of acceptance of CONTRACTOR's Certificate of Insurance or other evidence of insurance shall not be construed as a waiver of the CONTRACTOR's obligation to obtain and maintain such insurance as required by

this agreement. CONTRACTOR shall be responsible for any and all deductibles and/or self-insured retentions. CONTRACTOR acknowledges and agrees that it shall comply with substantially similar insurance requirements included in construction license agreements between the City and the University of Maine System and other owners of property abutting the work.

4. The CONTRACTOR shall furnish to the CITY, upon execution of the Contract, a Contract Performance Bond and a Contract Labor and Materials Payment Bond each for the full amount of the Contract and issued by a surety company or surety companies authorized to do business in the State of Maine and approved by the CITY. The Bonds shall remain in effect for one year after final acceptance of the Work, and protect the CITY for at least one year of warranty of the Work hereunder, and also shall insure settlement of claims for the payment of all bills for labor, materials and equipment.

5. To the fullest extent permitted by law, the CONTRACTOR shall defend, indemnify and hold harmless the CITY, its officers and employees, from and against all claims, damages, losses, and expenses, just or unjust, including, but not limited to, the costs of defense and attorney's fees arising out of or resulting from the performance of this Agreement, provided that any such claims, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use therefrom, and (2) is caused in whole or in part by any act or omission of the CONTRACTOR, anyone directly or indirectly employed by it, or anyone for whose act it may be liable. Such obligation of indemnification shall not be construed to negate or abridge any other obligation of indemnification running to the CITY which otherwise exists. The extent of the indemnification provision shall not be limited by the provision for insurance in this Agreement. CONTRACTOR's obligations under this paragraph shall survive termination of this Agreement.

6. Prior to any payment, the CITY reserves the right to require Waivers of Lien for materials and labor from the CONTRACTOR and its subcontractors and suppliers guaranteeing One Hundred Percent (100%) performance, free and clear from all liens and encumbrances. Any mechanic's lien or any other lien which may be filed against the premises which are the subject of this Agreement by reason of the Work described herein shall be defended (by counsel reasonably acceptable to the CITY) and promptly discharged by the CONTRACTOR at its own expense. The CITY may require the CONTRACTOR to provide a bond satisfactory to the CITY to indemnify it against any lien and as a substitution in place of a lien. If the CONTRACTOR should fail either to defend the CITY against the lien or to discharge it, then the CITY may do so at the CONTRACTOR's expense. In the event of such an undertaking by the CITY, the CONTRACTOR will promptly reimburse the CITY for all its costs and expenses in so doing, including, but not limited to, reimbursement of the CITY's reasonable counsel fees, as well as costs which may be incurred by it in substituting a bond in place of a lien. CONTRACTOR's obligations under this paragraph shall survive termination of this Agreement.

7. The CONTRACTOR shall perform the work to the satisfaction of the responsible CITY official who will have the right of inspection at all times, and whose approval and

acceptance of the work will be a condition precedent to payments by the CITY under this Contract. CITY inspectors will have the authority to stop work in progress if such work is being done contrary to the plans, specifications or engineering practice. CONTRACTOR acknowledges and agrees that such inspection is for purposes of approving payment alone and such inspection shall not be deemed to impose any duty or liability upon the CITY to supervise any aspect of or approve the quality of the Work.

8. Time is of the essence in the performance of this Agreement. Upon receipt of executed contracts and insurance as required, the CITY will promptly send an executed CITY contract to the CONTRACTOR, which will commence work upon receipt.

   CONTRACTOR acknowledges and agrees that the construction of storm drain outfalls at Baxter Boulevard, north of Preble Street (Bedford System), and the intersection of Baxter Boulevard and Belmeade Road (Belmeade System) includes working in a protected natural water resource. This work shall be completed in accordance with NRPA Permit by Rule and US Army Corps of Engineer permit requirements including the Maine Department of Marine Resources and Maine Department of Inland Fisheries and Wildlife Timing of Activity approvals.

   Bedford System. CONTRACTOR shall commence Work on the project on or before April 16, 2018. Construction of the storm drain outfall pipe for the Bedford Street System shall be complete by May 1, 2018, and CONTRACTOR shall be required to begin work on Bedford Street by May 14, 2018 and complete all construction up to first lift of asphalt on Bedford Street by August 31, 2018. The CONTRACTOR is required to complete the Bedford Street outfall system up to substantial completion with all base paving by October 31, 2018. All Bedford Street Work, including, without limitation, final completion of the Bedford Street outfall system and final lift of the pavement, shall be complete by June 1, 2019.

   Belmeade System. CONTRACTOR shall commence Work on the Belmeade System by April 1, 2019, and construction of the storm drain outfall pipe for the Belmeade System shall be completed by May 1, 2019. The CONTRACTOR is required to complete the Belmeade System up to substantial completion with all base paving by June 30, 2019. All Belmeade System Work, including, without limitation, Final completion of the Belmeade System and final lift of the pavement, shall be complete by June 30, 2020. In the event that CONTRACTOR begins the Belmeade outfall Work in 2018, construction of the storm drain outfall pipe for the Belmeade System shall be completed by May 1, 2018.

9. In the event of any dispute as to the amount, nature or scope of the work required under this Contract, the design and judgment of the Director of Public Works or his or her designee (hereinafter, the "Director") will be final and binding.

10. For performance of all the terms and conditions of this Agreement, the CITY will pay the CONTRACTOR Five Million One Hundred Twenty-Four Thousand Seven Dollars and Seventy Cents ($5,124,035.70) according to the rates set forth in the Proposal. This amount includes (1) a $75,000 deduction from the price set forth in the Proposal in exchange for the City's acceptance of a later completion date for the Belmeade Street

Outfall system as described in a March 27, 2018 letter to the City from the Contractor (a copy of which is attached hereto as Exhibit C), and (2) an increase of $28.00 to account for a clerical error in the Proposal.[1]

11. Payment shall be in accordance with Section 108 – Prior to substantial completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as the **CITY** may determine or may withhold, including but not limited to liquidated damages in accordance with general conditions:

    i. 95 percent of work completed (with balance being retainage); and
    ii. 95 percent of cost of materials and equipment not incorporated in the work (with balance being retainage)

    Upon substantial completion, the **CITY** shall pay an amount sufficient to increase total payments to the **CONTRACTOR** to 98 percent of the work completed, less such amounts as the **CITY** shall determine in accordance with general conditions. The final two percent of the value of the Work shall be retained for a period of one year from the date of substantial completion.

12. The CONTRACTOR shall keep accurate records of all services performed under this Agreement and shall submit such information to the CITY on a monthly basis. Payment for such Work shall be made to the CONTRACTOR not more than thirty (30) days after receipt of an invoice and acceptance of the Work by the Director.

13. The CITY may terminate this Agreement for cause by written notice to the CONTRACTOR. In the event of such termination, the CONTRACTOR shall not be entitled to any further payment under this Agreement from the date of receipt of said notice.

14. The CITY shall have the right to terminate this Agreement at any time for its convenience on thirty (30) days' prior written notice to the CONTRACTOR. If the Agreement is terminated by the CITY for convenience, the CITY shall pay the CONTRACTOR for all Work performed and all materials purchased pursuant to this Agreement prior to receipt of such notice.

15. Out of concern for the public, CITY employees and the CONTRACTOR's employees, all work performed by the CONTRACTOR shall be in conformance with pertinent OSHA, local, state and federal government regulations.

16. No waiver of any breach of any one or more of the conditions of this Agreement by the CITY shall be deemed to imply or constitute a waiver of any succeeding or other breach hereunder.

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[1] Exhibit C includes other price reductions proposed by Contractor for allowing certain daytime work. The City has not agreed to allow the proposed daytime work.

17. This Agreement and its attachments represents the entire and complete agreement and understanding between the parties and supersedes any prior agreement or understanding, written or oral, between the parties with respect to the subject matter of this Agreement. This Agreement cannot be amended except by written instrument executed by the CITY and CONTRACTOR.

18. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the obligations hereunder, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court.

19. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement. A signature in a pdf or electronic document shall be considered the equivalent of an original signature.

20. CONTRACTOR warrants and represents that it has the full right and authority to enter into this Agreement, that there is no impediment that would inhibit its ability to perform their respective obligations under this Agreement, and that the person signing this Agreement on behalf of CONTRACTOR has the authority to do so.

21. CONTRACTOR acknowledges and agrees that the Work requires a temporary right of access on properties owned by others as set forth in a March 27, 2018 Temporary License Agreement between the City and Oakhurst Dairy related to property located at 332-336 Forest Avenue, a March 30, 2018 Temporary License Agreement between the City and the University of Southern Maine related to property located at 23-37 Bedford Street, and a March 30, 2018 Temporary License Agreement between the City and the University of Southern Maine related to property located at 96 Falmouth Street, copies of which are attached hereto collectively as Exhibit D and incorporated herein. CONTRACTOR agrees to comply with all terms and conditions set forth in the license agreements included in Exhibit D.

Signature page follows.

IN WITNESS WHEREOF, the said **CITY OF PORTLAND** has caused this Agreement to be signed and sealed by Jon P. Jennings, its City Manager, thereunto duly authorized, **SHAW BROTHERS CONSTRUCTION, INC.** has caused this Agreement to be signed and sealed by Daniel H. Shaw, its Treasurer, thereunto duly authorized, the day and date first above written.

WITNESS:

CITY OF PORTLAND

By: _____
Jon P. Jennings
Its City Manager

WITNESS:

SHAW BROTHERS CONSTRUCTION, INC.

By: _____

Print or type name: Daniel H. Shaw

Its: Treasurer

Approved as to form:

_____
City Corporation Counsel's Office

Approved as to funds:

_____
City Finance Director

EXHIBIT A

CITY OF PORTLAND, MAINE

DEPARTMENT OF PUBLIC WORKS

CONTRACT AND SPECIFICATIONS

For

Bedford Street Sewer Separation

Bid Number: 18056

Dated: February 16, 2018
Issued for Bid

STATE OF MAINE
ROBERT A. McSORLEY
No. 8589
LICENSED
PROFESSIONAL ENGINEER

2-16-18

Bedford Street Sewer Separation

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ADVERTISEMENT: NOTICE TO CONTRACTORS

Bid No. 18056
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

Project Name: Bedford Street Sewer Separation

Sealed bids, addressed to Purchasing, Room 103, City Hall, 389 Congress Street, Portland, Maine 04101, and endorsed on the outside of the envelope with the name of the Bidder, Contract Name and Bid number will be received until 3:00 PM (prevailing time) on **March 15, 2018**, at which time they will be publicly opened and read.

Location: The Bedford Street Sewer Separation Project is located along portions of Bedford Street, Durham Street, Forest Avenue, Baxter Boulevard, Preble Street Extension, Belmeade Road, Deerfield Road and Grasmere Road.

Outline of Work: The City of Portland work includes installation of sewer and storm drain pipe, catch basin and drain manhole structures, street re-construction, earthwork, dewatering, and associated work as shown on contract drawings and documents. Work also includes water renewal work in the project limits. The selected Contractor will be required to enter into a separate contract with the Portland Water District and shall complete the required work in accordance with the Portland Water District Contract documents. The contactor shall coordinate, cooperate and schedule all work between the City of Portland and Portland Water District to ensure sewer separation work and water renewal work is completed in accordance with both the City of Portland and Portland Water District requirements. Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis and include alternate bid items as indicated in the Bid Form.

Bid Note: The start of work for this project is anticipated to be on or before April 1, 2018. The Contractor is required to complete the project at substantial completion with all base paving by October 31st, 2018. The completion of the work and final lift of the pavement shall be complete by June 1st, 2019.

The construction of storm drain outfalls north of the Baxter Boulevard and Preble Street Extension Intersection and north of the intersection of Baxter Boulevard and Belmeade Road includes work within a protect natural water resource. This work shall be completed in accordance with NRPA Permit by Rule and US Army Corps of Engineer permit requirements including the Maine Department of Marine Resources and Maine Department of Inland Fisheries and Wildlife Timing of

Activity approvals. Construction of the storm drain outfalls shall be complete by May 1, 2018. This includes installation of the pipes, rip-rap apron, backfill, restoration and stabilization of the embankments.

Bidders are required to complete the Portland Water District bid forms as provided in the Portland Water District Contract Documents. The selected Contractor will be required to enter into a separate contract with the Portland Water District and shall complete the required work in accordance with the Portland Water District Contract documents. The contactor shall coordinate, cooperate and schedule all work between the City of Portland and Portland Water District to ensure sewer separation work and water renewal work is completed in accordance with both the City of Portland and Portland Water District requirements.

The contractor shall be responsible for any and all work requirements including any specialized work requirements necessary for project construction which shall be considered incidental to the construction cost.

PRE-BID CONFERENCE

Before submitting bids, firms are required to attend a mandatory pre-bid conference, which will be held at 10:00 a.m. on March 1st, 2018 in room 24 of the Portland City Hall, 389 Congress Street, Portland, Maine. Only firms represented at this meeting will be allowed to submit a proposal (bid) for this contract. Attendance by Subcontractors, while encouraged, is not mandatory.

In the event of inclement weather, please check the local media outlets, the City of Portland Purchasing website (www.portlandpurchasing.com) and/or call the City's Purchasing Office, 207-874-8654 regarding any postponement. If Portland Schools and/or City operations have been cancelled, any scheduled pre-bid meetings will be cancelled as well. NOTE: Every effort will be made to provide as much forewarning as possible regarding these decisions.

BID BOND

A bid must be accompanied by Bid security made payable to the City in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 90 days after receipt of bids unless released by the Owner.

AGENCY NOT A PARTY

This contract is funded in whole or in part by the State of Maine Department of Environmental Protection (DEP) Clean Water State Revolving Loan Fund (CWSRF) program. Neither the State of Maine nor any of its departments, agencies, or employees is or will be a party to this contract. The word "agency" in the contract documents refers to the DEP and all other involved funding agencies.

SRF DISADVANTAGED BUSINESS ENTERPRISES PROGRAM

The contractor must comply with the Disadvantaged Business Enterprises (DBE) SRF special requirements contained in the CWSRF Supplementary Conditions. Failure of the successful bidder to complete the pre-award requirements of this program may result in finding that the bidder is non-responsible and therefore not entitled to award of this contract.

OSHA REQUIREMENTS

All materials and equipment used as well as all methods of installation shall comply at a minimum with any and all Federal, OSHA, State and/or local codes, including applicable municipal ordinances and regulations.

FEDERAL REQUIREMENTS

The contractor must comply with all Federal Requirements per the CWSRF Supplementary Conditions, including submittal of pre-award certification regarding Lobbying.

DAVIS-BACON AND RELATED ACTS

The contractor must comply with Davis-Bacon (DB) and Davis-Bacon Related Acts (DBRA) as stated in the CWSRF Supplementary Conditions. All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in the bidding documents. Any laborers and mechanics not listed in the wage determination shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in the bidding documents.

AMERICAN IRON AND STEEL

The Contractor shall comply with the Use of American Iron and Steel requirements on this project.

EQUAL EMPLOYMENT OPPORTUNITIES

Vendor shall comply fully with the Nondiscrimination and Equal Opportunity Provisions of the Workforce Investment Act of 1998, as amended (WIA, 29 CFR part 37); the Nontraditional Employment for Women Act of 1991; title VI of the Civil Rights Act of 1964, as amended; section 504 of the Rehabilitation Act of 1973, as amended; the Age Discrimination Act of 1975, as amended; title IX of the Education Amendments of 1972, as

amended; and with all applicable requirements imposed by or pursuant to regulations implementing those laws, including but not limited to 29 CFR part 37 and all other applicable laws, including the Maine Human Rights Act, ordinances and regulations regarding equal opportunity and equal treatment.

GENERAL INFORMATION

Plans, specifications and proposal forms for the above named project may be seen at the City of Portland Engineering Office, Department of Public Works, 55 Portland Street, Portland, Maine or at the Purchasing Office, City Hall, Room 103, 389 Congress Street, Portland, Maine (phone 207-874-8654, fax 207-874-8652 or e-mail jrl@portlandmaine.gov. Plans and proposal books are available for purchase at the Purchasing Office, Room 103, City Hall, upon payment in advance of $100.00 or $125.00 to be mailed. Such payment will not be refunded. Electronic copies of the plans and proposal books are available at no charge. Each prospective bidder will be required to obtain from the City each copy of the proposal form and plan set. Partial sets will not be issued.

Bids from vendors not registered with the Purchasing Office may be rejected; receipt of this document directly from the City of Portland indicates registration. Should a vendor receive this Invitation from a source other than the City, please contact 207-874-8654 to ensure that your firm is listed as a vendor for this bid.

It is the custom of the City of Portland, Maine, to pay its bills 30 days after completion and acceptance of the work, and the receipt of properly documented invoices for that work covered under the contract. In submitting applications under these specifications, applicants should take into account all discounts, both trade and time, allowed in accordance with this payment policy and quote a net price.

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees. Bidders who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset which shall be established by the contract which shall be issued to the successful bidder.

CITY OF PORTLAND, MAINE PURCHASING OFFICE

NOTICE TO BIDDERS

Bid No. 18056
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

Project Name: Bedford Street Sewer Separation

Sealed bids for the above project, addressed to Purchasing office, City Hall, Room 103, 389 Congress Street, Portland, Maine 04101, and clearly marked on the outside of the envelope with the name of the bidder, project title and bid number, will be received until 3:00 pm on **March 15, 2018,** at which time they will be publicly opened. Late, unsigned bids or bids submitted electronically shall not be accepted. Bids shall remain open to acceptance for thirty days from their opening. Each bid shall be submitted on the forms provided and in an envelope plainly marked on the outside with the bid's title and number.

BID BOND

A bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 60 days after receipt of bids unless released by the Owner.

PRE-BID CONFERENCE

Before submitting bids, firms are required to attend a mandatory pre-bid conference, which will be held at 10:00 a.m. on March 1st, 2018 in room 24 of the Portland City Hall. Only firms represented at this meeting will be allowed to submit a proposal (bid) for this contract. Attendance by Subcontractors, while encouraged, is not mandatory.

In the event of inclement weather, please check the local media outlets, the City of Portland Purchasing website (www.portlandpurchasing.com) and/or call the City's Purchasing Office, 207-874-8654 regarding any postponement. If Portland Schools and/or City operations have been cancelled, any scheduled pre-bid meetings will be cancelled as well. NOTE: Every effort will be made to provide as much forewarning as possible regarding these decisions.

AGENCY NOT A PARTY

This contract may be funded in whole or in part by the State of Maine Department of Environmental Protection (DEP) Clean Water State Revolving Loan Fund (CWSRF) program. Neither the State of Maine nor any of its departments, agencies, or employees is or will be a party to this contract. The word "agency" in the contract documents refers to the DEP and all other involved funding agencies.

PERFORMANCE AND PAYMENT BOND

The successful bidder must submit Performance and Payment Bonds to the City prior to contract award. Detail information can be found in the General Conditions.

INSURANCE

CONTRACTOR shall procure and maintain occurrence-based Automobile Liability Insurance and Commercial General Liability Insurance coverage (including completed operations coverage for at least 36 months after completion of the Work), and Pollution Liability Insurance coverage in amounts of not less than Three Million Dollars ($3,000,000.00) per occurrence for bodily injury, death and property damage, naming the CITY as an additional insured thereon. CONTRACTOR shall maintain Workers' Compensation Insurance coverage to the extent required by law. With respect to the Automobile, Commercial General, and Pollution Liability Insurance, the CONTRACTOR shall name the CITY as an additional insured for coverage only in those areas where government immunity has been expressly waived by 14 M.R.S. A. § 8104-A, as limited by § 8104-B, and § 8111. This provision shall not be deemed a waiver of any defenses, immunities or limitations of liability or damages available to the CITY under the Maine Tort Claims Act, other Maine statutory law, judicial precedent, common law, or any other defenses, immunities or limitations of liability available to the CITY. CONTRACTOR shall maintain certificates evidencing all such coverages, which certificates shall guarantee thirty (30) days' notice to the CITY of termination of insurance from the insurance provider or agent. CONTRACTOR shall also provide a copy of any endorsement naming the CITY as additional insured. A certificate that merely has a box checked under "Addl Insr," or the like, or that merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. Upon CITY'S request, CONTRACTOR shall provide CITY with a complete copy of any of the above-referenced policies. CITY's acceptance or lack of acceptance of CONTRACTOR's Certificate of Insurance or other evidence of insurance shall not be construed as a waiver of the CONTRACTOR's obligation to obtain and maintain such insurance as required by this agreement. CONTRACTOR shall be responsible for any and all deductibles and/or self-insured retentions.

BASIS OF AWARD

This project will be a bid as a blend bid between the City of Portland CWSRF sewer separation bid and the Portland Water District's water main renewal bid. The CWSRF bid must include pricing for the use of American Iron and Steel, Davis Bacon wage rates and meet all other requirements listed below. The contract shall be awarded based on the responsible bidder whose bid, complying with conditions and requirements provided in this Notice and bid form, is the lowest total summation between the City of Portland CWSRF bid and the Portland Water District water main renewal bid as identified on the bid form.

The City of Portland will also require the contractor to submit a second bid form (located in Appendix D) for the City work to be based on City of Portland CIP funding in lieu of CWSRF funding. This bid is to be submitted in a separate sealed envelope and will not be opened publically at the time of the bid opening. This secondary bid form shall not include any cost

associated with the CWSRF funding program. The City may choose after the award to fund the project with CIP funds and utilize the second bid. However, the basis of the contract award will be awarded to the low bidder of the CWSRF City of Portland bid and the Portland Water District water main renewal bid.

Each CWSRF requirement in this document will be denoted with italicized text and an asterisk (*SRF REQUIREMENT)

CONTRACT TIME

The start of work for this project is anticipated to be on or before April 1, 2018. The Contractor is required to complete the project at substantial completion with all base paving by October 31st, 2018. The completion of the work and final lift of the pavement shall be complete by June 1st, 2019.

The construction of storm drain outfalls at Baxter Boulevard, north of Preble Street, and the intersection of Baxter Boulevard and Belmeade Road includes working in a protected natural water resource. This work shall be completed in accordance with NRPA Permit by Rule and US Army Corps of Engineer permit requirements including the Maine Department of Marine Resources and Maine Department of Inland Fisheries and Wildlife Timing of Activity approvals. Construction of the storm drain outfalls shall be complete by May 1, 2018.

TAXES

The City is exempt from Maine state sales and use taxes on all materials to be incorporated in the work. Said taxes shall not be included in the bid. Detailed information can be found in the General Conditions and the CWSRF Supplementary Conditions.

*AMERICAN IRON AND STEEL (*SRF REQUIREMENT)*

The Contractor shall comply with the Use of American Iron and Steel in accordance with Public Law 113-76, Section 436. The law and its requirements and guidance, including certification forms, can be found in the SRF supplementary conditions.

*SRF DISADVANTAGED BUSINESS ENTERPRISE PROGRAM (*SRF REQUIREMENT)*

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 40 CFR part 33, Disadvantaged Business Enterprises (DBE), in the award and administration of subcontracts. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

1. During the bidding period, the Contractor is required to make the good faith efforts as described in the CWSRF Supplementary Conditions if they will be awarding subcontracts. Contractors should initiate solicitation efforts early in the bidding period.

2. The Contractor must comply with the following provisions when submitting their bid:
   (a) The contractor must complete and submit EPA Form 6100–4, 'DBE Program Subcontractor Utilization Form' (**copy attached**) as part of the prime contractor's bid or proposal package to the Owner. Note, only DBE subcontractors should be listed. If no DBE subcontractors are to be used, the contractor must still complete and submit the form.
   (b) The contractor must have each of its proposed DBE subcontractors complete the EPA Form 6100–3, 'DBE Program Subcontractor Performance Form' (**copy attached**). The completed forms must be submitted as part of the prime contractor's bid or proposal package to the Owner.

3. Prior to contract award, as the Successful Bidder, the Contractor must comply with the following provisions:

   a. The contractor must submit to the Owner documentation of its good faith efforts (such as copies of solicitation letters and emails) and data relied upon in formulating its fair share objectives. Solicitation documentation must include proof of receipt. The records must be submitted to the Owner even if the goals were met.

   b. The contractor must submit to the Owner a bidders list of all firms that bid or quote on subcontracts, including both MBE/WBEs and non-MBE/WBEs. The purpose of a bidders list is to provide contractors who conduct competitive bidding with as accurate a database as possible about the universe of MBE/WBE and non-MBE/WBE subcontractors. The list must include the following information:

   (1) Entity's name with point of contact;
   (2) Entity's mailing address, telephone number, and e-mail address;
   (3) The procurement on which the entity bid or quoted, and when; and
   (4) Entity's status as an MBE/WBE or non-MBE/WBE.

Additional information and forms may be found in the CWSRF Supplementary Conditions."

SUSPENSION AND DEBARMENT (*SRF REQUIREMENT)

The eligibility of successful bidder will be verified through the federal government's Excluded Parties List System prior to Maine Department of Environmental Protection approval of the contract award. Furthermore, by entering into the contract, the contractor shall certify that no part of the contract shall be subcontracted to a Debarred or Suspended person or firm. Detailed information may be found in the CWSRF Supplementary Conditions.

RESTRICTIONS ON LOBBYING (*SRF REQUIREMENT)

The successful bidder must submit certification regarding Lobbying (EPA form 6600-06) to the Owner prior to contract award. If applicable, the contractor shall also complete and submit the Disclosure of Lobbying Activities form (EPA Standard Form LLL) to the Owner

prior to contract award. Detailed information and forms can be found in the CWSRF Supplementary Conditions.

*DAVIS-BACON AND RELATED ACTS (*SRF REQUIREMENT)*

The contractor must comply with Davis-Bacon (DB) and Davis-Bacon Related Acts (DBRA). All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in these bidding documents. Any laborers and mechanics not listed in the wage determination but employed by the contractor and subcontractors on this project shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in these bidding documents. A form 1444 submission will be required to obtain additional employee rate classifications, after contract award. No allowances or extra considerations on behalf of any contractor or subcontractor will be permitted subsequently by reason of error or oversight on account of Department of Labor wage determinations. The contractor and subcontractors shall pay all employees weekly. The contractor and subcontractors shall submit weekly certified payrolls to the owner or designated representative, including a payroll summary with signed certification form WH-347. Detailed information and forms can be found in the CWSRF Supplementary Conditions.

*FEDERAL REQUIREMENTS (*SRF REQUIREMENT)*

The contractor must comply with all Federal requirements found in the CWSRF Supplementary Conditions.

STATE MINIMUM WAGES

All laborers and mechanics employed or working upon the construction site of the project shall be paid not less than the prevailing State minimum wage rate regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

BID PROTESTS

All protests arising from the City's procurement practices must be submitted to the City as soon as practical. The City will investigate the basis for the protest, seek the advice of legal counsel, document all meetings and actions, and attempt to resolve the protest promptly and equitably.

MODIFYING OR WITHDRAWING OF BID

Bids may be modified or withdrawn as follows:

1. Before the time for bid opening:
    a. Bidder may modify a bid at any time by delivering an original, written notice of the modification signed by the bidder. The modification must be set forth clearly.

b. Upon providing proof of identity, a bidder may withdraw a bid at any time by physically retrieving the bid, or by delivering an original, signed notice that the bid is withdrawn. Any bid security shall be returned to the bidder.
c. It is solely the bidder's responsibility to properly deliver any written modification or withdrawal. Delivery must be made to the Procurement Official with responsibility for the bid.

2. After the time for bid opening:
   a. Bids may only be modified as determined by the City.
   b. Bids may only be withdrawn with the consent of a Procurement Official. The official has sole discretion to determine whether to permit the withdrawal of a bid or the release of any bid security.

EQUAL EMPLOYMENT OPPORTUNITIES

Vendor shall comply fully with the Nondiscrimination and Equal Opportunity Provisions of the Workforce Investment Act of 1998, as amended (WIA, 29 CFR part 37); the Nontraditional Employment for Women Act of 1991; title VI of the Civil Rights Act of 1964, as amended; section 504 of the Rehabilitation Act of 1973, as amended; the Age Discrimination Act of 1975, as amended; title IX of the Education Amendments of 1972, as amended; and with all applicable requirements imposed by or pursuant to regulations implementing those laws, including but not limited to 29 CFR part 37.

COORDINATION OF CITY AND PWD RENEWAL WORK

Bidders are required to complete the Portland Water District bid forms as provided in the Portland Water District Contract Documents. The selected Contractor will be required to enter into a separate contract with the Portland Water District and shall complete the required work in accordance with the Portland Water District Contract documents. The contactor shall coordinate, cooperate and schedule all work between the City of Portland and Portland Water District to ensure sewer separation work and water renewal work is completed in accordance with both the City of Portland and Portland Water District requirements.

The contractor shall be responsible for any and all work requirements including any specialized work requirements necessary for project construction which shall be considered incidental to the construction cost.

SUBMISSION OF BIDS

All Bids shall be submitted on the attached form and are to remain open for sixty (60) days after their opening. Late bids, bids without the required amount or form of surety, bids not signed and facsimile bids will not be accepted.

REJECTION OF BID

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These

obligations may include but are not limited to real estate and personal property taxes and sewer user fees. Bidders who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset which shall be established by the contract which shall be issued to the successful bidder.

LIEN WAIVERS

Prior to any payment by the City, the Contractor may be required to supply the City with a Waiver of Lien – Material and Labor for the total awarded contract cost, guaranteeing payment in full for all labor and materials used or required in connection with the work described in this bid. The City may also require waivers of lien, signed by individual subcontractors and materials suppliers, with requests for progress payments.

Any mechanic's lien or any other lien which may be filed against the premises which are the subject of the contract by reason of the work described herein shall be defended (by counsel reasonably acceptable to the City) and promptly discharged by the Contractor at its own expense. If the Contractor should fail either to defend the City against the lien or to discharge it, then the City may do so at the Contractor's expense. In the event of such an undertaking by the City, the Contractor will promptly reimburse the City for all its costs and expenses in so doing including, but not limited to, reimbursement of the City's reasonable counsel fees and costs which may be incurred by it in substituting a bond in place of the lien.

CONTRACTOR RESPONSIBILITIES

The Contractor shall furnish all labor, materials, fixtures, supplies, equipment and transportation necessary to do the work as specified. Work shall be conducted in an orderly manner and all work shall be performed in accordance with best trade policy and in conformance with pertinent OSHA, Local, State and Federal Government regulations. Contractors will be responsible for acquiring all necessary permits, licenses and pay all associated fees (including dump disposal fees and disposal taxes, if applicable), unless otherwise specified herein.

The Contractor shall erect, and maintain at all times, any and all safeguards necessary for the protection of life and property of all maritime, pedestrian and vehicular traffic, where applicable.

GENERAL INFORMATION

All questions shall be directed in writing ONLY to the Purchasing Office at the above address and be received at least five business days prior to the bid opening date (FAX 207-874-8652, or E-mail jrl@portlandmaine.gov). Questions received after this time will not be addressed. Responses from the City that substantially alter this bid will be issued in the form of a written addendum to all bid holders registered in the Purchasing Office. Oral explanations or interpretations given before the award of the contract will not be binding.

DISCLAIMER

The City disclaims any and all responsibility for injury to contractors, their agents or others while examining the job or at any other time.

February 16, 2018

Matthew F. Fitzgerald
Purchasing Manager

PROPOSAL

Bid No. 18056
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

PROJECT: BEDFORD STREET SEWER SEPARATION

**** THIS SHEET MUST BE INCLUDED IN YOUR PROPOSAL ****

The undersigned hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, that it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same, and that no person acting for or employed by the City of Portland is directly or indirectly interested in this proposal or in any anticipated profits which may be derived there from.

The undersigned hereby declares that they have read and understand all conditions as outlined in this Request for Proposals, and that the proposal is made in accordance with the same.

The bidder acknowledges the receipt of Addenda numbered: _____

COMPANY NAME: _____

PRINT NAME & TITLE: _____

ADDRESS: _____

E-MAIL ADDRESS: _____

PHONE NUMBER: _____ FAX NUMBER: _____

TYPE OF ORGANIZATION - PARTNERSHIP, CORPORATION, INDIVIDUAL, OTHER:
_____

STATE OF INCORPORATION, IF APPLICABLE: _____

FEDERAL TAX IDENTIFICATION NUMBER (Required): _____

AUTHORIZED SIGNATURE: _____

DATE: _____

NOTE: Proposals must bear the handwritten signature of a duly authorized member or employee of the organization submitting a proposal.

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
1	201.24	EA 4.00	Remove Street Tree and Stump @_____ _____ Per Each				
2	202.15	EA 6.00	Remove Exist Manhole or Catch Basin @_____ _____ Per Each				
3	202.20	SY 13820.00	Remove Bituminous Concrete Pavement (Plan Quantity) @_____ _____ Per Square Yard				
4	202.60	LF 82.00	Remove Storm Drain or Sewer Pipe @_____ _____ Per Linear Foot				
5	202.70	SY 4110.00	Remove Subsurface Cobblestones with Concrete Base @_____ _____ Per Square Yard				
6	202.90	LF 920.00	Remove Subsurface Rail Line @_____ _____ Per Linear Foot				
7	203.20	CY 4840.00	Common Excavation @_____ _____ Per Cubic Yard				
8	203.25	CY 340.00	Granular Borrow @_____ _____ Per Cubic Yard				
9	203.28	VF 70.00	Test Pits @_____ _____ Per Vertical Foot				
10	203.35	CY 140.00	Crushed Stone (Overdepth) @_____ _____ Per Cubic Yard				
11	206.061	CY 140.00	Structural Earth Excavation (Overdepth) @_____ _____ Per Cubic Yard				
12	206.07	CY 1620.00	Structural Rock Excavation @_____ _____ Per Cubic Yard				
13	304.10	CY 5910.00	Agg Subbase Course Type D @_____ _____ Per Cubic Yard				
14	304.15	CY 1130.00	Agg Base Course Type B @_____ _____ Per Cubic Yard				
15	312.10	SY 563.00	Bituminous Driveway Apron @_____ _____ Per Square Yard				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
16	403.207	T 2280.00	Hot Mix Asphalt 19.0 MM @_____ _____ Per Ton				
17	403.208	T 1840.00	Hot Mix Asphalt 12.5MM @_____ _____ Per Ton				
18	603.132	LF 2090.00	8-Inch Diameter PVC SDR35 Storm Drain/Sewer Pipe @_____ _____ Per Linear Foot				
19	603.142	LF 770.00	10-Inch Diameter PVC SDR35 Storm Drain/Sewer Pipe @_____ _____ Per Linear Foot				
20	603.159	LF 1160.00	12-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
21	603.179	LF 390.00	18-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
22	603.199	LF 1840.00	24-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
23	603.209	LF 767.00	30-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
24	603.219	LF 300.00	36-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
25	603.229	LF 320.00	42-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
26	603.239	LF 700.00	48-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
27	603.259	LF 220.00	60-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
28	603.829	LF 90.00	42-Inch Diameter DIP, Class 250, Storm Drain Pipe @_____ _____ Per Linear Foot				
29	603.91	EA 1.00	30-Inch Diameter Check Valve @_____ _____ Per Each				

BID FORM
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BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
30	603.93	EA 2.00	42-Inch Diameter Check Valve @_____ _____ Per Each				
31	604.131	EA 45.00	4-foot Diameter Catch Basin @_____ _____ Per Each				
32	604.15	EA 22.00	4-foot Diameter Manhole @_____ _____ Per Each				
33	604.153	EA 17.00	5-foot Diameter Manhole @_____ _____ Per Each				
34	604.154	EA 10.00	6-foot Diameter Manhole @_____ _____ Per Each				
35	604.156	EA 3.00	8-foot Diameter Manhole @_____ _____ Per Each				
36	604.159	EA 1.00	14-foot X 5-foot Vault Structure @_____ _____ Per Each				
37	604.161	EA 8.00	Modify Structure @_____ _____ Per Each				
38	604.18	EA 7.00	Adjusting Manhole or Structure to Grade @_____ _____ Per Each				
39	608.08	SY 302.00	Reinforced Concrete Sidewalk @_____ _____ Per Square Yard				
40	608.081	SY 77.00	Reinforced Concrete Driveway @_____ _____ Per Square Yard				
41	608.15	SY 20.00	Brick Sidewalk with Bituminous Base @_____ _____ Per Square Yard				
42	608.26	SF 12.00	Curb Ramp Detectable Warning Field @_____ _____ Per Square Foot				
43	609.15	LF 472.00	Sloped Curb Type 1 @_____ _____ Per Linear Foot				
44	609.151	LF 58.00	Sloped Curb Type 1 - Cir. @_____ _____ Per Linear Foot				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
45	609.38	LF 770.00	Remove and Reset Granite Curb @_____ _____ Per Linear Foot				
46	610.08	CY 456.00	Plain Riprap @_____ _____ Per Cubic Yard				
47	614.14	EA 28.00	Masonry Plug @_____ _____ Per Each				
48	614.16	CY 30.00	Flowable Concrete Fill @_____ _____ Per Cubic Yard				
49	615.072	SY 390.00	Loam, Seed and Mulch @_____ _____ Per Square Yard				
50	627.7	LF #N/A	Pavement Markings @_____ _____ Per Linear Foot				
51	627.733	LF 3890.00	4" White or Yellow Pavement Marking Line @_____ _____ Per Linear Foot				
52	627.744	LF 1420.00	6" White or Yellow Pavement Marking Line @_____ _____ Per Linear Foot				
53	627.75	SF 880.00	White or Yellow Pavement & Curb Marking @_____ _____ Per Square Foot				
54	627.82	EA 21.00	Directional Arrow & Bike Symbol @_____ _____ Per Each				
55	629.05	HR 40.00	Hand Labor, Straight Time @_____ _____ Per Hour				
56	629.06	HR 40.00	Mason, Straight Time @_____ _____ Per Hour				
57	631.105	HR 40.00	Air Tool and Compressor (inc operator) @_____ _____ Per Hour				
58	631.12	HR 40.00	All Purpose Excavator (inc operator) @_____ _____ Per Hour				
59	631.121	HR 40.00	Heavy Duty Excavator (inc operator) @_____ _____ Per Hour				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
60	631.13	HR 40.00	Bulldozer (inc operator) @_____ _____ Per Hour				
61	631.172	HR 40.00	Truck - Large or Small (inc operator) @_____ _____ Per Hour				
62	631.22	HR 40.00	Front End Loader (inc operator) @_____ _____ Per Hour				
63	631.36	HR 40.00	Foreman, Straight Time @_____ _____ Per Hour				
64	632.043	EA 1.00	10-Inch Inserta-Tee Section @_____ _____ Per Each				
65	632.08	EA 19.00	4"/6" X8" WYE Section @_____ _____ Per Each				
66	633.05	LF 919.00	4"/6" Sewer Laterals @_____ _____ Per Linear Foot				
67	645.106	LS 1.00	Demount and Reinstall Sign @_____ _____ Lump Sum				
68	645.107	LS 1.00	Furnish & Install New Reg, Warning, Conf. & Route Sign @_____ _____ Lump Sum	$113,750.00	00	$113,750.00	00
69	652.38	LS 1.00	Flagger (CONTRACT ALLOWANCE) @_____ _____ Lump Sum				
70	652.39	LS 1.00	Work Zone Traffic Control @_____ _____ Lump Sum				
71	654.08	EA 43.00	Density Test @_____ _____ Per Each				
72	656.75	LS 1.00	Temporary Soil Erosion and Water Pollution Control @_____ _____ Lump Sum				
73	659.1	LS 1.00	Mobilization @_____ _____ Lump Sum				
74	670.06	EA 1.00	NSBB-6-12 Nutrient Baffle Box @_____ _____ Per Each				

BID FORM
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BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
75	670.10	EA 1.00	NSBB-10-16 Nutrient Baffle Box @_____ _____ Per Each				
76	900.401	EA 1.00	Water Quality Swale 1 @_____ _____ Per Each				
77	900.402	EA 1.00	Water Quality Swale 2 @_____ _____ Per Each				
78	900.403	EA 1.00	Water Quality Swale 3 @_____ _____ Per Each				
79	900.404	EA 1.00	Water Quality Swale 4 @_____ _____ Per Each				
80	900.405	EA 1.00	Water Quality Swale 5 @_____ _____ Per Each				
81	900.406	EA 1.00	Water Quality Swale 6 @_____ _____ Per Each				
82	901.501	EA 1.00	Filtera 6 x 10 @_____ _____ Per Each				
83	901.502	EA 1.00	Filtera 4 x 8 @_____ _____ Per Each				

	TOTAL PRICE
TOTAL AMOUNT OF CWSRF BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES. _____ _____	

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W1	LF 1480.00	16-in Ductile Iron Water Main @_____ _____ Per Linear Foot				
W2	LF 1320.00	12-in Ductile Iron Water Main @_____ _____ Per Linear Foot				
W3	LF 3434.00	8-in Ductile Iron Water Main @_____ _____ Per Linear Foot				
W4	LF 40.00	4-in Ductile Iron Water Main @_____ _____ Per Linear Foot				
W5	EA 13.00	Hydrant - Shortside @_____ _____ Per Each				
W6	EA 1.00	20-Inch Cut-In Gate Valve @_____ _____ Per Each				
W7	EA 3.00	12-Inch Cut-In Gate Valve @_____ _____ Per Each				
W8	EA 3.00	8-Inch Cut-In Gate Valve @_____ _____ Per Each				
W9	EA 3.00	6-Inch Cut-In Gate Valve @_____ _____ Per Each				
W10	EA 3.00	16-inch Gate Valve @_____ _____ Per Each				

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W11	EA	12-inch Gate Valve @_____ _____				
	5.00	Per Each				
W12	EA	8-inch Gate Valve @_____ _____				
	14.00	Per Each				
W13	EA	6-inch Gate Valve @_____ _____				
	3.00	Per Each				
W14	EA	2-inch Blowoff @_____ _____				
	1.00	Per Each				
W15	EA	1-inch Air Release Valve @_____ _____				
	7.00	Per Each				
W16	EA	1-inch Copper Service - Shortside @_____ _____				
	27.00	Per Each				
W17	EA	1-inch Copper Service - Longside @_____ _____				
	15.00	Per Each				
W18	EA	1-inch Copper Service - Reconnect @_____ _____				
	1.00	Per Each				
W19	EA	2-inch Copper Service - Shortside @_____ _____				
	4.00	Per Each				
W20	EA	2-inch Copper Service - Reconnect @_____ _____				
	6.00	Per Each				

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W21	EA 3.00	4-inch Fire Service - Long Side @_____ _____ Per Each				
W22	EA 1.00	4-inch Fire Service - Reconnect @_____ _____ Per Each				
W23	EA 3.00	6-inch Fire Service - Shortside @_____ _____ Per Each				
W24	EA 3.00	6-inchFire Service - Long Side @_____ _____ Per Each				
W25	EA 1.00	6-inch Fire Service - Reconnect @_____ _____ Per Each				
W26	EA 2.00	8-inch Fire Service - Reconnect @_____ _____ Per Each				
W27	EA 1.00	12-inch Fire Service - Reconnect @_____ _____ Per Each				
W28	CY 71.00	Gravel Borrow @_____ _____ Per Cubic Yard				
W29	CY 71.00	Unsuitable Material Excavated Below Grade @_____ _____ Per Cubic Yard				
W30	CY 119.00	Rock Excavation @_____ _____ Per Cubic Yard				

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W31	SY 6234.00	Roadway Pavement Removal - Plan Quantity @_____ _____ Per Square Yard				
W32	CY 119.00	Road Repave Shim Gravel - Plan Quantity @_____ _____ Per Cubic Yard				
W33	T 1000.00	HMA Binder Course - 19MM @_____ _____ Per Ton				
W34	T 620.00	HMA Surface Course - 9.5MM @_____ _____ Per Ton				
W35	LS 1.00	Work Zone Traffic Control @_____ _____ Lump Sum				
W36	LS 1.00	Flaggers @_____ _____ Lump Sum				

	TOTAL COST
TOTAL AMOUNT OF PORTLAND WATER DISTRICT BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES. _____ _____ _____	

BASE BID TOTAL

CWSRF Sewer Separation Bid = $_____

Water Main Replacement Bid = $_____

Total Base Bid = $_____

(Basis of Award)

Note: The City is also requiring that the contractor fill out a separate bid form (located in Appendix D), which is to be bid as a City CIP funded project without CWSRF funding requirements which shall be delivered in a separate sealed envelope and will not opened publically. The City may choose to use CIP funding on this project; however, the basis of award shall be a summation of the CWSRF Sewer Separation Bid and the Water Main Replacement Bid.

The undersigned also agrees as follows:

FIRST: To do any extra work, not covered by the above schedule of items, which may be ordered, and to accept as full compensation therefore such prices as may be agreed upon in writing by the Engineer and the Contractor; or in case no agreement is made, to accept as full compensation the amount determined upon a "force account" basis as provided in the M.D.O.T. Standard Specifications, Revision of November 2014.

SECOND: To begin work on the date specified in the Engineer's "Notice to Commence Work" and to prosecute said work in such a manner as to complete it within the time limits given in the Special Provisions. Further, that monies will be deducted as liquidated damages at the rate specified in Subsection 107.7.2 "Schedule of Liquidated Damages" for each day that the work shall remain uncompleted after the time herein specified for completion of the work.

THIRD: That this offer is to continue open to acceptance until the formal contract is executed by the successful bidder of this work, and the City may at any time without notice accept this proposal whether any other proposal has previously been accepted or not. Provided, however, that the City will accept, in writing, one of the proposals made, or reject all proposals made, within sixty (60) calendar days after the date of opening of the proposals.

The undersigned as Bidder, declares that the only persons or parties interested in this Proposal are those named herein; that the bidder is not financially interested in, or otherwise affiliated in a business way with any other bidder on this contract; and that this Proposal is made without collusion with any other person, firm or corporation.

"The undersigned declares that any person(s) employed by the City of Portland, Maine, who has direct or indirect personal or financial interest in this proposal or in any portion of the

profits which may be derived therefrom, has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of. An example of a direct interest would be a City employee who would be paid to perform services under this proposal. An example of an indirect interest would be a City employee who is related to any officers, employees, principal or shareholders of your firm or you.) If in doubt as to status or interest, please disclose to the extent known."

Respectfully submitted this _____ day of _____, 2018

IF AN INDIVIDUAL, SIGN HERE

Signature of Bidder_____

Address_____

_____

IF A FIRM OR PARTNERSHIP, SIGN HERE

Signature of Bidder_____

Name of Firm or Partnership _____

Business Address_____

Telephone Number_____ Fax Number_____

Soc. Sec. No. or Tax I.D. Number_____

Names and Addresses of Members of Firm or Partnership:

_____

_____

_____

(Signatures for a Corporation on next page.)

PROPOSAL (continued)

IF A CORPORATION, SIGN HERE

Name of Bidder_____

Authorized Signature_____
(name) (title)

Business Address_____

Telephone Number_____ Fax Number_____

Soc. Sec. No. or Tax I.D. Number_____

Incorporated under the Laws of the State of_____

Names and Addresses of Officers of the Corporation:

President_____

Secretary _____

Treasurer _____ss

Before me, personally appeared _____ and acknowledged
that the signature to the preceding bid is his/her signature in his/her official capacity.

Date: _____

_____
Notary Public - Signature and Seal

ALL CORPORATIONS MUST SIGN THIS FORM
AND SUBMIT WITH THE BID PROPOSAL

(Insert copy of that part of the records of the corporation wherein authority is given to the officer of that corporation to sign this bid on behalf of the corporation.)

_____

_____

_____

_____

_____
(date)

The above is a true copy of the records of the_____

Corporation, which records are in my legal custody.

_____
Officer having custody of the records

_____ss

Before me appeared, _____

_____ of the _____ Corporation, and

made oath that the above statement is true.

_____
Notary Public - Signature and Seal

ALL CONTRACTORS SHALL FILL IN THE FOLLOWING INFORMATION
BEFORE SUBMITTING BID

	Name and Address of Contractor	Products to be Supplied
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____

	Name and Address of Contractor	Service or Trades to be Supplied	Anticipated $ Amount
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
1	201.24	EA 4.00	Remove Street Tree and Stump @_____ _____ Per Each				
2	202.15	EA 6.00	Remove Exist Manhole or Catch Basin @_____ _____ Per Each				
3	202.20	SY 13820.00	Remove Bituminous Concrete Pavement (Plan Quantity) @_____ _____ Per Square Yard				
4	202.60	LF 82.00	Remove Storm Drain or Sewer Pipe @_____ _____ Per Linear Foot				
5	202.70	SY 4110.00	Remove Subsurface Cobblestones with Concrete Base @_____ _____ Per Square Yard				
6	202.90	LF 920.00	Remove Subsurface Rail Line @_____ _____ Per Linear Foot				
7	203.20	CY 4840.00	Common Excavation @_____ _____ Per Cubic Yard				
8	203.25	CY 340.00	Granular Borrow @_____ _____ Per Cubic Yard				
9	203.28	VF 70.00	Test Pits @_____ _____ Per Vertical Foot				
10	203.35	CY 140.00	Crushed Stone (Overdepth) @_____ _____ Per Cubic Yard				
11	206.061	CY 140.00	Structural Earth Excavation (Overdepth) @_____ _____ Per Cubic Yard				
12	206.07	CY 1620.00	Structural Rock Excavation @_____ _____ Per Cubic Yard				
13	304.10	CY 5910.00	Agg Subbase Course Type D @_____ _____ Per Cubic Yard				
14	304.15	CY 1130.00	Agg Base Course Type B @_____ _____ Per Cubic Yard				
15	312.10	SY 563.00	Bituminous Driveway Apron @_____ _____ Per Square Yard				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
16	403.207	T 2280.00	Hot Mix Asphalt 19.0 MM @_____ _____ Per Ton				
17	403.208	T 1840.00	Hot Mix Asphalt 12.5MM @_____ _____ Per Ton				
18	603.132	LF 2090.00	8-Inch Diameter PVC SDR35 Storm Drain/Sewer Pipe @_____ _____ Per Linear Foot				
19	603.142	LF 770.00	10-Inch Diameter PVC SDR35 Storm Drain/Sewer Pipe @_____ _____ Per Linear Foot				
20	603.159	LF 1160.00	12-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
21	603.179	LF 390.00	18-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
22	603.199	LF 1840.00	24-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
23	603.209	LF 767.00	30-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
24	603.219	LF 300.00	36-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
25	603.229	LF 320.00	42-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
26	603.239	LF 700.00	48-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
27	603.259	LF 220.00	60-Inch Diameter PVC or HDPE Storm Drain Pipe @_____ _____ Per Linear Foot				
28	603.829	LF 90.00	42-Inch Diameter DIP, Class 250, Storm Drain Pipe @_____ _____ Per Linear Foot				
29	603.91	EA 1.00	30-Inch Diameter Check Valve @_____ _____ Per Each				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
30	603.93	EA 2.00	42-Inch Diameter Check Valve @_____ _____ Per Each				
31	604.131	EA 45.00	4-foot Diameter Catch Basin @_____ _____ Per Each				
32	604.15	EA 22.00	4-foot Diameter Manhole @_____ _____ Per Each				
33	604.153	EA 17.00	5-foot Diameter Manhole @_____ _____ Per Each				
34	604.154	EA 10.00	6-foot Diameter Manhole @_____ _____ Per Each				
35	604.156	EA 3.00	8-foot Diameter Manhole @_____ _____ Per Each				
36	604.159	EA 1.00	14-foot X 5-foot Vault Structure @_____ _____ Per Each				
37	604.161	EA 8.00	Modify Structure @_____ _____ Per Each				
38	604.18	EA 7.00	Adjusting Manhole or Structure to Grade @_____ _____ Per Each				
39	608.08	SY 302.00	Reinforced Concrete Sidewalk @_____ _____ Per Square Yard				
40	608.081	SY 77.00	Reinforced Concrete Driveway @_____ _____ Per Square Yard				
41	608.15	SY 20.00	Brick Sidewalk with Bituminous Base @_____ _____ Per Square Yard				
42	608.26	SF 12.00	Curb Ramp Detectable Warning Field @_____ _____ Per Square Foot				
43	609.15	LF 472.00	Sloped Curb Type 1 @_____ _____ Per Linear Foot				
44	609.151	LF 58.00	Sloped Curb Type 1 - Cir. @_____ _____ Per Linear Foot				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
45	609.38	LF 770.00	Remove and Reset Granite Curb @_____ _____ Per Linear Foot				
46	610.08	CY 456.00	Plain Riprap @_____ _____ Per Cubic Yard				
47	614.14	EA 28.00	Masonry Plug @_____ _____ Per Each				
48	614.16	CY 30.00	Flowable Concrete Fill @_____ _____ Per Cubic Yard				
49	615.072	SY 390.00	Loam, Seed and Mulch @_____ _____ Per Square Yard				
50	627.7	LF #N/A	Pavement Markings @_____ _____ Per Linear Foot				
51	627.733	LF 3890.00	4" White or Yellow Pavement Marking Line @_____ _____ Per Linear Foot				
52	627.744	LF 1420.00	6" White or Yellow Pavement Marking Line @_____ _____ Per Linear Foot				
53	627.75	SF 880.00	White or Yellow Pavement & Curb Marking @_____ _____ Per Square Foot				
54	627.82	EA 21.00	Directional Arrow & Bike Symbol @_____ _____ Per Each				
55	629.05	HR 40.00	Hand Labor, Straight Time @_____ _____ Per Hour				
56	629.06	HR 40.00	Mason, Straight Time @_____ _____ Per Hour				
57	631.105	HR 40.00	Air Tool and Compressor (inc operator) @_____ _____ Per Hour				
58	631.12	HR 40.00	All Purpose Excavator (inc operator) @_____ _____ Per Hour				
59	631.121	HR 40.00	Heavy Duty Excavator (inc operator) @_____ _____ Per Hour				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
60	631.13	HR 40.00	Bulldozer (inc operator) @_____ _____ Per Hour				
61	631.172	HR 40.00	Truck - Large or Small (inc operator) @_____ _____ Per Hour				
62	631.22	HR 40.00	Front End Loader (inc operator) @_____ _____ Per Hour				
63	631.36	HR 40.00	Foreman, Straight Time @_____ _____ Per Hour				
64	632.043	EA 1.00	10-Inch Inserta-Tee Section @_____ _____ Per Each				
65	632.08	EA 19.00	4"/6" X8" WYE Section @_____ _____ Per Each				
66	633.05	LF 919.00	4"/6" Sewer Laterals @_____ _____ Per Linear Foot				
67	645.106	LS 1.00	Demount and Reinstall Sign @_____ _____ Lump Sum				
68	645.107	LS 1.00	Furnish & Install New Reg, Warning, Conf. & Route Sign @_____ _____ Lump Sum				
69	652.38	HR 6400.00	Flagger @_____ _____ Per Hour				
70	652.39	LS 1.00	Work Zone Traffic Control @_____ _____ Lump Sum				
71	654.08	EA 43.00	Density Test @_____ _____ Per Each				
72	656.75	LS 1.00	Temporary Soil Erosion and Water Pollution Control @_____ _____ Lump Sum				
73	659.1	LS 1.00	Mobilization @_____ _____ Lump Sum				
74	670.06	EA 1.00	NSBB-6-12 Nutrient Baffle Box @_____ _____ Per Each				

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

				Unit Price		Total Price	
Bid Item	**Spec No. Pay Item**	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
75	670.10	EA 1.00	NSBB-10-16 Nutrient Baffle Box @_____ _____ Per Each				
76	900.401	EA 1.00	Water Quality Swale 1 @_____ _____ Per Each				
77	900.402	EA 1.00	Water Quality Swale 2 @_____ _____ Per Each				
78	900.403	EA 1.00	Water Quality Swale 3 @_____ _____ Per Each				
79	900.404	EA 1.00	Water Quality Swale 4 @_____ _____ Per Each				
80	900.405	EA 1.00	Water Quality Swale 5 @_____ _____ Per Each				
81	900.406	EA 1.00	Water Quality Swale 6 @_____ _____ Per Each				
82	901.501	EA 1.00	Filtera 6 x 10 @_____ _____ Per Each				
83	901.502	EA 1.00	Filtera 4 x 8 @_____ _____ Per Each				

	TOTAL PRICE
TOTAL AMOUNT OF NON-CWSRF BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES. _____ _____	

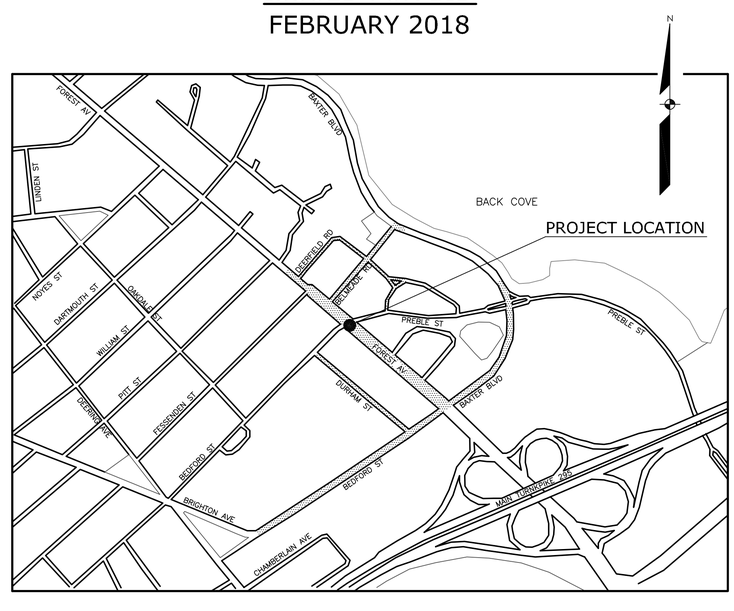
CITY OF PORTLAND
PUBLIC WORKS DEPARTMENT

CONTRACT DRAWINGS

BEDFORD STREET
SEWER SEPERATION PROJECT
PORTLAND WATER DISTRICT MAIN REPLACEMENT

YEAR
APPROVED
2018

BID NO. 18056
ISSUED FOR BID
FEBRUARY 2018



CHRISTOPHER BRANCH, PE DATE
PUBLIC WORKS DIRECTOR

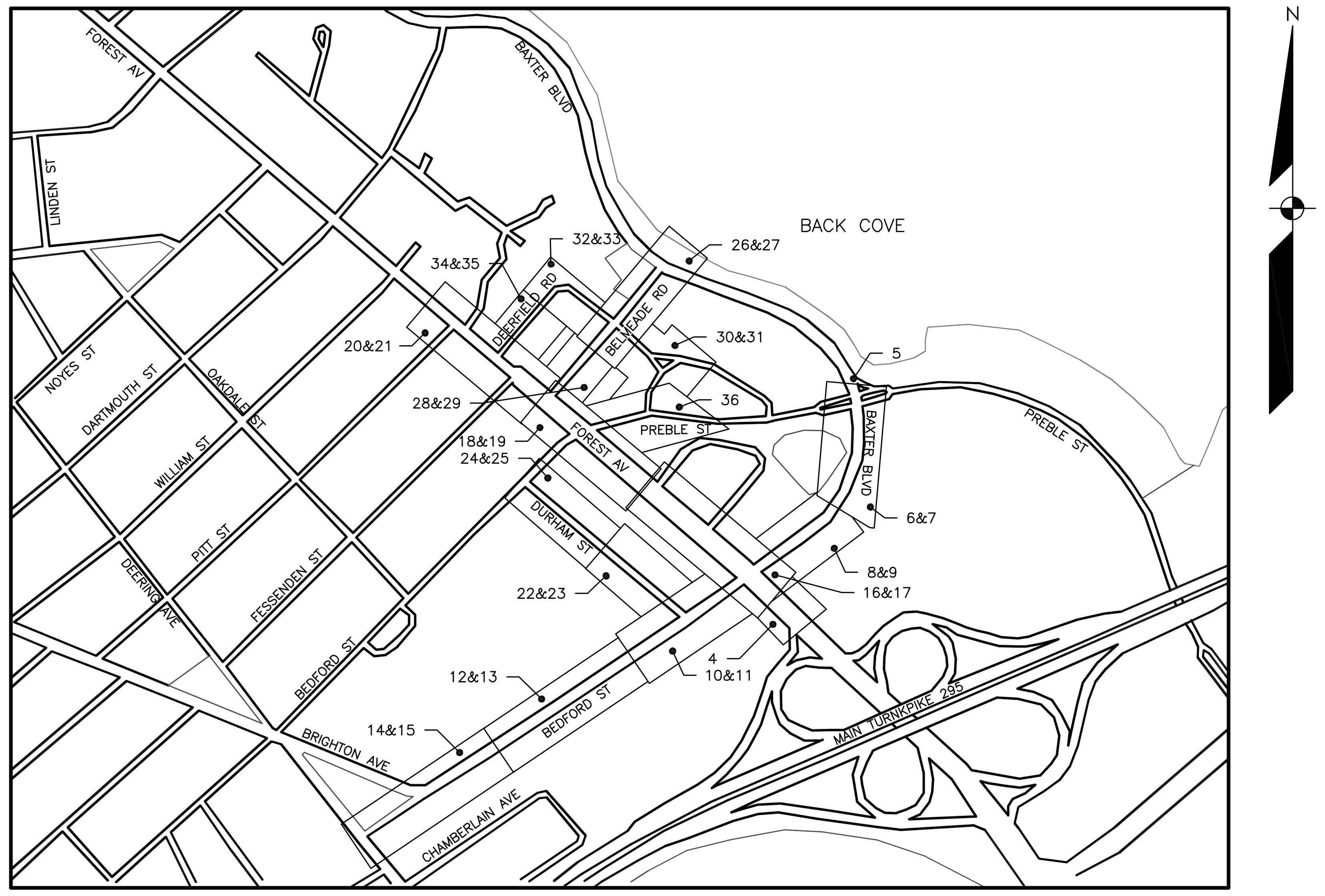
JUSTIN PELLERIN, PE DATE
PROJECT ENGINEER

INDEX OF PLANS

SHEET NO.	SHEET TITLE
1	COVER SHEET
2	GENERAL NOTES AND LEGEND
3	EROSION CONTROL NOTES AND PORTLAND WATER DISTRICT NOTES
4	TEMPORARY WATER PHASING PLAN
5	PLAN & PROFILE – BAXTER BOULEVARD OUTFALL
6	BAXTER BOULEVARD LAYOUT & WATER PLAN
7	PLAN & PROFILE – BAXTER BOULEVARD STA. 14+00 TO STA. 18+50
8	BAXTER BOULEVARD LAYOUT & WATER PLAN
9	PLAN & PROFILE – BAXTER BOULEVARD STA. 18+50 STO STA. 22+85.55
10	BEDFORD STREET LAYOUT & WATER PLAN
11	PLAN & PROFILE – BEDFORD STREET STA. 0+00 TO STA. 5+00
12	BEDFORD STREET LAYOUT & WATER PLAN
13	PLAN & PROFILE – BEDFORD STREET STA. 5+00 TO STA. 11+00
14	BEDFORD STREET LAYOUT & WATER PLAN
15	PLAN & PROFILE – BEDFORD STREET STA. 11+00 TO STA. 17+12.46
16	FOREST AVENUE LAYOUT & WATER PLAN
17	PLAN & PROFILE – FOREST AVENUE STA. 0+00 TO STA. 5+00
18	FOREST AVENUE LAYOUT & WATER PLAN
19	PLAN & PROFILE – FOREST AVENUE STA. 5+00 TO STA. 10+00
20	FOREST AVENUE LAYOUT & WATER PLAN
21	PLAN & PROFILE – FOREST AVENUE STA. 10+00 TO STA. 15+00
22	DURHAM STREET LAYOUT & WATER PLAN
23	PLAN & PROFILE – DURHAM STREET STA. 0+00 TO STA. 3+75
24	DURHAM STREET LAYOUT & WATER PLAN
25	PLAN & PROFILE – DURHAM STREET STA. 3+75 TO STA. 7+60
26	BELMEADE ROAD LAYOUT & WATER PLAN
27	PLAN & PROFILE – BELMEADE ROAD STA. –0+85 TO STA. 3+75
28	BELMEADE ROAD LAYOUT & WATER PLAN
29	PLAN & PROFILE – BELMEADE ROAD STA. 3+75 TO STA 6+47.69
30	DEERFIELD ROAD LAYOUT & WATER PLAN
31	PLAN & PROFILE – DEERFIELD ROAD STA 0+00 TO STA. 2+62.72
32	DEERFIELD ROAD LAYOUT & WATER PLAN
33	PLAN & PROFILE – DEERFIELD ROAD STA. 2+62 TO STA. 5+75
34	DEERFIELD ROAD LAYOUT & WATER PLAN
35	PLAN & PROFILE – DEERFIELD ROAD STA. 5+75 TO STA. 8+52.30
36	PLAN & PROFILE – GRASMERE ROAD STA. 0+00 TO STA. 2+75
37	STANDARD CONSTRUCTION DETAILS
38	STANDARD CONSTRUCTION DETAILS
39	STANDARD CONSTRUCTION DETAILS
40	STANDARD CONSTRUCTION DETAILS
41	STANDARD CONSTRUCTION DETAILS
42	STANDARD CONSTRUCTION DETAILS
43	STANDARD CONSTRUCTION DETAILS
44	PORTLAND WATER DISTRICT DETAILS
45	PORTLAND WATER DISTRICT DETAILS
46	BAXTER BOULEVARD RE–STRIPING PLAN, R–1

STATE OF MAINE
ROBERT A. McSORLEY
No. 8580
LICENSED
PROFESSIONAL ENGINEER
2-16-2018

02-16-2018



LOCATION MAP

NOT TO SCALE

LEGEND

GENERAL LINE TYPE

- CENTERLINE
- EDGE OF PAVEMENT
- LEDGE PROFILE
- STREET LINE
- SURVEY BASE LINE

EXISTING SYMBOLS		PROPOSED SYMBOLS
UD	UNDERDRAIN	UD
D	STORM DRAIN	D
S	SANITARY SEWER	S
CS	COMBINED SEWER	CS
S	HOUSE LATERAL	S
G	GAS LINE	G
W	WATER LINE	W
	CURB	
x	CHAIN LINK FENCE	x
	GUARD RAIL	
	WOOD RAIL FENCE	
	STOCKADE FENCE	
	HYDRAULIC LINE	HL

EXISITING SYMBOLS

- CATCH BASIN
- SEWER MANHOLE
- DRAIN MANHOLE
- UTILITY POLE
- LIGHT POLE
- WATER GATE OR VALVE (WV)
- WATER SHUT OFF (WSO)
- HYDRANT
- GAS VALVE (GV)
- HANDICAP
- HEDGE
- SHRUB OR BUSH
- DECIDUOUS TREE
- CONIFER TREE
- PK FOUND
- DRILL HOLE FOUND (D.H.F.)
- MONUMENT FOUND (M.F.)
- HUB FOUND (H.F.)
- TEST PIT
- BORING TEST
- S1 = TRAFFIC STOP SIGN

PROPOSED SYMBOLS

- CATCH BASIN
- SEWER MANHOLE (SMH)
- DRAIN MANHOLE (DMH)
- UTILITY POLE
- LIGHT POLE
- WATER GATE OR VALVE (WV)
- WATER SHUT OFF
- HYDRANT
- HANDICAP
- HEDGE
- SHRUB OR BUSH
- DECIDUOUS TREE
- CONIFER TREE
- PK SET
- DRILL HOLE SET (D.H.S.)
- PROPOSED MONUMENT
- HUB SET (H.S.)
- BOX CUT
- TRENCH
- OVERLAY
- RIPRAP
- NEW CONCRETE SIDEWALK
- COBBLE STONE GUTTER
- BIT. SIDEWALK REPAIR
- LOAM & SEED

GENERAL NOTES

1. LOCATIONS OF UTILITIES ARE APPROXIMATE AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO HAVE ALL THE UTILITIES LOCATE THEIR SERVICES PRIOR TO THE START OF CONSTRUCTION. THE LOCATION, TYPE AND SIZE OF EXISTING PIPES, DUCTS, CONDUITS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES SHOWN ON THE DRAWINGS ARE NOT WARRANTED TO BE EXACT NOR IS IT WARRANTED THAT ALL UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN. INFORMATION SHOWN IS CONSIDERED APPROXIMATE BOTH AS TO SIZE AND LOCATION AND IS INDICATED ON THE DRAWINGS TO GIVE BIDDERS A GENERAL IDEA OF EXISTING CONDITIONS. IT IS UNDERSTOOD AND AGREED THAT THE CONTRACTOR SHALL NOT RELY UPON THESE DRAWINGS FOR SUCH INFORMATION AND SHALL MAKE EXAMINATIONS IN THE FIELD BY VARIOUS AVAILABLE METHODS AND SHALL OBTAIN INFORMATION FROM UTILITY CORPORATIONS AND INDIVIDUALS AS TO THE LOCATION OF ALL SUBSURFACE STRUCTURES, BOTH PUBLIC AND PRIVATE PRIOR TO COMMENCEMENT OF CONSTRUCTION. DEPTH OF SERVICES ARE UNKNOWN AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR. EXCAVATING TEST PITS AS NECESSARY TO VERIFY UTILITY LOCATIONS AND DEPTHS SHALL BE INCIDENTAL TO THIS PROJECT.
2. PRIOR TO THE BEGINNING OF CONSTRUCTION, THE CONTRACTOR SHALL SECURE A STREET OPENING PERMIT FROM THE PORTLAND PUBLIC WORKS DEPARTMENT. NO FEE WILL BE CHARGED FOR THIS PERMIT. CONTRACTOR IS REQUIRED TO SUBMIT A STREET OPENING PERMIT FOR EACH INDIVIDUAL PROJECT STREET.
3. PROPERTY MARKERS AND STREET LINE MONUMENTS SHALL BE PROPERLY PROTECTED AND SHALL NOT BE DISTURBED. IF DISTURBED, THEY SHALL BE REPLACED BY A LICENSED SURVEYOR AT THE CONTRACTOR'S EXPENSE.
4. DEMOLITION SHALL BE COMPLETED IN COORDINATION WITH NEW INFRASTRUCTURE.
5. ALL EXISTING CATCH BASINS, MANHOLES, CONNECTIONS, CONDUIT AND PIPING SHALL BE CLEANED AND LEFT IN SATISFACTORY OPERATING CONDITION AFTER CONSTRUCTION HAS BEEN COMPLETED. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
6. ALL LAWN AREAS, WALKWAYS, AND DRIVEWAYS OUTSIDE THE WORK AREA, DAMAGED BY THE CONTRACTOR, SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE CITY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL TREES AND SHRUBS ON THE PROJECT WHICH ARE NOT TO BE REMOVED.
8. EXISTING PAVEMENT SHALL BE SAW CUT AND BUTTED TO THE NEW PAVEMENT. NO FEATHERING OF PAVEMENT WILL BE PERMITTED. DRIVEWAY BUTT JOINTS ARE INCIDENTAL TO THE CONTRACT AND SHALL NOT REQUIRE MEASUREMENT.
9. EXISTING DRAINAGE STRUCTURES SHALL NOT BE DISTURBED UNLESS OTHERWISE NOTED IN THE DRAWINGS OR BY THE CITY REPRESENATIVE.
10. BEFORE CONNECTING NEW PIPES TO AN EXISTING SEWER LINE, THE CONTRACTOR SHALL NOTIFY THE SEWER MAINTENANCE DIVISION OR THE CITY OF PORTLAND PUBLIC WORKS DEPARTMENT. <u>NO WORK SHALL BE DONE WITHOUT THEIR APPROVAL.</u>
11. NO ADDITIONAL PAYMENT WILL BE MADE FOR GRADING SIDE SLOPES OF DRIVEWAYS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY TRENCH PAVEMENT THAT HAS EXPERIENCED EXCESSIVE SETTLEMENT, CRACKING, OR OPENING OF JOINTS. REPAIRS MAY INCLUDE OVERLAY, REMOVAL OF UNACCEPTABLE MATERIALS, COMPLETE REPLACEMENT, JOINT SEALING, OR REBUTTING PAVEMENT AS REQUIRED. THIS WORK MAY BE NECESSARY <u>AFTER THE FINAL ACCEPTANCE</u> OF WORK OR PRIOR TO THE END OF THE ONE YEAR GUARANTEE. THIS WORK SHALL BE DONE AT THE CONTRACTOR'S EXPENSE.
13. THE FINISHED PAVEMENT SURFACE GRADE SHALL MATCH EXISTING GRADE UNLESS NOTED OTHERWISE.
14. ALL MANHOLE FRAMES SHALL BE SUPPLIED WITH H-20 LOADING AND SOLID MANHOLE COVERS. THE RIM ELEVATION OF PROPOSED STORM AND SEWER MANHOLES SHALL BE SET AT FINISHED PAVEMENT SURFACE GRADE. WINTERIZATION WILL BE REQUIRED. SEE STANDARD DETAIL.
15. NEW CATCH BASINS SHALL BE INSTALLED WITH A TYPE A-4 CATCH BASIN INLET STONE INCIDENTAL TO PAY ITEM 604.131. RIM ELEVATIONS FOR CATCH BASINS ARE GIVEN AT THE FACE OF CURB AND TAKE INTO ACCOUNT THE 3" DEPRESSION FROM THE NORMAL GUTTER LINE GRADE AS SHOWN IN THE DETAILS.
16. ON ALL "REMOVE" STRUCTURES, THE CONTRACTOR SHALL REMOVE THE STRUCTURE ENTIRELY. ALL EXISTING GRANITE CATCH BASIN STONES, MANHOLE FRAMES AND COVERS TO BE REMOVED SHALL BE DELIVERED TO THE CITY STOCK YARD AS DIRECTED. REMOVAL OF EXISTING STRUCTURAL CONCRETE, CONCRETE, EXCAVATED STRUCTURES, MANHOLES, CATCH BASINS, MORTARED STONE MASONRY, CONCRETE MASONRY, WOODEN TIMBERS/PILES AND ANY OTHER STRUCTURAL ELEMENTS ENCOUNTERED DURING CONSTRUCTION ARE INCIDENTAL TO THE ASSOCIATED PIPE PAY ITEMS. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
17. REMOVAL OF EXISTING STORM DRAINS, SEWER PIPES OR OTHER PIPE STRUCTURES, BACKFILLING AND ALL ASSOCIATED WORK WITHIN THE EXCAVATION LIMITS OF PROPOSED WORK SHALL BE CONSIDERED INCIDENTAL TO THE COSTS OF CONSTRUCTION. NO EXTRA PAYMENT WILL BE MADE.
18. ALL TERMINAL MANHOLES SHALL HAVE BRICK CHANNELS CONSTRUCTED STRAIGHT THROUGH THE MANHOLE.
19. THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT AND MATERIALS AS REQUIRED TO PERFORM THE WORK AS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATIONS. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE APPLICABLE FEDERAL, STATE AND LOCAL CODES.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS (STATIONS AND OFFSETS FOR MANHOLES AND OTHER STRUCTURES ARE SHOWN ON THE DRAWINGS TO THE CENTER OF EACH). ADDITIONALLY, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL "AS-BUILT" INFORMATION AS REQUIRED IN THE SPECIFICATION
21. THE PROJECT WILL REQUIRE RE-LOCATION OF UNITIL NATURAL GAS LINES. THE CONTRACTOR SHALL COORDINATE WITH UNITIL AND SHALL LAYOUT THE LOCATION OF THE NATURAL GAS LINE RE-LOCATION AS SHOWN ON THE CONTRACT DRAWINGS. UNITIL PLANS TO START WORK IN BEDFORD STREET IN APRIL 2018.
22. THE QUANTITY OF HOUSE AND STORM DRAIN LATERALS INCLUDES A QUANTITY FOR EVERY HOUSE WITHIN PROJECT LIMITS EVEN THOUGH NOT ALL ARE SHOWN ON THE PLANS. THE FINAL DETERMINATION OF HOW MANY ARE INSTALLED WILL BE DETERMINED IN THE FIELD BY ENGINEER.
23. THE EXISTING COLLECTION SYSTEM INCLUDING GRAVITY SEWERS AND STORM DRAINS SHALL REMAIN FULLY OPERATIONAL DURING CONSTRUCTION UNTIL PROJECT IS COMPLETED AND ACCEPTED BY OWNER. THE CONTRACTOR SHALL FULLY COORDINATE CONSTRUCTION ACTIVITIES WITH THE OWNER'S OPERATIONS TO MINIMIZE ADVERSE IMPACTS ON THEIR EXISTING OPERATIONS. THE COST OF ADDITIONAL WORK REQUIRED TO MAINTAIN EXISTING OPERATIONS THROUGHOUT CONSTRUCTION OPERATIONS WILL NOT BE ELIGIBLE FOR PAYMENT AS AN EXTRA UNDER A CHANGE ORDER; RATHER, THESE COSTS WILL BE CONSIDERED AS "INCIDENTAL" TO THE BIDS SUBMITTED FOR THIS CONTRACT. ALSO, THE NECESSITY TO COORDINATE CONSTRUCTION ACTIVITIES WITH OWNER OPERATIONS WILL NOT BE CONSIDERED A VALID OR MERITORIOUS REASON FOR A DELAY CLAIM OR TIME EXTENSION ON THIS PROJECT.
24. THERE MAY BE ONE OR MORE CONTRACTORS PERFORMING WORK IN THE PROJECT AREA. COORDINATION BETWEEN CONTRACTORS IS A PRIMARY RESPONSIBILITY OF EACH CONTRACTOR WITH THE INTENT TO AVOID DELAYS, COMPLICATIONS AND UNDO DISRUPTION OF CONSTRUCTION ACTIVITY.
25. THE CONTRACTOR SHALL MAINTAIN TRAFFIC IN A SAFE MANNER AT ALL TIMES DURING CONSTRUCTION. THE MOST CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) MANUAL FOR BOTH WORK ZONE AND TRAFFIC CONTROL REQUIREMENTS SHALL APPLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CREATING A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH SECTION 652 (PAY ITEM 652.39).
26. EXISTING FACILITIES AND IMPROVEMENTS (I.E. LIGHT POLES, SIGNS, ETC.) SHALL BE REMOVED AND REPLACED OR PROTECTED AS REQUIRED DURING CONSTRUCTION AND SHALL BE CONSIDERED INCIDENTAL TO THE RELATED PAY ITEMS. BRACING OF UTILITY POLES, WHERE REQUIRED, SHALL BE INCIDENTAL TO THE PROJECT.
27. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL TREES ON THE PROJECT WHICH ARE NOT CALLED TO BE REMOVED. EQUIPMENT AND MATERIALS SHALL NOT BE STORED OVER THE ROOT ZONE WHICH SHALL BE DEFINED AS THE AREA ENCOMPASSED BY THE DRIPLINE. WHENEVER POSSIBLE, OTHER PLANTINGS SHALL BE PRESERVED BY WHATEVER METHOD NECESSARY INCLUDING TRANSPLANTING AND/OR TEMPORARY RELOCATION. THE ASSOCIATED COSTS ARE INCIDENTAL TO THE PROJECT. ANY TREES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED USING APPROVED TREE DRESSING OR PAINT IN ACCORDANCE WITH THE APPROPRIATE PROVISIONS OF SECTION 201 OF THE STANDARD SPECIFICATIONS. ANY TREE DAMAGED BY THE CONTRACTOR SHALL RESULT IN A FINANCIAL PENALTY OF $1,500 FOR EACH INCIDENCE. DAMAGE SHALL INCLUDE ANY AND ALL IMPACTS TO TREES TO INCLUDE BUT NOT LIMITED TO LIMB/TREE BREAKAGE, DAMAGE TO TREE TRUNKS, ROOTS STRUCTURE AND ANY INCIDENTAL IMPACTS.
28. ALL CONNECTIONS OF PIPING TO EXISTING FACILITIES SHALL BE CONSIDERED INCIDENTAL. THIS INCLUDES ALL WORK REQUIRED TO CORE HOLE, INSTALLATION OF WATERTIGHT CONNECTIONS, AND ALL ASSOCIATED WORK.
29. DELIVERED WITHIN TEN (10) CALENDAR DAYS OF THE CONTRACT SIGNING, THE CONTRACTOR SHALL SUBMIT THREE (3) COPIES OF A CONSTRUCTION OPERATIONS PLAN TO THE ENGINEER, AND CITY OF PORTLAND. THE COST OF THE OPERATIONS PLAN SHALL BE INCIDENTAL.
30. ALL PIPE TRENCH EXCAVATIONS SHALL BE BACKFILLED AND "CLOSED" DURING CONTRACTOR NON-WORKING HOURS INCLUDING NIGHTS, HOLIDAYS AND WEEKENDS. THE CONTRACTOR MAY REQUEST IN WRITING TO THE ENGINEER AND OWNER TO SECURE OPEN EXCAVATION IN LIEU OF BACKFILLED AND "CLOSED." NOT ALLOWING A SECURE OPEN EXCAVATION SHALL NOT BE A BASIS FOR CLAIMS AGAINST THE OWNER.
31. BORINGS WERE COMPLETED IN JANUARY 2018. REFERENCE APPENDIX OF THE SPECIFICATIONS.
32. TEST PITS SHALL BE EXCAVATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL OBTAIN THE LOCATION OF THE UTILITY/STRUCTURE IN QUESTION WITH TIES TO SURROUNDING FEATURES AND THE ELEVATION OF BOTH THE TOP AND BOTTOM OF THE UTILITY/STRUCTURE. COSTS FOR TEST PITS WILL BE PAID THROUGH THE BID ITEM 203.28.
33. ANY EXCAVATION BY CONTRACTOR THAT UNCOVERS AN HISTORICAL OR ARCHAEOLOGICAL ARTIFACT SHALL BE IMMEDIATELY REPORTED TO OWNER AND A REPRESENTATIVE OF AGENCY. CONSTRUCTION SHALL BE TEMPORARILY HALTED PENDING THE NOTIFICATION PROCESS AND FURTHER DIRECTIONS ISSUED BY AGENCY AFTER CONSULTATION WITH THE STATE HISTORIC PRESERVATION OFFICER (SHPO). CONTRACTOR SHALL NOT BE ENTITLED TO PAY COMPENSATION DUE TO DELAY ASSOCIATED WITH THIS ITEM. COST SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
34. ANY REQUIRED PROJECT WORK NOT IDENTIFIED UNDER A PAY ITEM OR RELATED TO A PAY ITEM SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. NO EXTRA PAYMENT WILL BE MADE.
35. IF WORK IS NECESSARY BEYOND THE SAW CUT LINES SHOWN ON CONTRACT PLANS TO ACCOMMODATE PROJECT CONSTRUCTION, COSTS SHALL BE CONSIDERED INCIDENTAL TO COSTS OF CONSTRUCTION AND NO EXTRA PAYMENT WILL MADE. ALL REQUIRED PROJECT WORK ASSOCIATED WITH CONTRACT DRAWINGS, DETAILS, GENERAL CONDITIONS AND SPECIFICATIONS SHALL BE CONSIDERED INCIDENTAL TO THE RELATED PAYS ITEMS. NO EXTRA PAYMENT WILL BE MADE FOR ANY DIRECT OR INCIDENTAL WORK REQUIRED TO COMPLETE THE PROJECT IN ITS ENTIRETY AND READY FOR OWNER ACCEPTANCE.
36. EXISTING CONDITIONS AND GROUND SURFACE FEATURES FOR FOREST AVENUE, DURHAM STREET, PREBLE STREET EXTENSION, GRASMERE ROAD, DEERFIELD ROAD AND BELMEADE ROAD ARE BASED UPON FIELD SURVEY COMPLETED BY SEBAGO TECHNICS IN THE SPRING 2017. EXISTING CONDITIONS AND GROUND SURFACE FEATURES FOR BAXER BOULEVARD AND BEDFORD STREET ARE BASED UPON SURVEYS COMPLETED BY OR FOR AND PROVIDED BY THE CITY OF PORTLAND.

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 N.dwg, TAB:N1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-II

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16.2018

STATE OF MAINE
ROBERT A. McSORLEY
No. 8588
LICENSED PROFESSIONAL ENGINEER
02. 16.2018

BEDFORD STREET
SEWER SEPERATION PROJECT

GENERAL NOTES AND LEGEND

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

SHEET #
2 OF 46

PLAN NUMBER

EROSION CONTROL NOTES

THIS PLAN HAS BEEN DEVELOPED TO PROVIDE A STRATEGY FOR DEALING WITH SOIL EROSION AND SEDIMENTATION DURING AND AFTER THE STREET RECONSTRUCTION AND SEWER SEPARATION PROJECT. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES" PUBLISHED BY THE CUMBERLAND COUNTY SOIL AND WATER DISTRICT AND MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, LATEST EDITION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO POSSES A COPY OF THE EROSION CONTROL PLAN AT ALL TIMES.

PRE–CONSTRUCTION PHASE

1. PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SEDIMENT BARRIERS WILL BE STAKED/INSTALLED ACROSS THE SLOPE(S), ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT PROPERTY LINE OR WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. THE PLACEMENT OF SEDIMENT BARRIERS SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES AND IN ACCORDANCE WITH THIS EROSION CONTROL PLAN AND DETAILS IN THIS PLAN SET. THIS NETWORK IS TO BE MAINTAINED BY THE CONTRACTOR UNTIL ALL EXPOSED SLOPES HAVE AT LEAST 85%–90% VIGOROUS PERENNIAL VEGETATIVE COVER TO PREVENT EROSION. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER PERMANENT STABILIZATION IS ATTAINED.

2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DETAILED SCHEDULE AND MARKED UP PLAN INDICATING AREAS AND COMPONENTS OF THE WORK AND KEY DATES SHOWING DATE OF DISTURBANCE AND COMPLETION OF THE WORK. THE CONTRACTOR SHALL SCHEDULE A PRE–CONSTRUCTION MEETING WITH THE MUNICIPAL STAFF. THREE COPIES OF THE SCHEDULE AND MARKED UP PLAN SHALL BE PROVIDED TO THE MUNICIPALITY THREE DAYS PRIOR TO THE SCHEDULED PRE–CONSTRUCTION MEETING. SPECIAL ATTENTION SHALL BE GIVEN TO THE 14 DAY LIMIT OF DISTURBANCE IN THE SCHEDULE ADDRESSING TEMPORARY AND PERMANENT VEGETATION MEASURES.

CONSTRUCTION AND POST–CONSTRUCTION PHASE

1. IN ORDER TO PROTECT THE NATURAL RESOURCES IN THE PROJECT AREA, ONLY DISTURB THOSE AREAS NECESSARY TO CONSTRUCT THE ROAD, INSTALL LANDSCAPING, SIDEWALKS AND SPECIFIED PIPING.

2. AREAS UNDERGOING ACTUAL CONSTRUCTION SHALL ONLY EXPOSE THAT AMOUNT OF MINERAL SOIL NECESSARY FOR PROGRESSIVE AND EFFICIENT CONSTRUCTION. AN AREA CONSIDERED OPEN IS ANY AREA NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING, EROSION CONTROL MATS, RIPRAP OR GRAVEL BASE ON A ROAD . OPEN AREAS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL AS SHOWN ON THE DESIGN PLANS AND AS DESCRIBED WITHIN THIS EROSION CONTROL PLAN WITHIN 14–DAYS OF DISTURBANCE. AREAS LOCATED WITHIN 100' OF NATURAL RESOURCES SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL WITHIN SEVEN (7) DAYS. REFER TO WINTER EROSION CONTROL NOTES FOR THE TREATMENT OF OPEN AREAS AFTER OCTOBER 1ST OF THE CONSTRUCTION YEAR.

3. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE LEFT IN AN UNTREATED OR UNVEGETATED CONDITION FOR A MAXIMUM OF 14 DAYS FROM FINAL GRADING OF THE LOAM. LOAM WILL BE STOCKPILED FOR FUTURE USE AND PROTECTED FROM EROSION LOSSES BY MULCH AND FILTER FABRIC/HAY BALE BARRIERS.

4. PRIOR TO ANY CLEARING OR GRUBBING, A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED AT THE INTERSECTION OF THE PROPOSED ENTRANCES AND EXISTING ROADWAY TO AVOID TRACKING OF MUD, DUST AND DEBRIS FROM THE SITE.

5. PRIOR TO CLEARING AND GRUBBING THE SITE, STORMDRAIN INLET PROTECTION SHALL BE INSTALLED AT ALL CATCH BASINS.

6. PRIOR TO CLEARING AND GRUBBING, SEDIMENT BARRIERS WILL BE INSTALLED ACROSS THE SLOPES, ON THE CONTOUR, AT OR JUST BELOW THE LIMITS OF CONSTRUCTION AND/OR JUST ABOVE ANY DOWNSLOPE ADJACENT PROPERTY OR WETLAND TO PROTECT AGAINST CONSTRUCTION RELATED EROSION.

7. THE CONTRACTOR MUST INSTALL ANY ADDED MEASURES WHICH MAY BE NECESSARY TO CONTROL EROSION/SEDIMENTATION FROM THE SITE DEPENDENT UPON THE ACTUAL SITE AND WEATHER CONDITIONS. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, IN ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION

8. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS. THE DISPOSAL OF POST SEEDING SEDIMENT, IF ANY SHALL, BE THE RESPONSIBILITY OF THE CONTRACTOR.

9. WHEN WORK IS IMMEDIATELY ADJACENT TO THE NATURAL RESOURCES, INCLUDING COASTAL WETLANDS, STREAMS AND HABITATS, CONSTRUCTION SITE MUST BE STABILIZED PRIOR TO THE END OF THE WORK DAY OR PRIOR TO ANY STORM EVENT. SEDIMENT BARRIERS SHALL BE PLACED BETWEEN ANY NATURAL RESOURCE AND THE DISTURBED AREA.

EROSION CONTROL APPLICATIONS & MEASURES

THE PLACEMENT OF EROSION CONTROL MEASURES SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES, THE EROSION CONTROL PLAN AND DETAILS IN THE PLAN SET.

1. STABILIZED CONSTRUCTION ENTRANCE/EXIT:

   PRIOR TO CLEARING AND/OR GRUBBING THE SITE A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED WHEREVER TRAFFIC WILL EXIT THE CONSTRUCTION SITE ONTO A PAVED ROADWAY IN ORDER TO MINIMIZE THE TRACKING OF SEDIMENT AND DEBRIS FROM THE CONSTRUCTION SITE ONTO PUBLIC ROADWAYS. THE ENTRANCES AND ADJACENT ROADWAY AREAS SHALL BE PERIODICALLY SWEPT OR WASHED TO FURTHER MINIMIZE THE TRACKING OF MUD, DUST OR DEBRIS FROM THE CONSTRUCTION AREA. STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED IN AREAS SPECIFIED ON THE PLANS AND AS DETAILED ON THE PLANS. PAYSON PARK ACCESS DRIVES SHALL NOT BE USED FOR CONSTRUCTION ACCESS.

2. TEMPORARY VEGETATION AND MULCH:

   IF FINAL SEEDING OF THE DISTURBED AREAS IS NOT COMPLETED BY SEPTEMBER 15TH OF THE YEAR OF CONSTRUCTION, THEN ON THAT DATE THESE AREAS WILL BE GRADED AND SMOOTHED, THEN SEEDED TO A WINTER COVER CROP OF RYE AT THE RATE OF 112 LBS/ACRE OR 3 LBS/1,000 SQUARE FEET AND MULCHED AT A RATE OF 70LBS./1000 SQUARE FEET. THE RYE SEEDING WILL PROCEED BY AN APPLICATION OF 3 TONS OF LIME AND 1000 LBS. OF 10–10–10 FERTILIZER PER ACRE, OR ITS EQUIVALENT. IF THE RYE SEEDING DOES NOT MAKE ADEQUATE GROWTH TO PROVE AT LEAST 75% VEGETATIVE COVER BY NOVEMBER 15TH, THEN ON THAT DATE, A TEMPORARY MULCH OF HAY WILL BE APPLIED TO THE AREA AT A RATE OF 150LBS./1000 SQUARE FEET. AREAS STABILIZED WITH RYE AND MULCH WILL BE TILLED AND RESEEDED USING THE VEGETATION PLAN FOR PERMANENT SEEDING THE FOLLOWING SPRING. FINAL VEGETATION OF THE SITE SHALL NOT BE CONSIDERED COMPLETE UNTIL EACH DISTURBED AREA NOT TO BE PAVED OR TREATED WITH RIPRAP HAS A VEGETATIVE COVER OVER AT LEAST 90% OF ITS SURFACE.

   ALL AREAS SEEDED DURING THE WINTER MONTHS WILL BE INSPECTED IN THE SPRING FOR ADEQUATE CATCH. ALL AREAS SUFFICIENTLY VEGETATED (LESS THAN 75 PERCENT CATCH) SHALL BE REVEGETATED BY REPLACING LOAM, SEED AND MULCH. IF DORMANT SEEDING IS NOT USED FOR THE SITE, ALL DISTURBED AREAS SHALL BE REVEGETATED IN THE SPRING.

   TEMPORARY MULCH WILL BE APPLIED TO ALL EXPOSED SOIL SURFACES WITHIN SEVEN (7) DAYS OR PRIOR TO ANY STORM EVENT.

3. SOIL STOCKPILES:

   STOCKPILES OF SOIL OR SUBSOIL SHALL BE MULCHED WITH HAY AT A RATE OF 75 LBS/1,000 S.F. (1.5 TONS PER ACRE) OR WITH A FOUR–INCH LAYER OF WOOD WASTE EROSION CONTROL MIX. THIS WILL BE DONE WITHIN 24 HOURS OF STOCKING AND REESTABLISHED PRIOR TO ANY RAINFALL. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

4. SEDIMENT BARRIERS:

   PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SILT FENCING SHALL BE STAKED ACROSS THE SLOPE(S), ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. MAXIMUM STAKE SPACING OF 6 FEET SHALL BE USED, UNLESS THE FENCE IS SUPPORTED BY WIRE FENCE REINFORCEMENT OF MINIMUM 14 GAUGE AND WITH A MAXIMUM MESH SPACING OF 6 INCHES, IN WHICH CASE STAKES MAY BE SPACED A MAXIMUM OF 10 FEET APART. SILT FENCING WITH A THE BOTTOM OF THE FENCE SHOULD BE PROPERLY ANCHORED A MINIMUM OF 6" PER THE PLAN DETAIL AND BACKFILLED.

   ALL SILT FENCE SHALL BE INSPECTED, REPLACED, AND/OR REPAIRED WEEKLY, AS WELL AS IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL, OR WHEN SEDIMENT REACHES 1/3 THE BARRIER HEIGHT. ALL HAY BALE, FILTER FABRIC BARRIERS SHALL REMAIN IN PLACE UNTIL SEEDINGS HAVE BECOME 75% ESTABLISHED AND THEN REMOVED WITH IN 10 DAYS.

   ANY SILT FENCE IDENTIFIED BY THE OWNER OR REVIEWING AGENCIES AS NOT BEING PROPERLY INSTALLED DURING CONSTRUCTION SHALL BE IMMEDIATELY REPAIRED IN ACCORDANCE WITH THE INSTALLATION DETAILS.

5. STORMDRAIN INLET PROTECTION:

   SILT SACKS SHALL BE PLACED AROUND A STORMDRAIN DROP INLET OR CURB INLET PRIOR TO PERMANENT STABILIZATION OF THE IMMEDIATE AND UPSTREAM DISTURBED AREAS. THEY SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN–OUT AND DISPOSAL OF TRAPPED SEDIMENTS AND MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES. ANY RESULTANT PONDING OF WATER FROM THE PROTECTION METHOD MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES. INSTALL SILT SACKS IN ACCORDANCE WITH THE DETAIL AND PER MANUFACTURER'S RECOMMENDATIONS. INLET PROTECTION SHALL INCLUDE ADDITIONAL PROTECTION TO BLOCK SEDIMENT FROM FLOWING INTO CURB INLET STONES AND BYPASSING CATCH BASIN SILT SACKS. SEE EROSION CONTROL DETAILS.

6. DUST CONTROL:

   DUST CONTROL DURING CONSTRUCTION SHALL BE ACHIEVED BY THE USE OF A WATERING TRUCK TO PERIODICALLY SPRINKLE THE EXPOSED ROADWAY AREAS AS NECESSARY TO REDUCE DUST DURING THE DRY MONTHS. APPLYING OTHER DUST CONTROL PRODUCTS SUCH AS CALCIUM CHLORIDE OR OTHER MANUFACTURED PRODUCTS ARE ALLOWED IF AUTHORIZED BY THE PROPER LOCAL, STATE AND/OR FEDERAL REGULATING AGENCIES. HOWEVER, IT IS THE CONTRACTOR'S ULTIMATE RESPONSIBILITY TO MITIGATE DUST AND SOIL LOSS FROM THE SITE.

7. PERMANENT VEGETATION:

   REVEGETATION MEASURES SHALL COMMENCE IMMEDIATELY UPON COMPLETION OF FINAL GRADING OF AREAS TO BE LOAMED AND SEEDED. PERMANENT REVEGETATION MEASURES INCLUDING LOAM, SEED AND MULCH SHALL MEET SECTION 615 OF THE SPECIFICATIONS.

8. SEDIMENT TRACKING:

   CONTRACTOR SHALL BE REQUIRED TO HAVE A VACUUM STYLE SWEEPER ON–SITE AND CLEAN STREETS PERIODICALLY DURING EACH WORK DAY OR AT THE IMMEDIATE DIRECTION OF THE CITY ENGINEER OR INSPECTOR. THIS WORK SHALL BE INCIDENTAL TO SECTION 656 OF THE CONTRACT SPECIFICATIONS. NO EXTRA PAYMENT WILL BE MADE TO THE CONTRACTOR.

TRENCH DEWATERING:

1. EXCAVATION, INSTALLATION OF STORM DRAINS AND ASSOCIATED STRUCTURES WILL REQUIRE CONTINUOUS DEWATERING THROUGHOUT CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PREPARING AND IMPLEMENTING A DEWATERING PLAN MEETING ENVIRONMENTAL REGULATIONS AND REQUIREMENTS STIPULATED WITHIN THE CONTRACT DOCUMENTS AND PLANS. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A WRITTEN DEWATERING PLAN AND SHALL MEET WITH CITY REPRESENTATIVES TO REVIEW THE DEWATERING PLAN. THE CONTRACTOR SHALL MAKE ADJUSTMENTS TO THE DEWATERING PLAN AS REQUIRED BY THE CITY OR OTHER AGENCIES. ANY REQUIRED CHANGES SHALL BE CONSIDERED INCIDENTAL TO THE COST OF DEWATERING AND NO EXTRA PAYMENT WILL BE MADE. ALL DEWATERING SHALL BE RUN THROUGH A PUMPED SEDIMENT REMOVAL SYSTEM EQUAL TO "DIRT BAG" OR ALTERNATIVE METHODS AS APPROVED BY THE ENGINEER. IT IS ANTICIPATED THAT HIGH VOLUMES OF PUMPING WILL BE REQUIRED FOR THE PROJECT. DISCHARGE LOCATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK AND COSTS ASSOCIATED WITH DEWATERING THE JOBSITE INCLUDING ANY CHANGES, MODIFICATIONS OR SPECIAL DEWATERING SYSTEMS/REQUIREMENTS TO ENSURE THE SITE IS DEWATERED. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE RELATED PAY ITEMS. WATER FROM CONSTRUCTION TRENCH DEWATERING WILL PASS FIRST THROUGH A SEDIMENTATION COLLECTION BAG PRIOR TO DISCHARGE. THE DISCHARGE SITE SHALL BE SELECTED TO AVOID FLOODING AND SEDIMENT DISCHARGES TO A PROTECTED RESOURCE. IN NO CASE SHALL THE SEDIMENTATION COLLECTION BAG BE LOCATED WITHIN 100 FEET OF A PROTECTED NATURAL RESOURCE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

MONITORING:

1. MAINTENANCE MEASURES WILL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. WEEKLY AND AFTER EACH RAINFALL, A VISUAL INSPECTION WILL BE MADE OF ALL INSTALLED EROSION CONTROL MEASURES AND REPAIRS WILL BE MADE AS NEEDED TO INSURE THEIR CONTINUING FUNCTION AS DESIGNED. FOLLOWING THE FINAL SEEDINGS, THE SITE WILL BE INSPECTED EVERY FIFTEEN DAYS UNTIL THE SEEDINGS HAVE BEEN ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 75% OF AREA VEGETATED WITH VIGOROUS GROWTH. RESEEDING WILL BE CARRIED OUT, WITH FOLLOW UP INSPECTIONS, IN THE EVENT OF ANY FAILURES. ALL EROSION CONTROL MEASURES WILL BE REMOVED WITHIN 10 DAYS WHEN VEGETATION IS ADEQUATELY ESTABLISHED.

RIPRAP OUTLET CONSTRUCTION NOTES (REFER TO RIPRAP APRON DETAIL ON DETAIL SHEET)

PRE–CONSTRUCTION

1. MEET ON SITE WITH OWNER, SITE CONTRACTOR, AND THE DESIGN ENGINEER TO DISCUSS SCOPE OF WORK AND EXPECTATIONS. DETERMINE LIMITS OF TIDAL "SPARTINA" GRASS.

2. CONTRACTOR SHALL HAVE ALL MATERIALS APPROVED BY THE DESIGN ENGINEER PRIOR TO INSTALLATION.

CONSTRUCTION PHASE

1. STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL BMP MANUAL, LATEST EDITION. SEE THE EROSION & SEDIMENT CONTROL NOTES AND PLAN FOR ADDITIONAL REQUIREMENTS. . PROTECT NEARBY TREES, WHICH ARE PROPOSED TO REMAIN. TO THE EXTENT PRACTICAL, PROTECT THE ROOT ZONE OF THESE TREES.

2. THE CONTRACTOR SHALL CONSIDER THE TIDE SCHEDULE CAREFULLY; AND SHALL SCHEDULE WORK TO AVOID INTERRUPTIONS OF DAYLIGHT WORKING HOURS WITH HIGH TIDES. WORKING WITHIN TIDAL WATERS IS NOT PERMITTED.

3. THE CONTRACTOR SHALL ONLY WORK IN AREAS THAT CAN BE COMPLETED DURING EACH CONSTRUCTION DAY. NO AREAS SHALL BE EXCAVATED BY THE CONTRACTOR AND LEFT EXPOSED, AS THESE AREAS WILL BE SUBJECT TO EROSION FROM TIDAL SURGES OR STORM EVENTS.

4. WITHIN VEGETATIVE AREA PROPOSED TO BE DISTURBED, CAREFULLY REMOVE THE TOP ORGANIC LAYER (12"±) BELOW ELEVATION DETERMINED AT PRECONSTRUCTION MEETING. REMOVE USING METHOD THAT WILL KEEP THE VEGETATION SYSTEM INTACT. STOCKPILE THE ORGANIC LAYER IN A MANNER SO THAT MATERIAL CAN BE REUSED. REMOVE ONLY ENOUGH VEGETATION NEEDED TO INSTALL THE TIDE GATE VAULT AND SEWER PIPE IN ACCORDANCE WITH THE CROSS–SECTION. ORGANIC LAYER REMOVAL, STORAGE AND PLACEMENT SHALL BE INCIDENTAL TO THE RELATED PIPE PAY ITEM.
5. PIPE INSTALLATION: LOW PERMEABILITY DAMS OF NATURAL CLAY, BETONITE OR FLOWABLE FILL SHALL BE INSTALLED AS SHOWN TO MINIMIZE TIDAL FLOW THROUGH THE BACKFILL. DAMS SHALL EXTEND A MINIMUM 1 FOOT BELOW THE TRENCH BOTTOM, 1 FOOT BEYOND THE SIDEWALLS AND UP TO ELEVATION 7.4 OR TOP OF FINISHED GRADE. DAMS SHALL BE A MINIMUM OF 2 FEET THICKNESS. COSTS OF LOW PERMEABILITY DAMS SHALL BE INCIDENTAL TO THE CONTRACT.

6. INSTALL RIPRAP SLOPE IN ACCORDANCE WITH THE DETAILS. ONCE THE CHECK VALVE VAULT, SEWER PIPE, STORAGE CONDUIT AND RIPRAP SLOPE ARE COMPLETELY INSTALLED, THE CONTRACTOR SHALL GRADE THE DISTURBED AREAS UNIFORMLY TO MATCH EXISTING TOPOGRAPHY (U.N.O.) AND THE NEW RIPRAP EDGE.

7. PLACE EXISTING ORGANIC MATERIAL IN DISTURBED VEGETATIVE AREAS BELOW ELEVATION 10, WORKING FROM THE OUTFALL TO THE VAULT. DISTURBED VEGETATIVE AREAS ABOVE ELEVATION 10 SHALL HAVE LOAM AND SEED. ORGANIC LAYER REMOVAL, STORAGE AND PLACEMENT SHALL BE INCIDENTAL TO THE RELATED PIPE PAY ITEM.

8. INSPECT THE SITE EVERY TWO WEEKS FOR SIGNS OF EROSION AND ESTABLISHMENT OF VEGETATION. REPAIR ERODED AREAS AND REPLANT VEGETATION TO ESTABLISH 75% VEGETATION CATCH, AS REQUIRED.

9. IN AREAS REQUIRING REPLANTING, INSTALL NORTH AMERICAN GREEN C125BN EROSION CONTROL FABRIC OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS (PAY ITEM 613.319).

10. USING RAZOR BLADE, CAREFULLY CUT HOLES 1 FOOT O.C. AND IN ROWS SPACED 1 FOOT APART. LOOSELY OFFSET HOLES BETWEEN ROWS FOR APPROXIMATELY 6–8 HOLES PER SQUARE YARD. PLANT CORD GRASS SPARTINA PATENS (SALT MEADOW GRASS) AND SPARTINA ALTERNIFLORA (SMOOTH CORDGRASS) PLUGS IN ALTERNATING FASHION. COSTS ASSOCIATED WITH CUTTING FABRIC AND PLANTING GRASS PLUGS WILL BE PAID THROUGH THE BID ITEM 615.072.

11. ALL WHEELED OR TRACKED EQUIPMENT THAT MUST TRAVEL OR WORK IN VEGETATED WETLAND AREAS MUST TRAVEL AND WORK ON MATS OR PLATFORMS IN ORDER TO PROTECT THE WETLAND VEGETATION.

DEMOLITION NOTES

1. DEMOLITION OF EXISTING SEWER AND STORMDRAIN PIPE TO BE INCIDENTAL TO PIPE INSTALLATION.

2. EACH EXISTING DRAINAGE STRUCTURE OR SEWER STRUCTURE TO BE ABANDONED OR REMOVED WILL BE INCIDENTAL TO THE INSTALLATION OF NEW STRUCTURES.

3. DEMOLITION SHALL BE COMPLETED IN COORDINATION WITH NEW INFRASTRUCTURE. CONTRACTOR SHALL ENSURE EXISTING ROAD SURFACE DRAINAGE IS MAINTAINED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR TEMPORARY DRAINAGE PROVISIONS. COSTS FOR TEMPORARY DRAINAGE PROVISIONS SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.

PORTLAND WATER DISTRICT NOTES

1. CONTRACTOR SHALL DISPOSE OF ALL EXCAVATED PIPING AND APPURTENANCES.
2. ALL MAINS AND SERVICES SHALL BE INSTALLED WITH 5.5' OF COVER MEASURED FROM PROPOSED ROAD GRADE UNLESS OTHERWISE APPROVED BY A PWD REPRESENTATIVE.
3. THE PORTLAND WATER DISTRICT WILL NOTIFY CUSTOMERS FOR ALL WORK INVOLVING TEMPORARY SHUT DOWN OF SERVICE. CUSTOMERS MUST RECEIVE AT LEAST 48 HOURS NOTIFICATION PRIOR TO ANY SHUT DOWN. THE DISTRICT MUST RECEIVE NOTICE FROM THE CONTRACTOR OF THE SHUT DOWN AT LEAST 48 HOURS PRIOR TO CUSTOMER NOTIFICATION.
4. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE POLYWRAPPED PER SPECIFICATIONS.
5. THE COST OF PROVIDING TEMPORARY WATER SERVICE TO THE BUILDINGS INDICATED ON THE PLAN SHALL BE LUMP SUM PAY ITEM. IF PROPERTIES REQUIRING A TEMPORARY WATER CONNECTION HAVE MALFUNCTIONING SILLCOCKS OR NO EXTERIOR PLUMBING, IT MAY BE NECESSARY TO EXCAVATE AND CONNECT INTO THE EXISTING SERVICE LINE BEHIND THE EXISTING SHUT–OFF VALVE TO PROVIDE TEMPORARY SERVICE.
6. PROVIDE TEMPORARY MAIN CONNECTION TO HYDRANT USING LL BRASS OR 304SS ADAPTER, 304SS NPT TO HDPE TRANSITION, AND FLANGED HDPE PIPING TO BRING PIPING ELEVATION FROM HYDRANT PORT TO GRADE. PROVIDING PIPING SUPPORTS/BLOCKING AT FITTINGS. HDPE SHALL BE AWWA C906, SDR11 WITH IPS FLANGE ADAPTERS AN DI BACKUP RINGS, DIMENSIONS PER AWWA C207. ALL PIPING AND FITTING SHALL BE NSF 61. PROVIDE FLANGED LL DOUBLE CHECK VALVE BACKFLOW DEVICE, SAME NOMINAL SIZE AS TEMP MAIN, AT EACH HYDRANT CONNECTED TO A TEMPORARY MAIN. PROVIDE FLANGED RESILIENT SEATED GATE VALVES FOR ISOLATION AND PROVIDE UPSTREAM AND DOWNSTREAM TAPS. REMOVE BACKFLOW ONLY UPON OWNER'S REQUEST AND PROVIDE FLANGED HDPE REPLACEMENT SPOOL PIECE. HDPE SHALL BE AWWA C906, SDR11, WITH IPS FLANGE ADAPTERS AND DI BACKUP RINGS. FLANGE DIMENSIONS PER AWWA C207. ALL PIPING AND FITTINGS SHALL BE NSF61. PROVIDE DOCUMENTATION OF ANNUAL INSPECTION BY A PERSON CERTIFIED BY THE NEW ENGLAND WATER WORKS ASSOCIATION OR AMERICAN BACKFLOW PREVENTION ASSOCIATION.
7. INSTALL 4" TEMPORARY FIRE DEPT CONNECTION (TYP.), 4" GATE VALVE, 90° ELBOW, RISER PIPE, 90° ELBOW, AND 4–1/2" NPT STEAMER PORT CONNECTION WITH CAP. ALL JOINTS TO BE RESTRAINED. STEAMER PORT, RISER AND TEE TO BE ANCHORED TO THE GROUND. OUTLET TO BE BETWEEN 1' AND 2' OFF THE GROUND.
8. REMOVE ALL OLD PIPING NOT EXPLICITLY CALLED OUT FOR ABANDONMENT.
9. TEMPORARY WATER SYSTEM SHALL ONLY BE ACTIVE BETWEEN APRIL 15TH AND OCTOBER 15TH. ALL WATER MAIN, EITHER EXISTING OR NEWLY INSTALLED, MUST BE ACTIVE, BETWEEN OCTOBER 16TH AND APRIL 14TH.
10. CONTRACTOR MUST ALLOW OWNERS SUFFICIENT TIME TO TRANSFER WATER SERVICES FROM EXISTING WATER MAIN TO TEMPORARY WATER SERVICES INSTALLED BY CONTRACTOR AND TO TRANSFER SERVICE TO NEW WATER MAIN/SERVICE LINE UPON SUCCESSFUL TESTING OF SAMPLE FOR ABSENCE OF BACTERIA. THE CONTRACTOR SHALL NOT CLAIM ANY DELAY–RELATED COSTS OR TIME RELATED TO THIS WORK.
11. REPLACE ALL SERVICES FROM MAIN TO STREET LINE, WITH 1" COPPER PIPING, UNLESS CALLED OUT TO BE REPLACED DIFFERENTLY.
12. VARIABLE MESSAGE BOARDS ARE TO BE PROVIDED AT EACH END OF THE PROJECT, IN PLACE AND ACTIVE AT LEAST ONE WEEK BEFORE CONSTRUCTION STARTS, AND SHALL REMAIN ACTIVE UNTIL THE WORK IS COMPLETE.
13. SIDEWALKS MUST REMAIN OPEN AT ALL TIMES OR MEASURABLE DETOURS PROVIDED.
14. LOCATIONS OF UTILITIES OTHER THAN WATER ARE APPROXIMATE, AND NOT ALL UTILITIES ARE SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING, SUPPORTING AND PROTECTING ALL UTILITIES DURING INSTALLATION OF THE WATER MAIN.
15. HYDRANTS TO BE REMOVED SHALL BE SALVAGED FOR PORTLAND WATER DISTRICT USE & DELIVERED TO THEIR OFFICE AS PART OF CONTRACT.

PERMIT TIMING NOTES – BACK COVE OUTFALL

1. CONSTRUCTION OF THE STORM DRAIN OUTFALLS SHALL BE COMPLETE BY MAY 1, 2018. THIS INCLUDES INSTALLATION OF THE PIPES, RIP–RAP APRON, RESTORATION AND STABILIZATION OF THE EMBANKMENTS.
2. THE WORK MAY NOT OCCUR BETWEEN JULY 15 AND SEPTEMBER 15 WITHOUT APPROVAL BY THE MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE.
3. SEE APPENDIX B OF THE CONTRACT SPECIFICATIONS FOR FULL PERMITS.

DEPARTMENT OF ENVIRONMENTAL PROTECTION PERMIT BY RULE: SECTION 7 NOTES

1. THE FOLLOWING MEASURES MUST BE TAKEN TO PREVENT EROSION OF SOIL OR FILL MATERIAL FROM THE DISTURBED AREAS INTO THE RESOURCE:

   (a) STAKED HAY BALES OR SILT FENCE MUST BE PROPERLY INSTALLED BETWEEN THE AREA OF SOIL DISTURBANCE AND THE EDGE OF THE RESOURCE BEFORE THE ACTIVITY BEGINS;

   (b) HAY BALES OR SILT FENCE BARRIERS MUST BE MAINTAINED UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED;

   (c) WITHIN 7 CALENDAR DAYS FOLLOWING THE COMPLETION OF ANY SOIL DISTURBANCE, AND PRIOR TO ANY STORM EVENT, MULCH MUST BE SPREAD ON ANY EXPOSED SOILS;

   (d) ALL DISTURBED SOILS MUST BE PERMANENTLY STABILIZED; AND

   (e) WITHIN 30 DAYS OF FINAL STABILIZATION OF THE SITE, ANY SILT FENCE MUST BE REMOVED.

4. DISTURBANCE OF WETLAND VEGETATION MUST BE AVOIDED IF POSSIBLE. IF WETLAND VEGETATION MUST BE DISTURBED DURING THE ACTIVITY, IT MUST BE REESTABLISHED IMMEDIATELY UPON COMPLETION OF THE ACTIVITY AND MUST BE MAINTAINED.
3. NON–NATIVE WETLAND PLANTS MAY NOT BE PLANTED IN DISTURBED AREAS.
4. THE TRENCH WIDTH IN ANY PROTECTED NATURAL RESOURCE MUST BE NO WIDER THAN NECESSARY TO INSTALL THE DEVICE.
5. THE TRENCH IN AND ADJACENT TO THE PROTECTED NATURAL RESOURCE MUST BE REFILLED WITH THE MATERIAL THAT WAS EXCAVATED. THE ORIGINAL GRADING AND ELEVATION OF THE WETLAND MUST BE RESTORED. RESIDUAL FILL MATERIAL MUST BE REMOVED FROM THE WETLAND OR WATER BODY AND PROPERLY STABILIZED. PIPE BEDDING MATERIAL SUCH AS CRUSHED STONE OR SAND MAY BE USED PROVIDED CLAY DAMS OR SYNTHETIC BOOTS ARE USED WHERE APPROPRIATE TO PREVENT WETLAND DRAINING THROUGH THE BEDDING MATERIAL.
6. BLASTING IN INUNDATED AREAS IS PROHIBITED.
7. THE OUTFALL STRUCTURE MAY NOT INTERFERE WITH ANY POTENTIAL BOAT USAGE OF THE PROJECT SITE.
8. WHEELED OR TRACKED EQUIPMENT MAY NOT OPERATE IN THE WATER. EQUIPMENT OPERATING ON THE SHORE MAY REACH INTO THE WATER WITH A BUCKET OR SIMILAR EXTENSION. EQUIPMENT MAY CROSS STREAMS ON ROCK, GRAVEL OR LEDGE BOTTOM.
9. ALL WHEELED OR TRACKED EQUIPMENT THAT MUST TRAVEL OR WORK IN A VEGETATED WETLAND AREA MUST TRAVEL AND WORK ON MATS OR PLATFORMS IN ORDER TO PROTECT WETLAND VEGETATION.
10. WORK BELOW THE HIGH WATER LINE OF A GREAT POND, RIVER, STREAM OR BROOK MUST BE DONE AT LOW WATER EXCEPT AS REQUIRED FOR EMERGENCY FLOOD CONTROL WORK. MEASURES, SUCH AS A SILT BOOM OR STAKED FENCING, MUST BE EMPLOYED TO REDUCE AND ISOLATE TURBIDITY.
11. MAINTENANCE CLEARING OF DEPOSITED DEBRIS AND SEDIMENTS FROM THE OUTFALL AREA IS ALLOWED PROVIDED THE CLEARED MATERIALS ARE REMOVED FROM THE RESOURCE. ANY DEBRIS GENERATED DURING THE ACTIVITY MUST BE PREVENTED FROM WASHING DOWNSTREAM AND MUST BE REMOVED FROM THE WETLAND OR WATER BODY. DISPOSAL OF DEBRIS MUST BE IN CONFORMANCE WITH MAINE HAZARDOUS WASTE, SEPTAGE AND SOLID WASTE MANAGEMENT ACT, 38 M.R.S.A. SECTION 1301 ET SEQ.
12. UNCURED CONCRETE MAY NOT BE PLACED DIRECTLY INTO THE WATER. CONCRETE MUST BE PRE–CAST AND CURED AT LEAST THREE WEEKS BEFORE PLACING IN THE WATER, OR WHERE NECESSARY, MUST BE PLACED IN FORMS AND CURED AT LEAST ONE WEEK BEFORE THE FORMS ARE REMOVED. NO WASHING OF TOOLS, FORMS, ETC. MAY OCCUR IN OR ADJACENT TO THE WATERBODY OR WETLAND.
13. IF THE ACTIVITY OCCURS WITHIN TIDAL WATERS, THE ACTIVITY MUST OCCUR DURING THE TIME PERIOD APPROVED BY THE DEPARTMENT OF MARINE RESOURCES.

SECTION 20 NOTES

FOR ACTIVITIES IN, ON OR OVER A SHOREBIRD NESTING, FEEDING, AND STAGING AREA BETWEEN JULY 15 AND SEPTEMBER 15, THE ACTIVITY MUST OCCUR DURING THE TIME PERIOD APPROVED BY THE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE.

FOR NEW ACTIVITIES IN A MODERATE VALUE INLAND WATERFOWL AND WADING BIRD HABITAT THAT TAKE PLACE BETWEEN APRIL 15 AND JULY 31 OF ANY YEAR, NOTICE OF APPROVAL OF THE TIMING OF THE ACTIVITY FROM THE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE MUST BE SUBMITTED TO THE DEP WITH THE NOTIFICATION FORM.

(4) EXCEPT FOR CUTTING OR REMOVAL OF VEGETATION ALLOWED PURSUANT TO PARAGRAPH C(6) OF THIS SECTION, CUTTING OR REMOVAL OF VEGETATION WITHIN A HIGH OR MODERATE VALUE INLAND WATERFOWL AND WADING BIRD HABITAT, OR SHOREBIRD ROOSTING BUFFER, IS LIMITED TO:

(A) REMOVAL OF A SAFETY HAZARD; OR

(B) CUTTING OR REMOVAL OF VEGETATION TO ALLOW FOR A FOOTPATH NOT TO EXCEED 6 FEET IN WIDTH AS MEASURED BETWEEN TREE TRUNKS AND SHRUB STEMS. THE FOOTPATH MAY NOT RESULT IN A CLEARED LINE OF SIGHT TO THE WATER.

ANY CUTTING OR REMOVAL OF VEGETATION WITHIN A SHOREBIRD ROOSTING BUFFER UNDER THIS PARAGRAPH MUST BE DONE IN CONSULTATION WITH AND AS APPROVED BY THE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE.

(5) CUTTING OR REMOVAL OF VEGETATION WITHIN A SHOREBIRD FEEDING BUFFER MUST MEET THE VEGETATIVE SCREENING STANDARDS SET FORTH IN MANDATORY SHORELAND ZONING, 38 M.R.S.A. §439–A(6). IN INTERPRETING AND ENFORCING THESE STANDARDS, THE DEPARTMENT SHALL RELY UPON THE DEPARTMENT'S SHORELAND ZONING RULES REGARDING CUTTING OR REMOVAL OF VEGETATION FOR ACTIVITIES OTHER THAN TIMBER HARVESTING GUIDELINES FOR MUNICIPAL SHORELAND ZONING ORDINANCES, 06–096 CMR 1000(15)(P) (CHAPTER LAST AMENDED MAY 1, 2006).
AND APPLY THE CUTTING STANDARDS APPLICABLE WITHIN 75 FEET OF A COASTAL WETLAND TO THE ENTIRE 100–FOOT FEEDING BUFFER.

Civil 3D 2013 Drawing Name:
17112 N.dwg, TAB:N2

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-II

REFERENCES:

DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE:	DATE:
RLM	SAP	RAM	1" = 20'	02. 16.2018

STATE OF MAINE
ROBERT A. McSORLEY
No. 8588
LICENSED
PROFESSIONAL ENGINEER
02. 16.2018

BEDFORD STREET
SEWER SEPERATION PROJECT

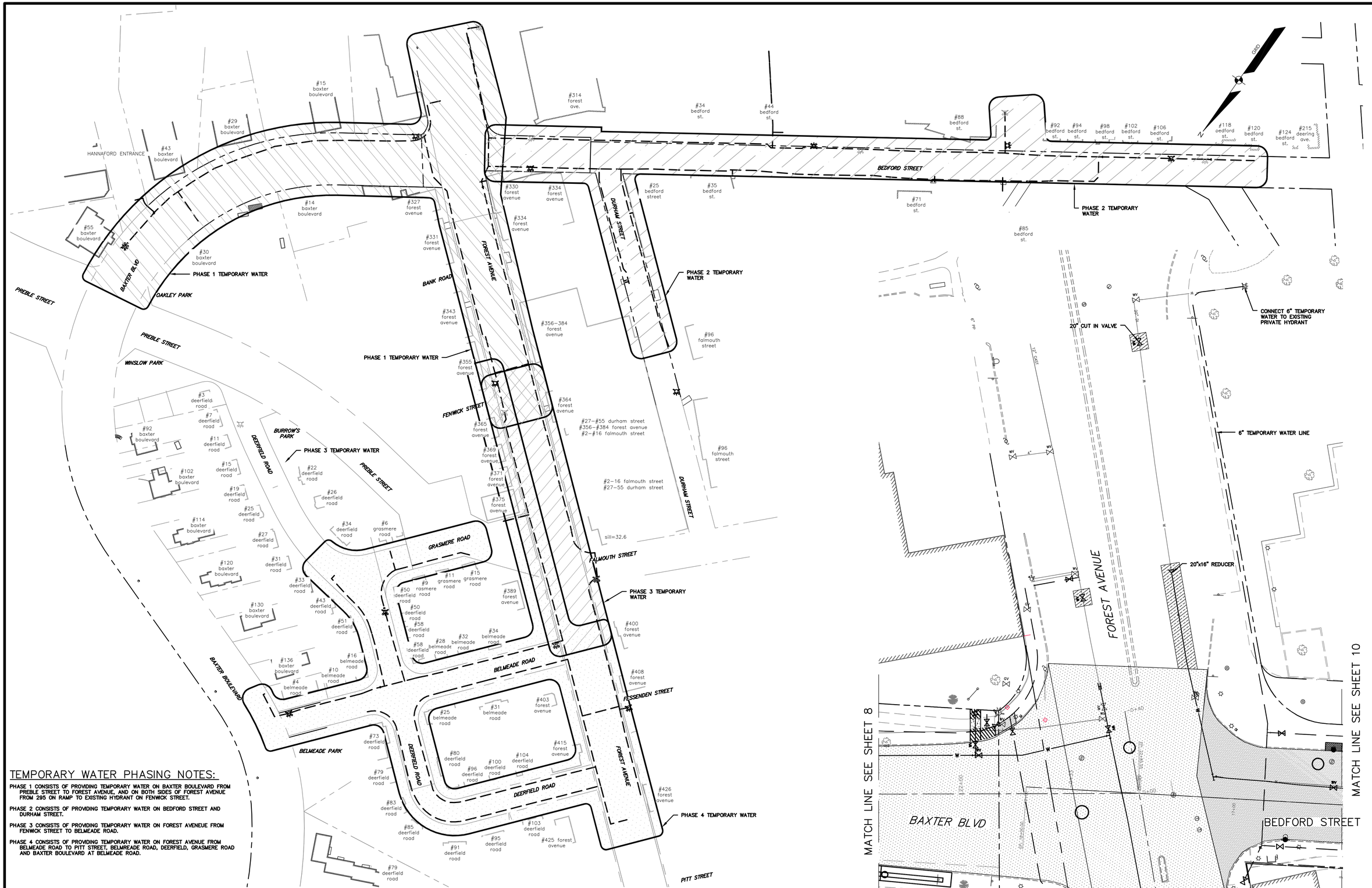
EROSION CONTROL NOTES AND
PORTLAND WATER DISTRICT NOTES

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM
CITY OF PORTLAND, MAINE

SHEET #
3 OF 46

PLAN NUMBER



TEMPORARY WATER PHASING NOTES:

PHASE 1 CONSISTS OF PROVIDING TEMPORARY WATER ON BAXTER BOULEVARD FROM PREBLE STREET TO FOREST AVENUE, AND ON BOTH SIDES OF FOREST AVENUE FROM 295 ON RAMP TO EXISTING HYDRANT ON FENWICK STREET.

PHASE 2 CONSISTS OF PROVIDING TEMPORARY WATER ON BEDFORD STREET AND DURHAM STREET.

PHASE 3 CONSISTS OF PROVIDING TEMPORARY WATER ON FOREST AVENEUE FROM FENWICK STREET TO BELMEADE ROAD.

PHASE 4 CONSISTS OF PROVIDING TEMPORARY WATER ON FOREST AVENUE FROM BELMEADE ROAD TO PITT STREET, BELMREADE ROAD, DEERFIELD, GRASMERE ROAD AND BAXTER BOULEVARD AT BELMEADE ROAD.

TEMPORARY WATER PHASING PLAN
SCALE: 1"=80'

PLAN
SCALE: 1"=20'

FEBRUARY 2018

REFERENCES:

Civil 3D 2018 Drawing Name:
17112 TEMP WATER PHASE.dwg, TAB:TEMP PHASE

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY: BLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16. 2018

STATE OF MAINE
ROBERT A. MOSER
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BEDFORD STREET
SEWER SEPERATION PROJECT

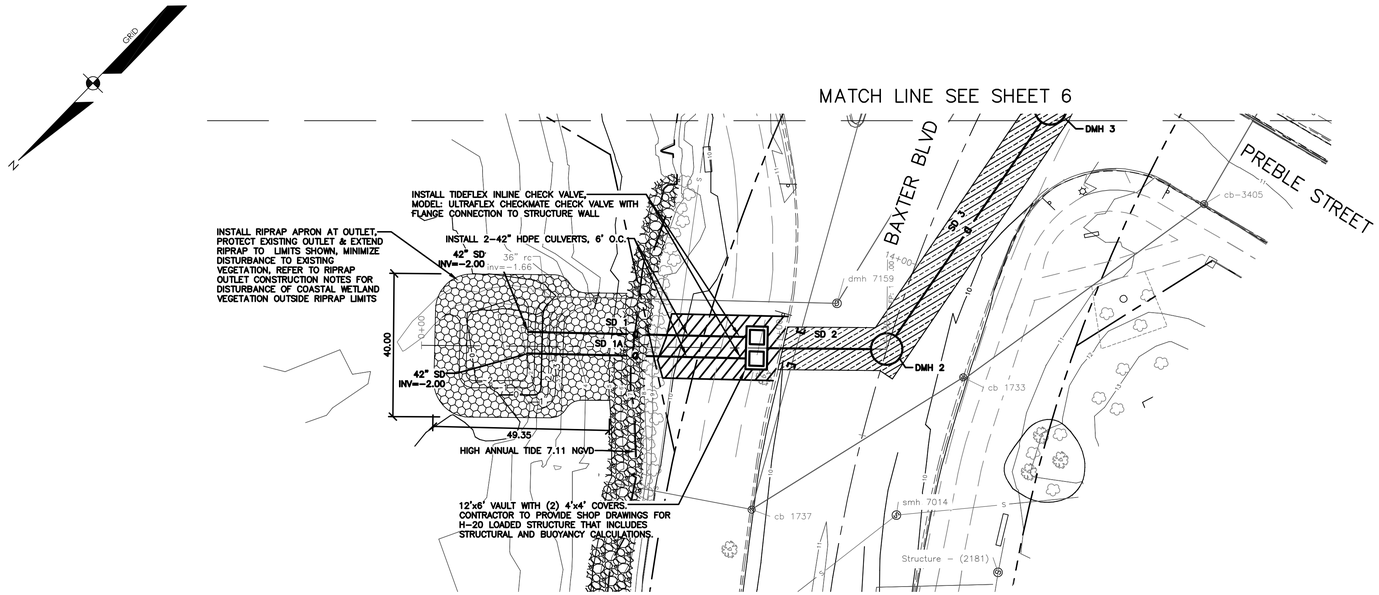
TEMPORARY WATER PHASING PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
RESURGAM

SHEET #
4 OF 46

PLAN NUMBER



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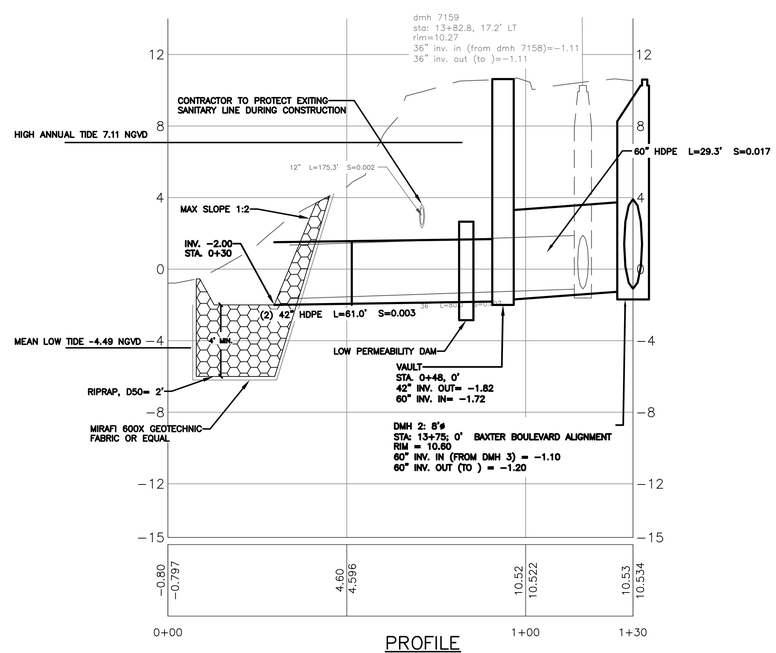

PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BAXTER BLVD.dwg, TAB:BAXTER BLVD OUTFALL

CITY PROPERTY PLAN BOOK SHEETS:
1 & 1 SHEETS: III-9, III-11

FEBRUARY 2018

DESIGN BY: RLM
DRAWN BY: SAB
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16. 2018

STATE OF MAINE
ROBERT A. MOSHER
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BEDFORD STREET
SEWER SEPERATION PROJECT

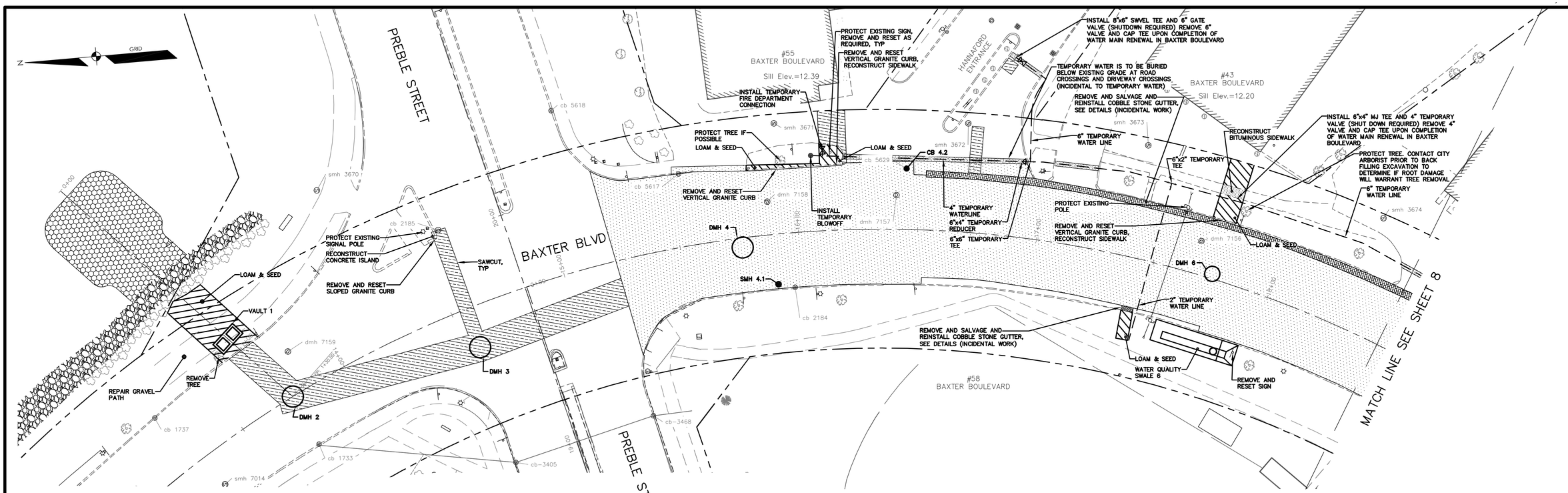
PLAN & PROFILE - BAXTER
BOULEVARD OUTFALL

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
OLI TO RESURGAM

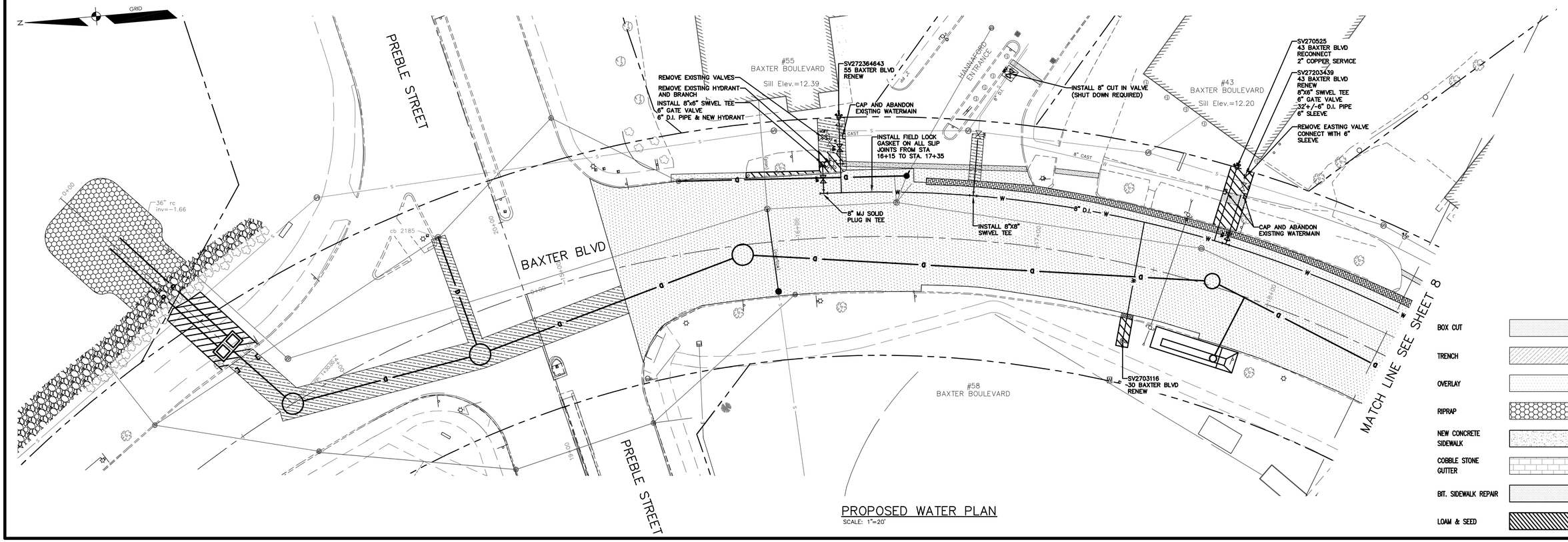
SHEET #
5 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



PROPOSED WATER PLAN

SCALE: 1"=20'

BOX CUT
TRENCH
OVERLAY
RIPRAP
NEW CONCRETE SIDEWALK
COBBLE STONE GUTTER
BIT. SIDEWALK REPAIR
LOAM & SEED

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP BAXTER BLVD.dwg, TAB:BAXTER BLVD LO1

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	DRAWN BY:	CHECKED BY:	SCALE:	DATE:
RJM	SAP	RAM	1" = 20'	02. 16.2018

STATE OF MAINE
ROBERT A. MCSPADDEN
LICENSED PROFESSIONAL ENGINEER
02. 16.2018

BEDFORD STREET SEWER SEPERATION PROJECT

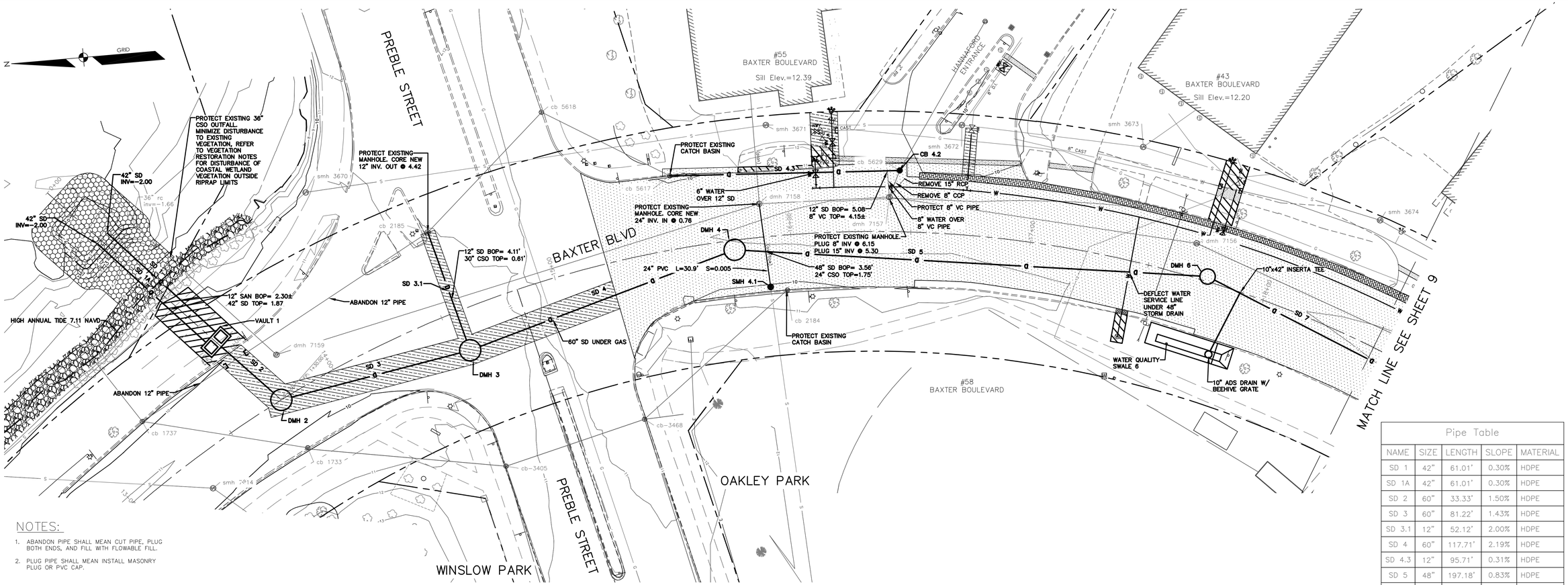
BAXTER BOULEVARD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE · RESURGAM

SHEET # 6 OF 46

PLAN NUMBER



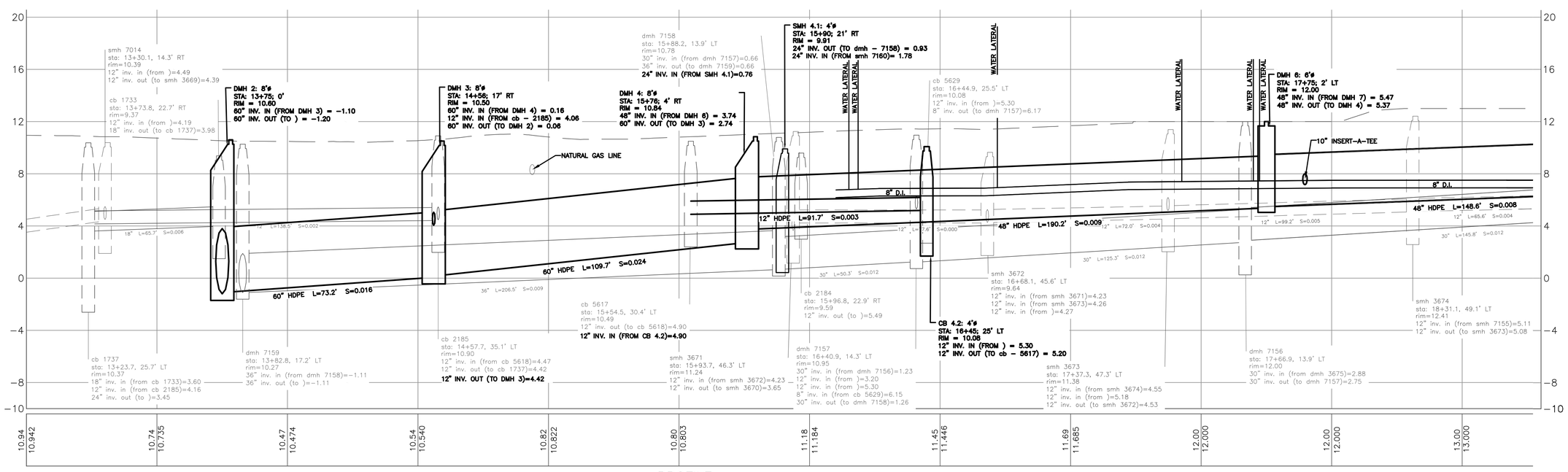
NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

PLAN

SCALE: 1"=20'

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 1	42"	61.01'	0.30%	HDPE
SD 1A	42"	61.01'	0.30%	HDPE
SD 2	60"	33.33'	1.50%	HDPE
SD 3	60"	81.22'	1.43%	HDPE
SD 3.1	12"	52.12'	2.00%	HDPE
SD 4	60"	117.71'	2.19%	HDPE
SD 4.3	12"	95.71'	0.31%	HDPE
SD 5	48"	197.18'	0.83%	HDPE
SD 7	48"	154.64'	0.76%	HDPE



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BAXTER BLVD.dwg, TAB:BAXTER BLVD PP1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY: RJM
DRAWN BY: SJP
CHECKED BY: RJM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE ROBERT J. MCSORLEY No. 6058 LICENSED PROFESSIONAL ENGINEER
02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT

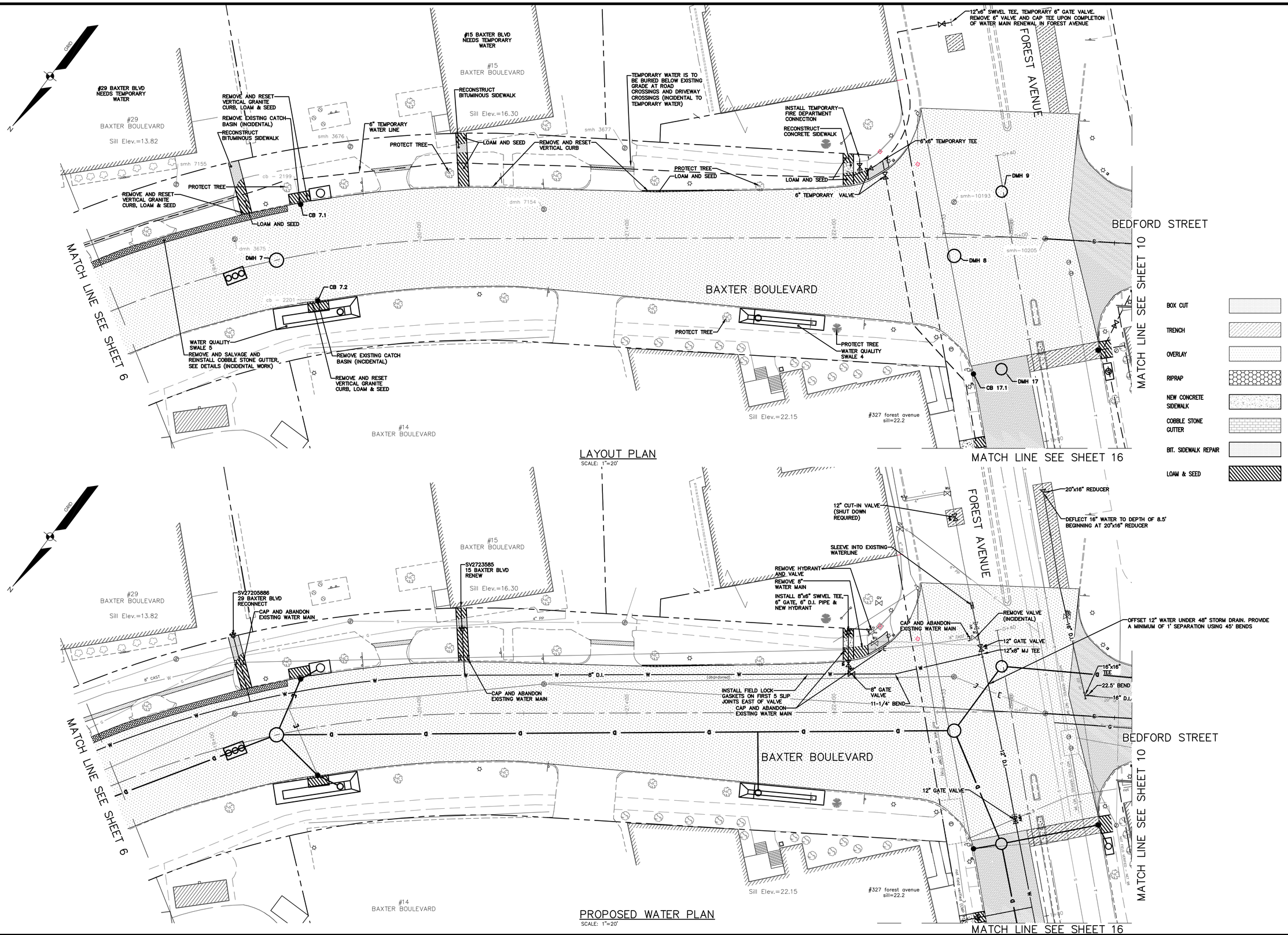
PLAN & PROFILE - BAXTER BOULEVARD STA. 14+00 TO STA. 18+50

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND MAINE RESURGAM

SHEET # 7 OF 46

PLAN NUMBER



REFERENCES:

Civil 3D 2013 Drawing Name: 17112 PP BAXTER BLVD.dwg, TAB:BAXTER BLVD LO2

CITY PROPERTY PLAN BOOK SHEETS: I & J SHEETS: III-9, III-11

FEBRUARY 2018

DESIGN BY:	RLM
DRAWN BY:	SAR
CHECKED BY:	RMA
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE ROBERT L. MUSSELMAN No. 8058 PROFESSIONAL ENGINEER 02. 16. 2018

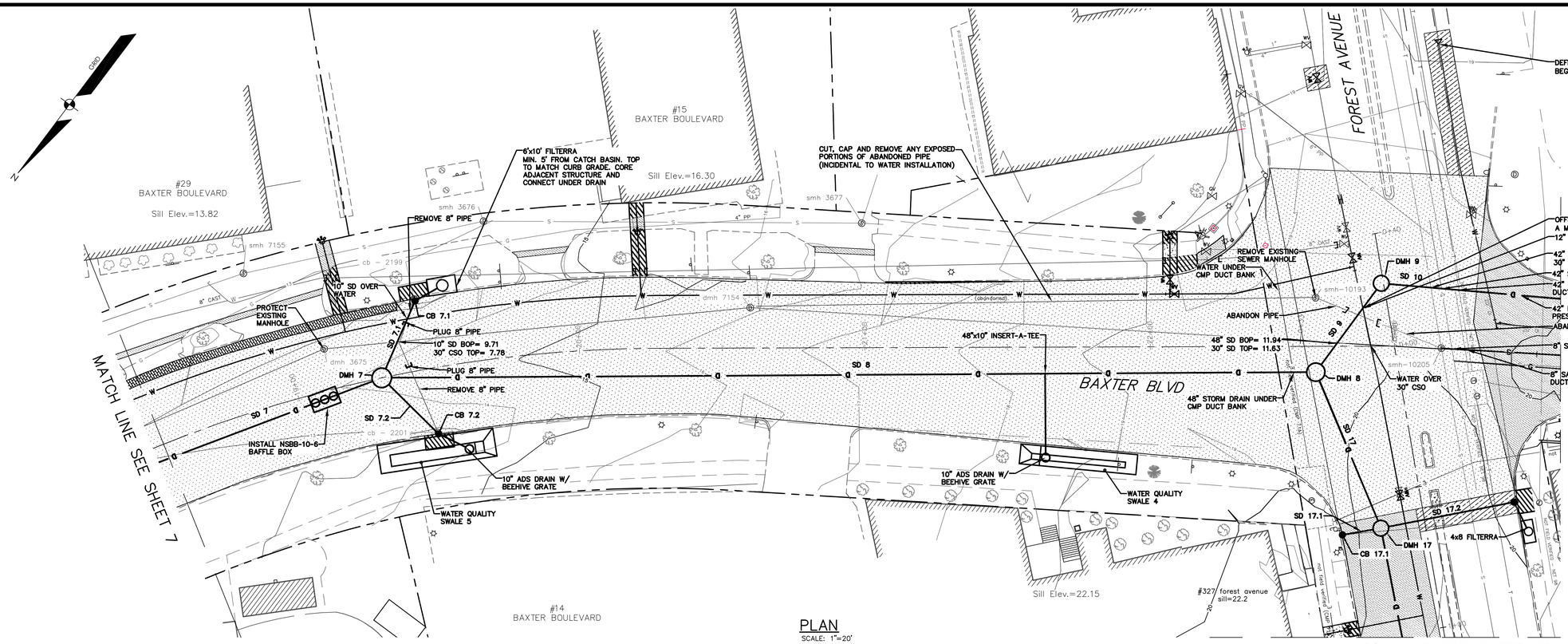
BEDFORD STREET SEWER SEPERATION PROJECT

BAXTER BOULEVARD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

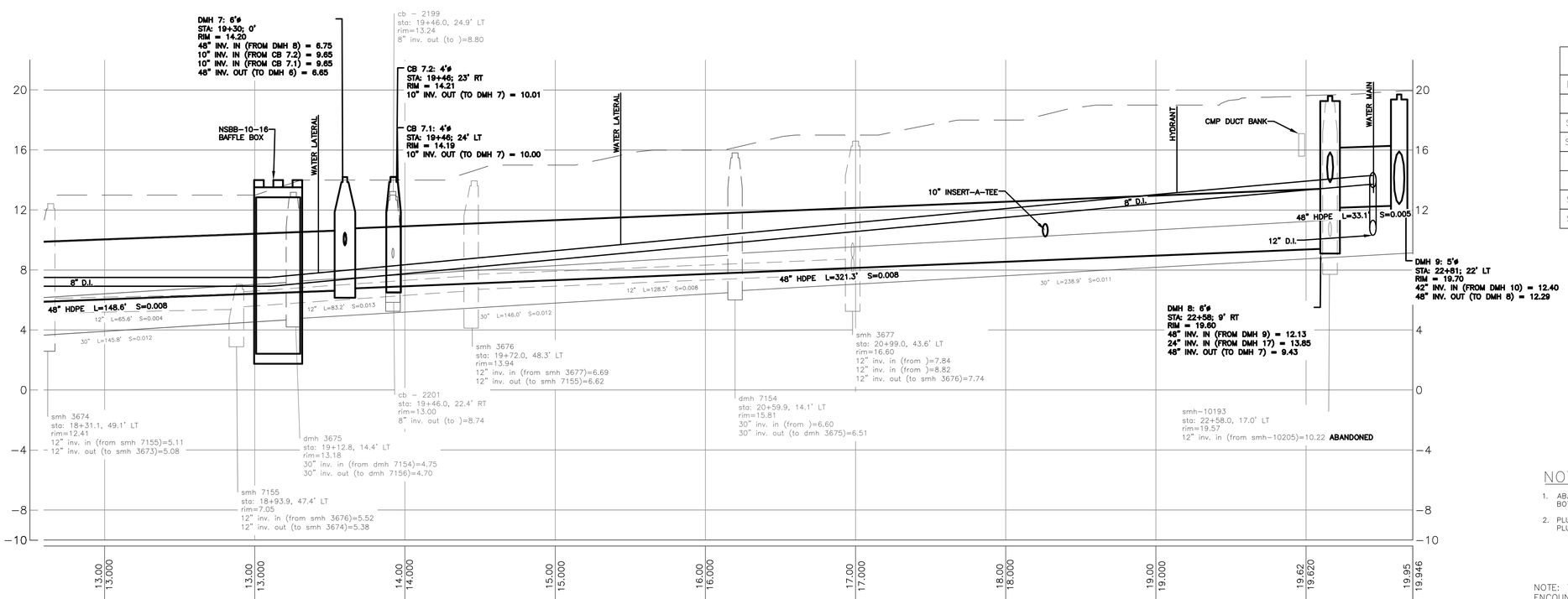
SHEET # 8 OF 46

PLAN NUMBER



PLAN

SCALE: 1"=20'



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 7	48"	154.64'	0.76%	HDPE
SD 7.1	10"	29.34'	1.19%	HDPE
SD 7.2	10"	27.98'	1.30%	HDPE
SD 8	48"	327.31'	0.82%	HDPE
SD 9	48"	38.60'	0.41%	HDPE
SD 10	42"	90.89'	0.00%	D.I.
SD 17	24"	59.23'	0.59%	HDPE

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.

REFERENCES:

Civil 3D 2013 Drawing Name:
171172 PP BAXTER BLVD.dwg, TAB:BAXTER BLVD PP2

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

FEBRUARY 2018

DESIGN BY: BLM
DRAWN BY: SJM
CHECKED BY: BLM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE
ROBERT L. MCCARTHY
LICENSED
PROFESSIONAL ENGINEER
No. 8258
02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT

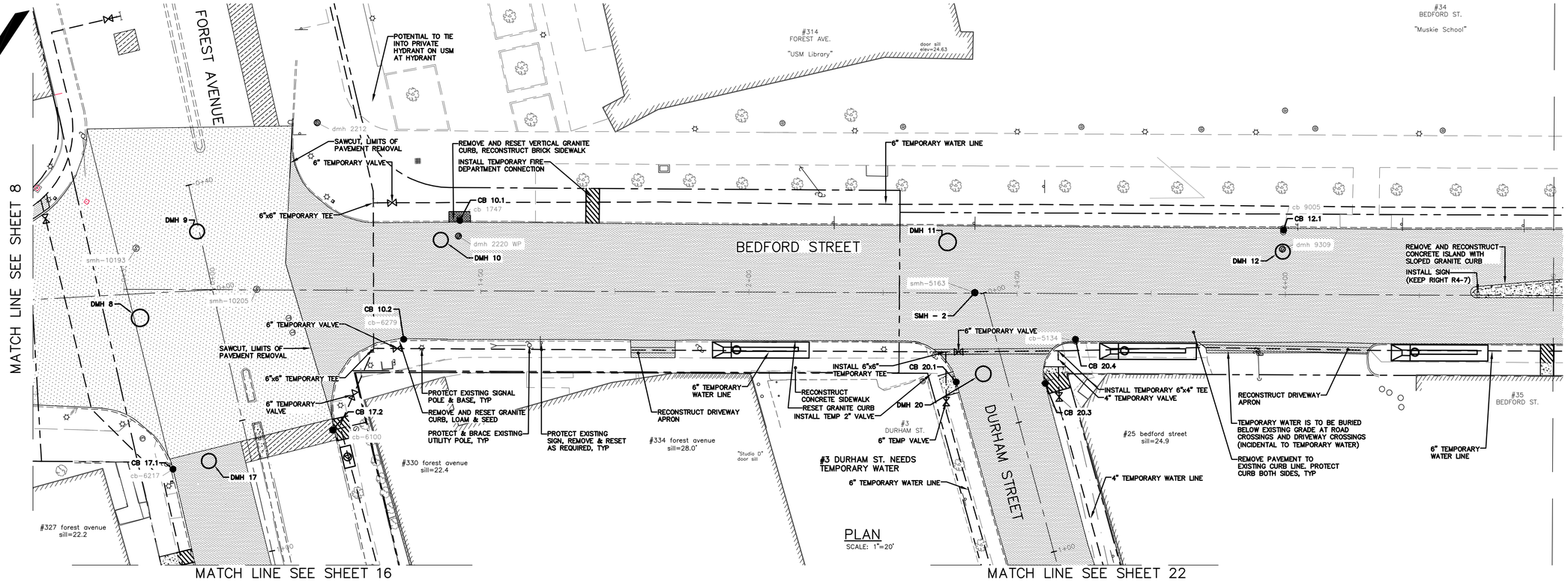
PLAN & PROFILE - BAXTER BOULEVARD STA. 18+50 STO STA. 22+85.55

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

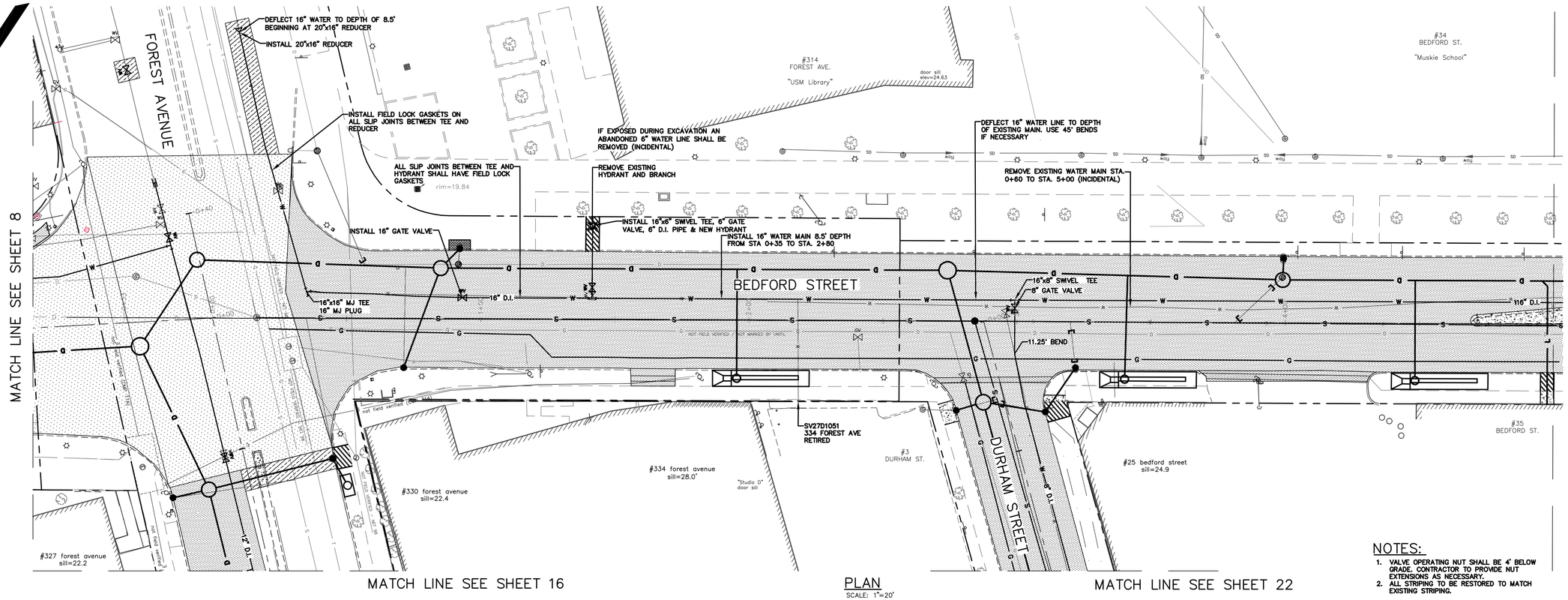
CITY OF PORTLAND, MAINE
RESURGAM

SHEET # 9 OF 46

PLAN NUMBER



PLAN
SCALE: 1"=20'



PLAN
SCALE: 1"=20'

BOX CUT	
TRENCH	
OVERLAY	
RIPRAP	
NEW CONCRETE SIDEWALK	
COBBLE STONE GUTTER	
BIT. SIDEWALK REPAIR	
LOAM & SEED	

NOTES:

1. VALVE OPERATING NUT SHALL BE 4' BELOW GRADE. CONTRACTOR TO PROVIDE NUT EXTENSIONS AS NECESSARY.
2. ALL STRIPING TO BE RESTORED TO MATCH EXISTING STRIPING.

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET L01

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: II-9, III-II

FEBRUARY 2018

DESIGN BY:	BLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1"=20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MOSER No. 8589 PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

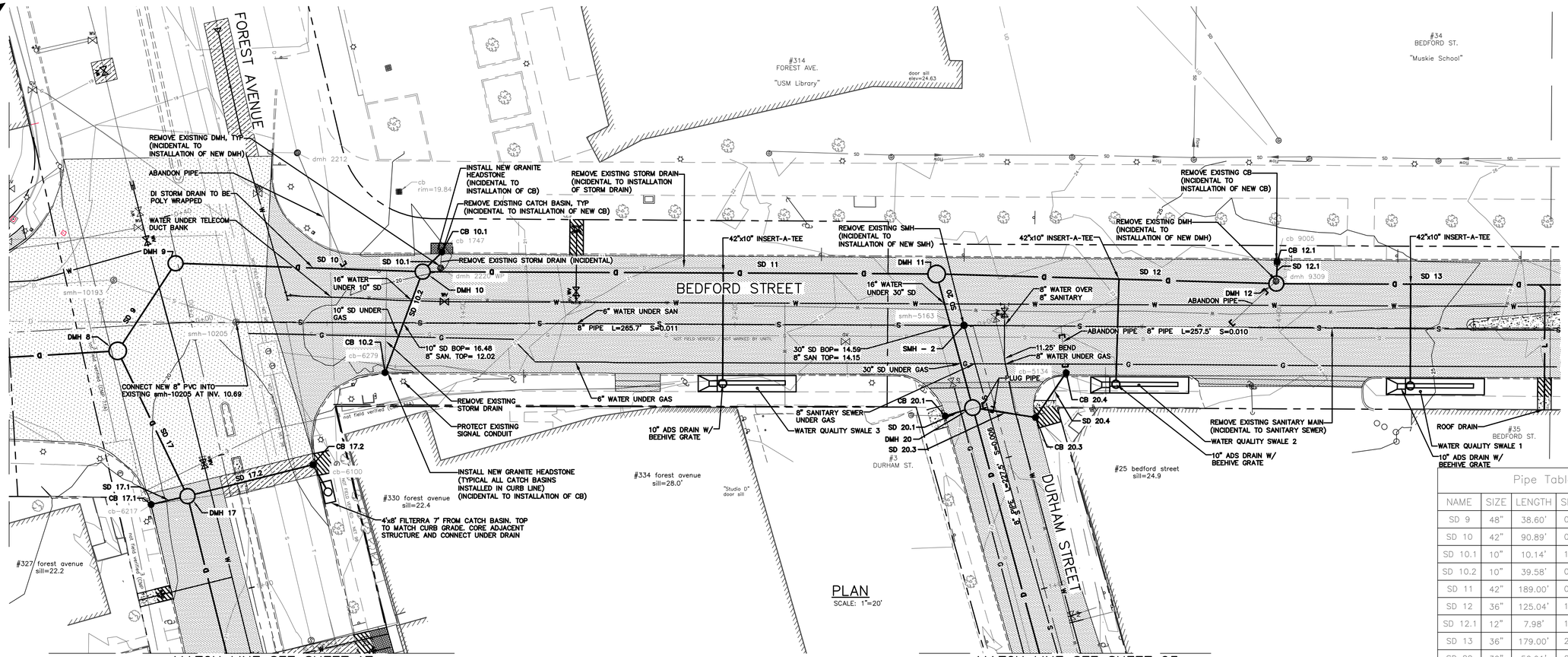
BEDFORD STREET LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE RESURGAM

SHEET # 10 OF 46

PLAN NUMBER



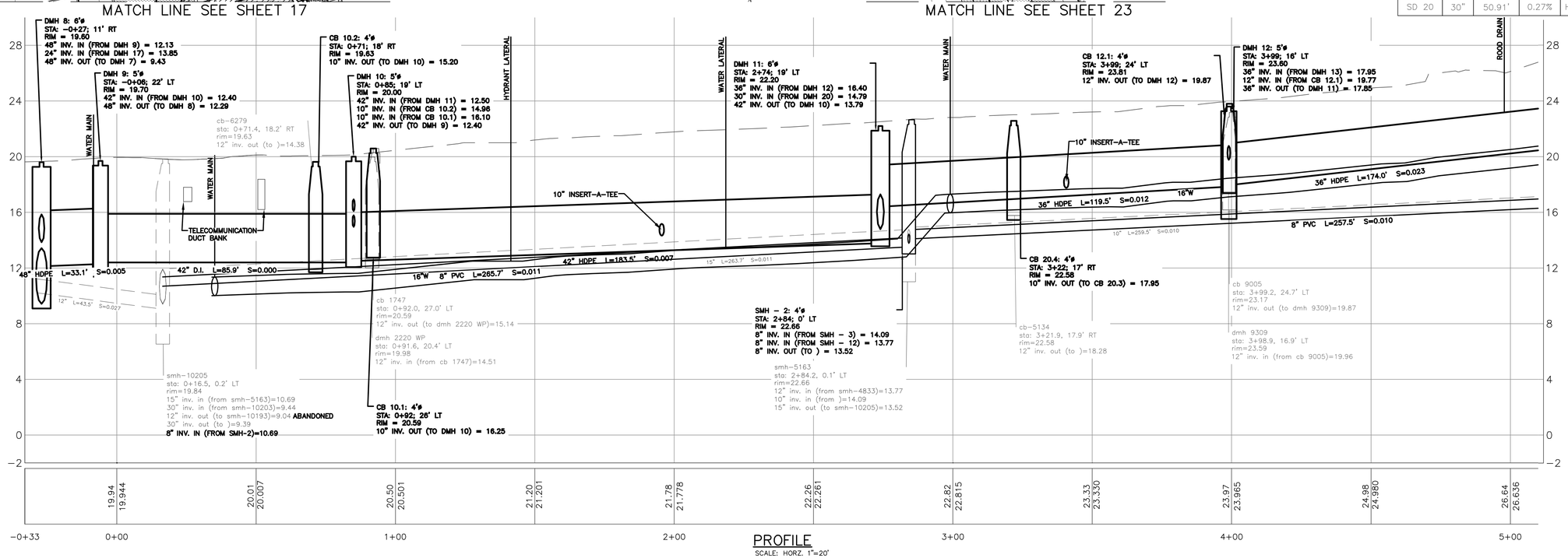
NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

PWD NOTE:

NEW WATER MAIN TO BE SET AT EXISTING MAIN ELEVATION.

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.



Pipe Table

NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 9	48"	38.60'	0.41%	HDPE
SD 10	42"	90.89'	0.00%	D.I.
SD 10.1	10"	10.14'	1.48%	HDPE
SD 10.2	10"	39.58'	0.61%	HDPE
SD 11	42"	189.00'	0.68%	HDPE
SD 12	36"	125.04'	1.16%	HDPE
SD 12.1	12"	7.98'	1.25%	HDPE
SD 13	36"	179.00'	2.26%	HDPE
SD 20	30"	50.91'	0.27%	HDPE

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET PP1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

REFERENCES:

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE ROBERT A. MCDERMOTT No. 8589 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

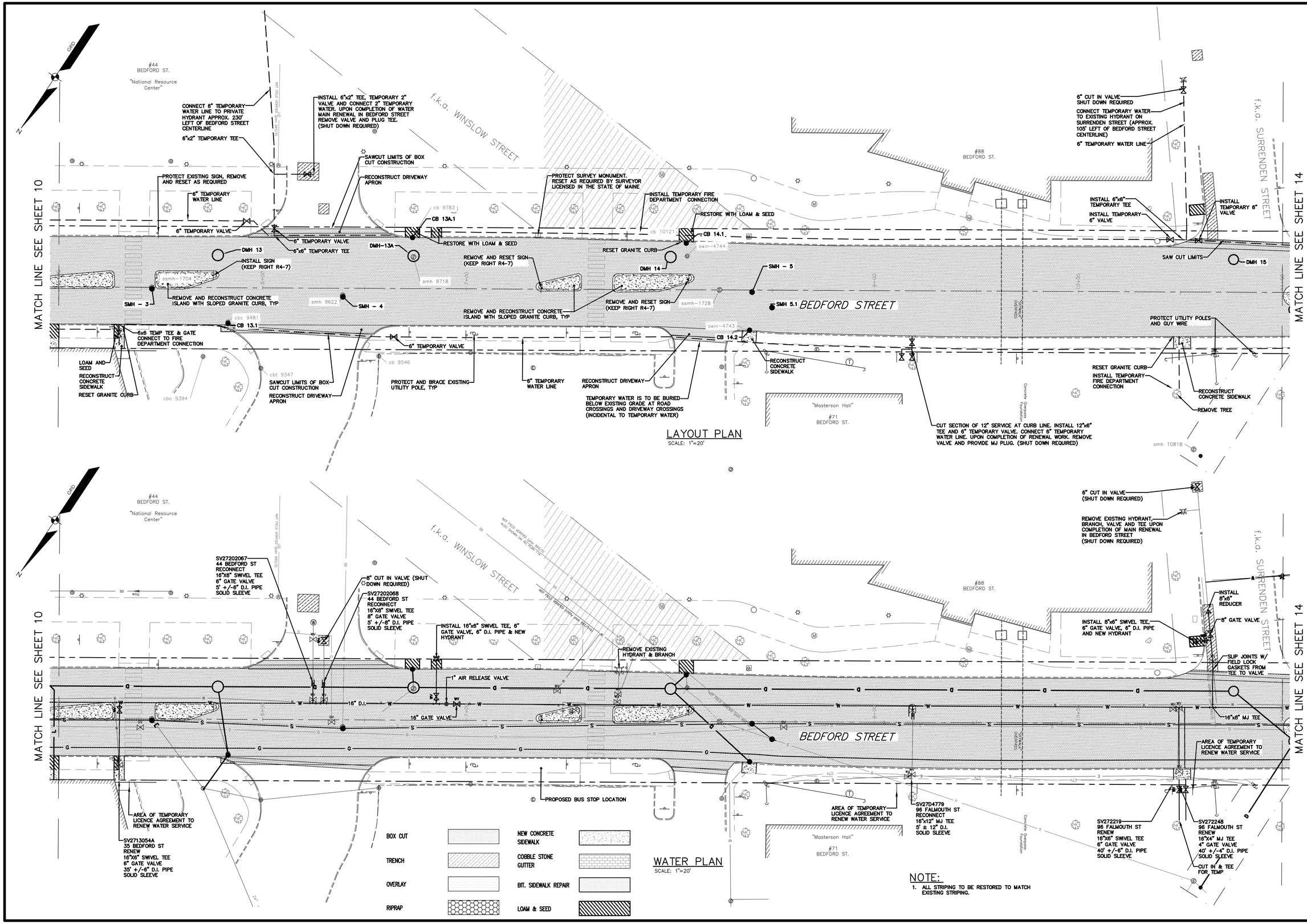
PLAN & PROFILE - BEDFORD STREET
STA. 0+00 TO STA. 5+00

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE — RESURGAM

SHEET # 11 OF 46

PLAN NUMBER



LAYOUT PLAN
SCALE: 1"=20'

WATER PLAN
SCALE: 1"=20'

NOTE:
1. ALL STRIPING TO BE RESTORED TO MATCH EXISTING STRIPING.

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET L02

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: 1H-9, 1I-H

FEBRUARY 2018

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE ROBERT A. McSORLEY No. 4569 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

BEDFORD STREET LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

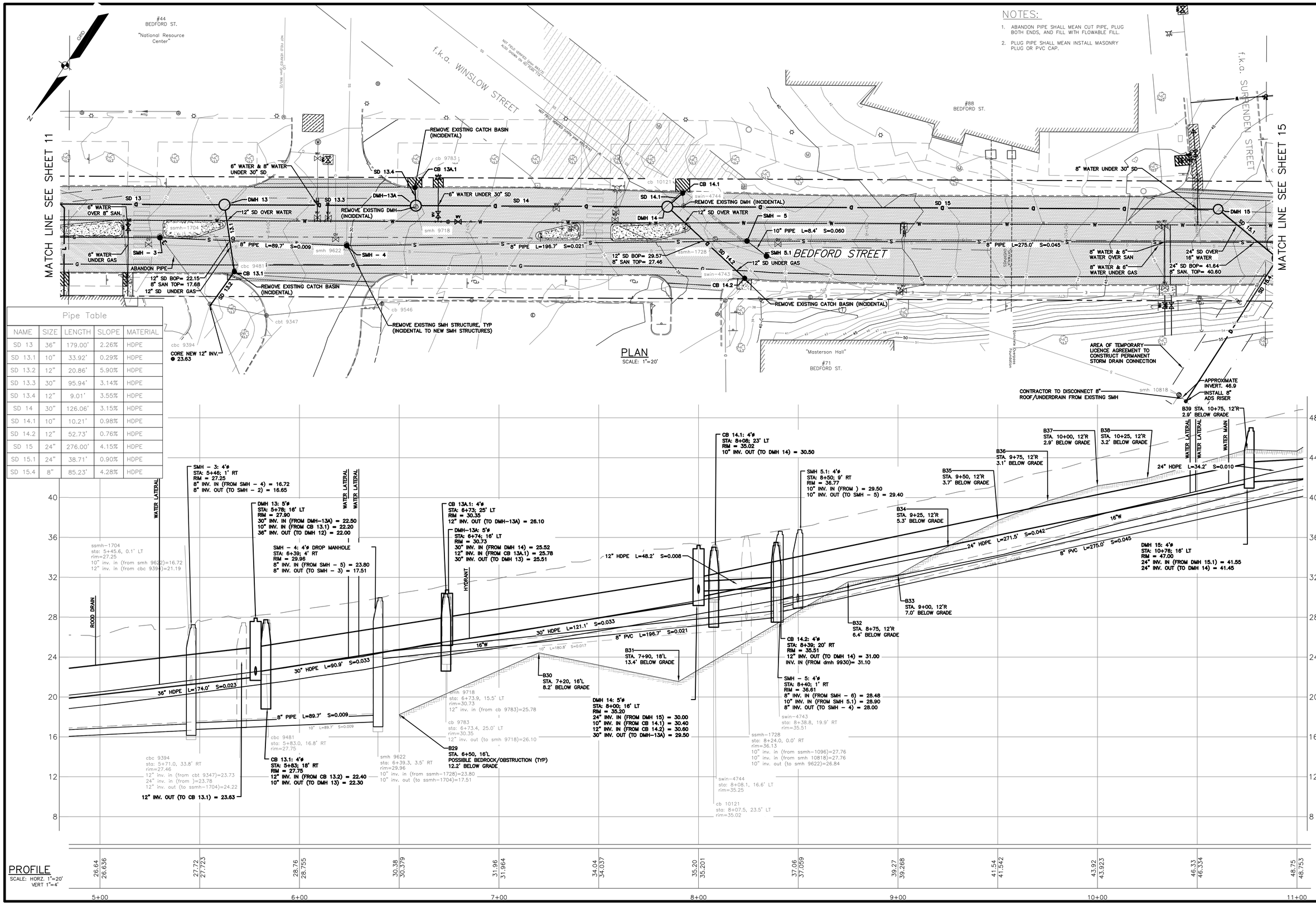
RESURGAM CITY OF PORTLAND, MAINE

SHEET #
12 OF 46

PLAN NUMBER

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.



REFERENCES:

Civil 3D 2013 Drawing Name: 17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET PP2

CITY PROPERTY PLAN BOOK SHEETS: I & I SHEETS: II-9, II-11

FEBRUARY 2018

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE ROBERT A. McSORLEY No. 8569 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

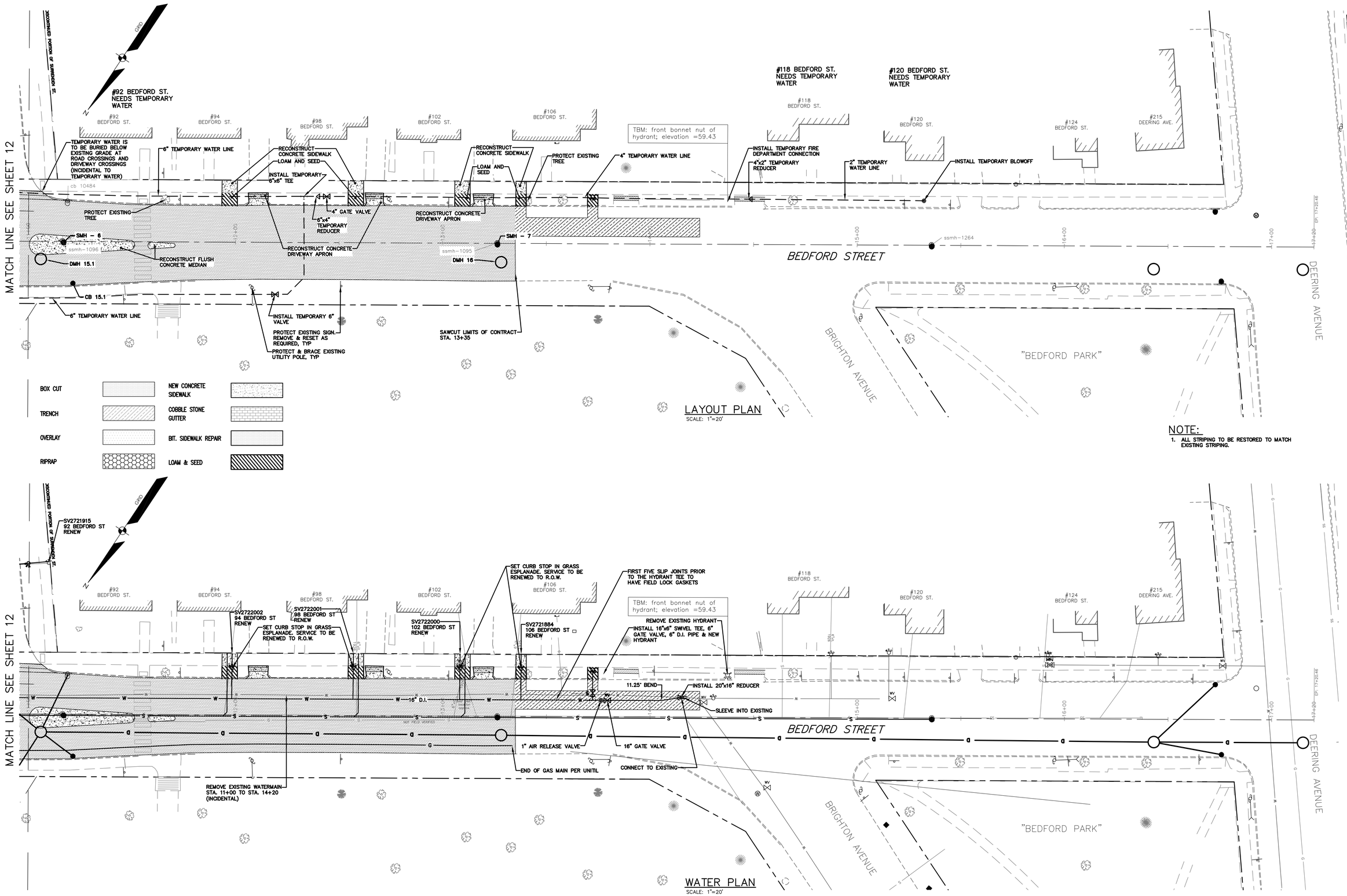
PLAN & PROFILE - BEDFORD STREET STA. 5+00 TO STA. 11+00

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE

SHEET # 13 OF 46

PLAN NUMBER



NOTE:

1. ALL STRIPING TO BE RESTORED TO MATCH EXISTING STRIPING.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET L03

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

REFERENCES:

DESIGN BY:	BLM
DRAWN BY:	SJM
CHECKED BY:	RMB
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE
ROBERT M. BOSCHETTI
LICENSED
No. 8568
PROFESSIONAL ENGINEER
02. 16. 2018

BEDFORD STREET
SEWER SEPERATION PROJECT

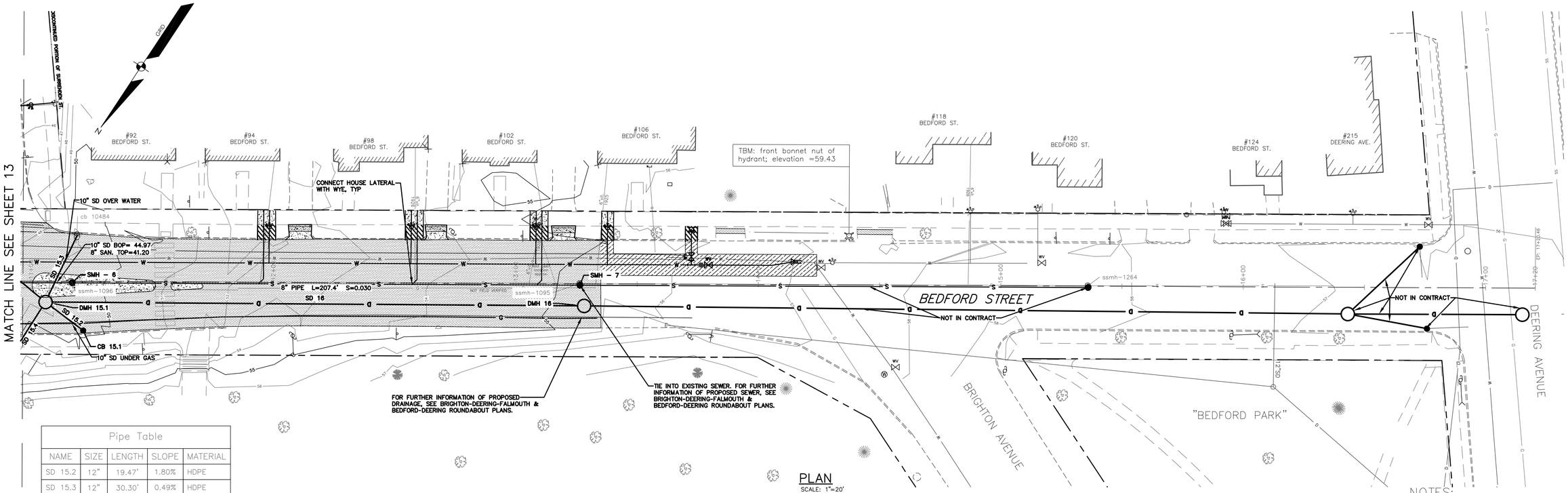
BEDFORD STREET LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
DIFFICILE RESURGAM

SHEET # 14 OF 46

PLAN NUMBER

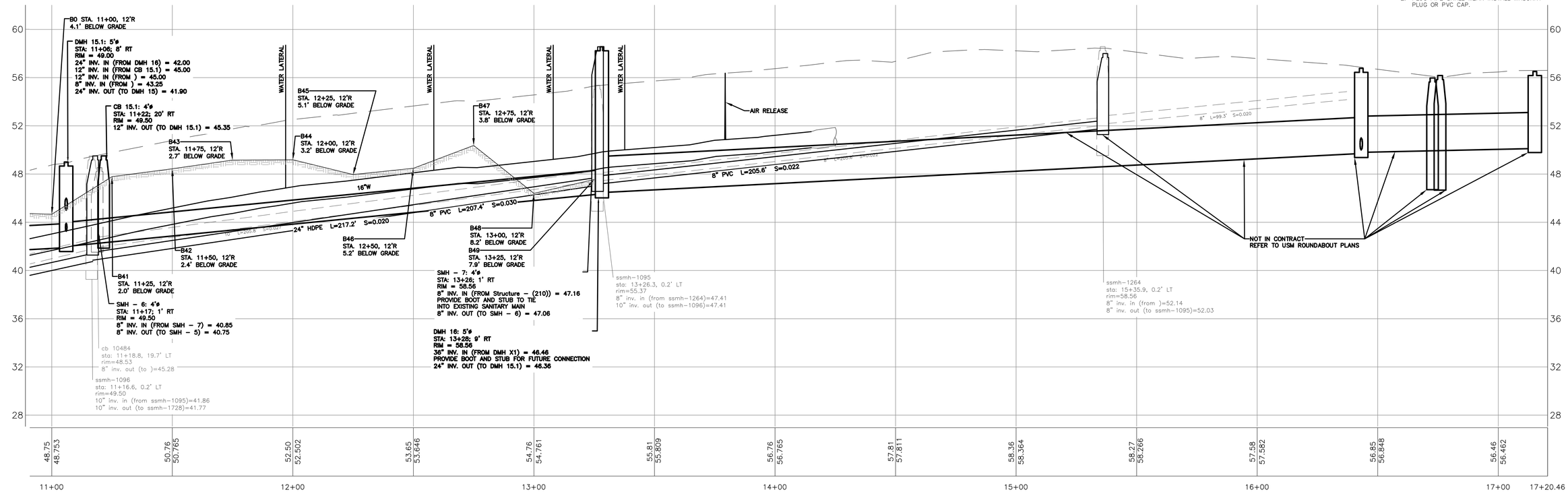


PLAN
SCALE: 1"=20'

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 15.2	12"	19.47'	1.80%	HDPE
SD 15.3	12"	30.30'	0.49%	HDPE
SD 15.4	8"	85.23'	4.28%	HDPE
SD 16	24"	222.20'	1.96%	HDPE

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BEDFORD STREET.dwg, TAB:BEDFORD STREET PP3

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-H

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16.2018

STATE OF MAINE
ROBERT A. MCSORLEY
No. 4556
LICENSED
PROFESSIONAL ENGINEER
02. 16.2018

BEDFORD STREET
SEWER SEPERATION PROJECT

PLAN & PROFILE - BEDFORD STREET
STA. 11+00 TO STA. 17+12.46

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

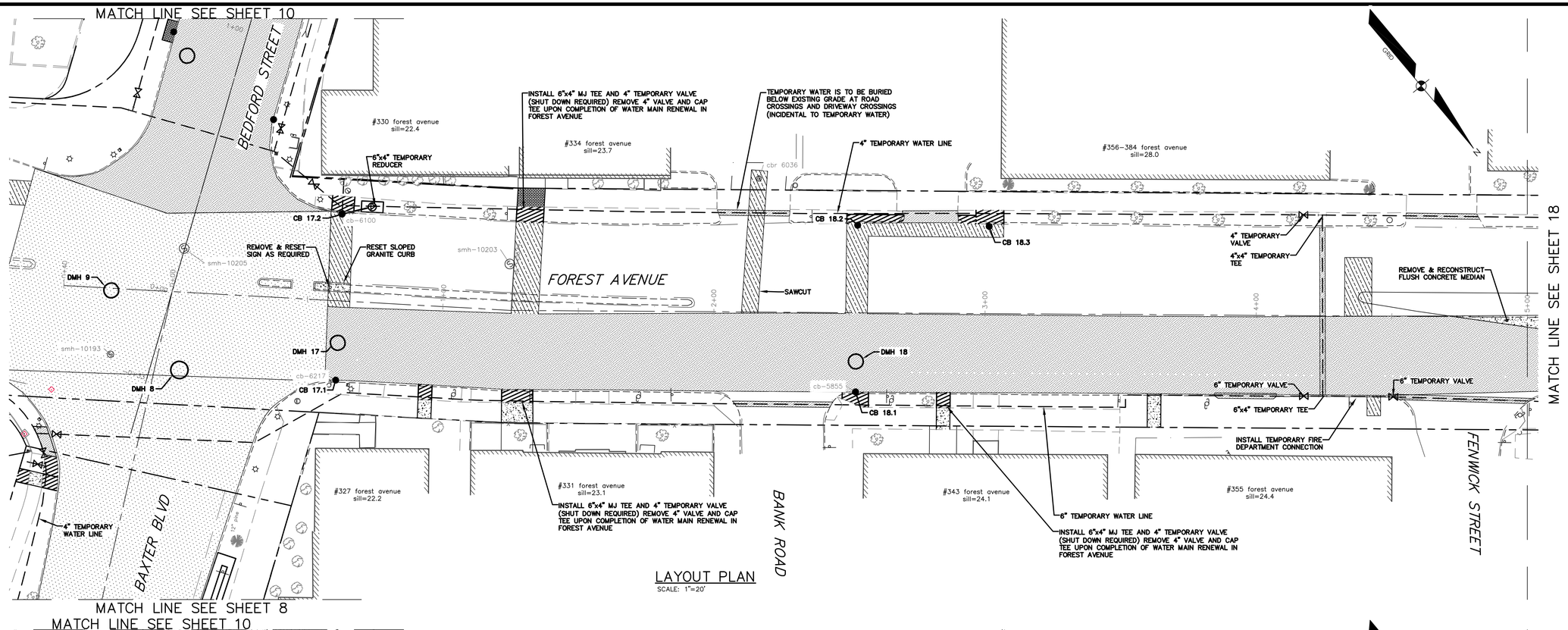
RESURGAM
CITY OF PORTLAND, MAINE

SHEET #
15 OF 46

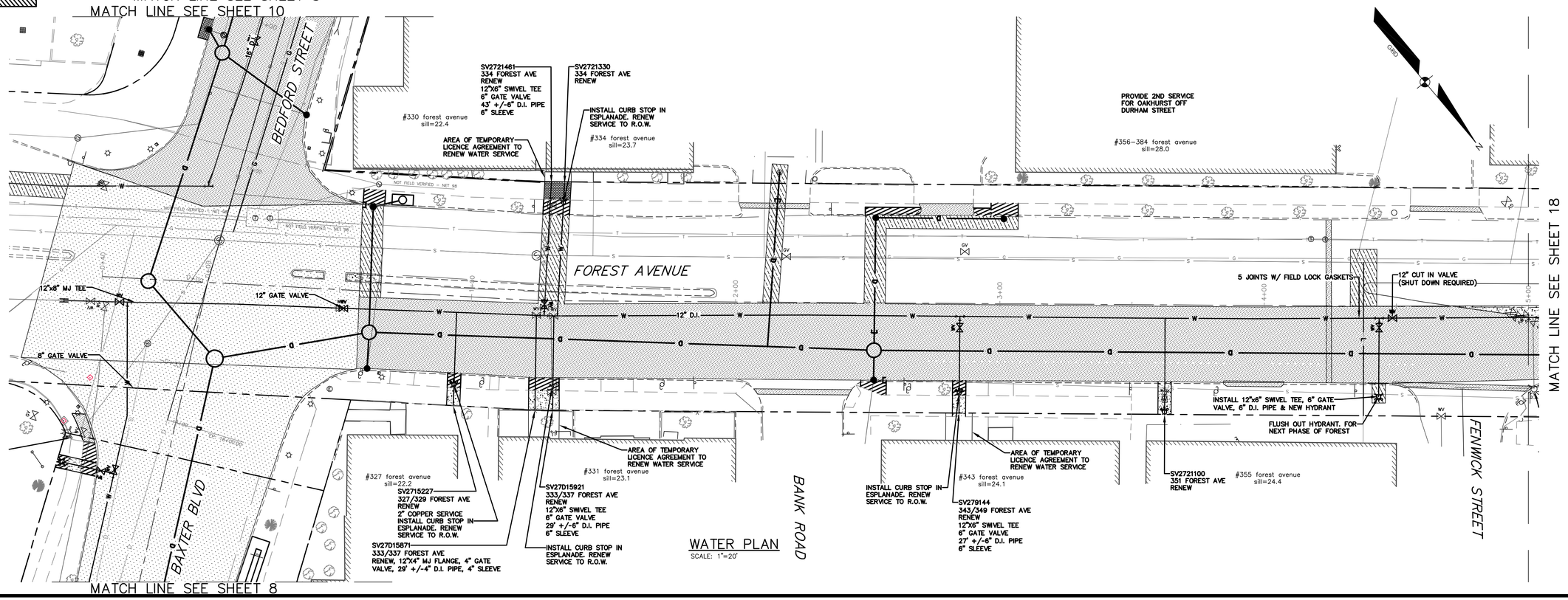
PLAN NUMBER

NOTE:
1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.
4. ALL STRIPING TO BE RESTORED TO MATCH EXISTING STRIPING.

BOX CUT
TRENCH
OVERLAY
RIPRAP
NEW CONCRETE SIDEWALK
COBBLE STONE GUTTER
BIT. SIDEWALK REPAIR
LOAM & SEED



LAYOUT PLAN
SCALE: 1"=20'



WATER PLAN
SCALE: 1"=20'

REFERENCES:
Civil 3D 2013 Drawing Name: 17112 PP FOREST AVE.dwg, TAB:FOREST AVE L01
CITY PROPERTY PLAN BOOK SHEETS: 1 & 3,SHEETS: 1II-9, 1II-11

FEBRUARY 2018

DESIGNED BY: RLM
DRAWN BY: AAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

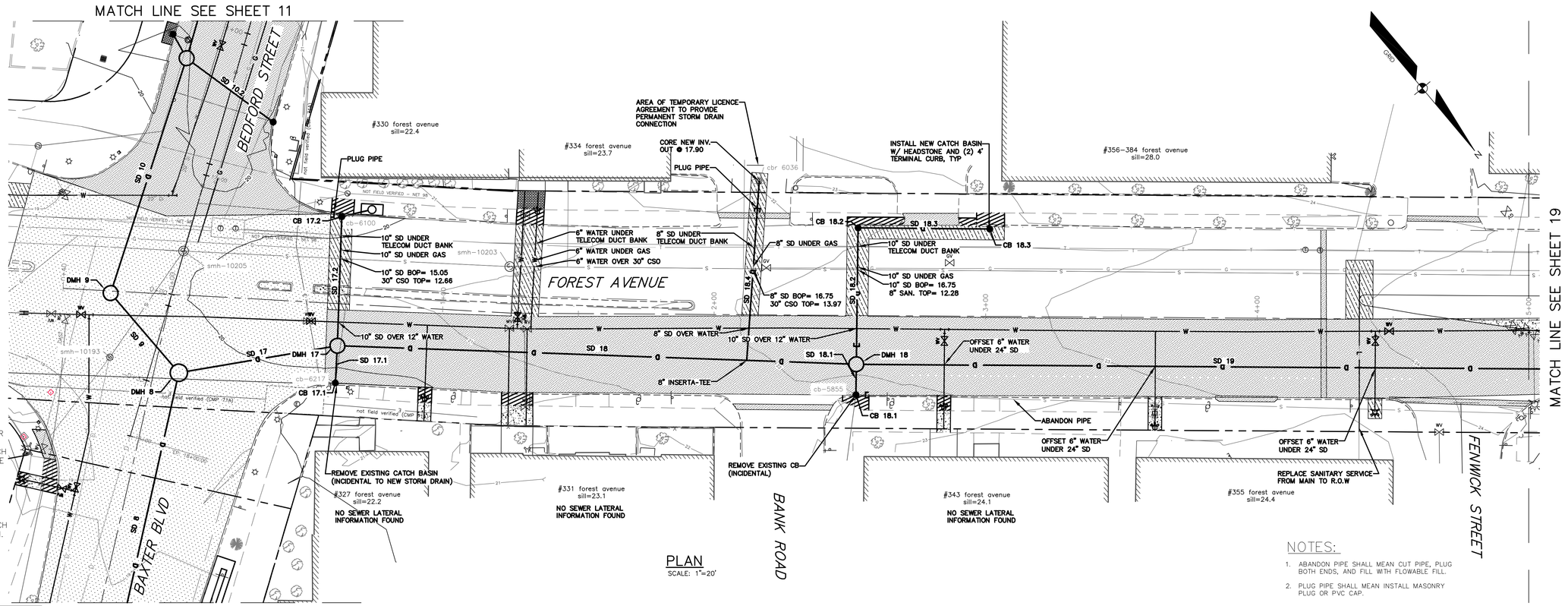
STATE OF MAINE ROBERT A. MCDONALD No. 8058 LICENSED PROFESSIONAL ENGINEER 02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT
FOREST AVENUE LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET # 16 OF 46
PLAN NUMBER



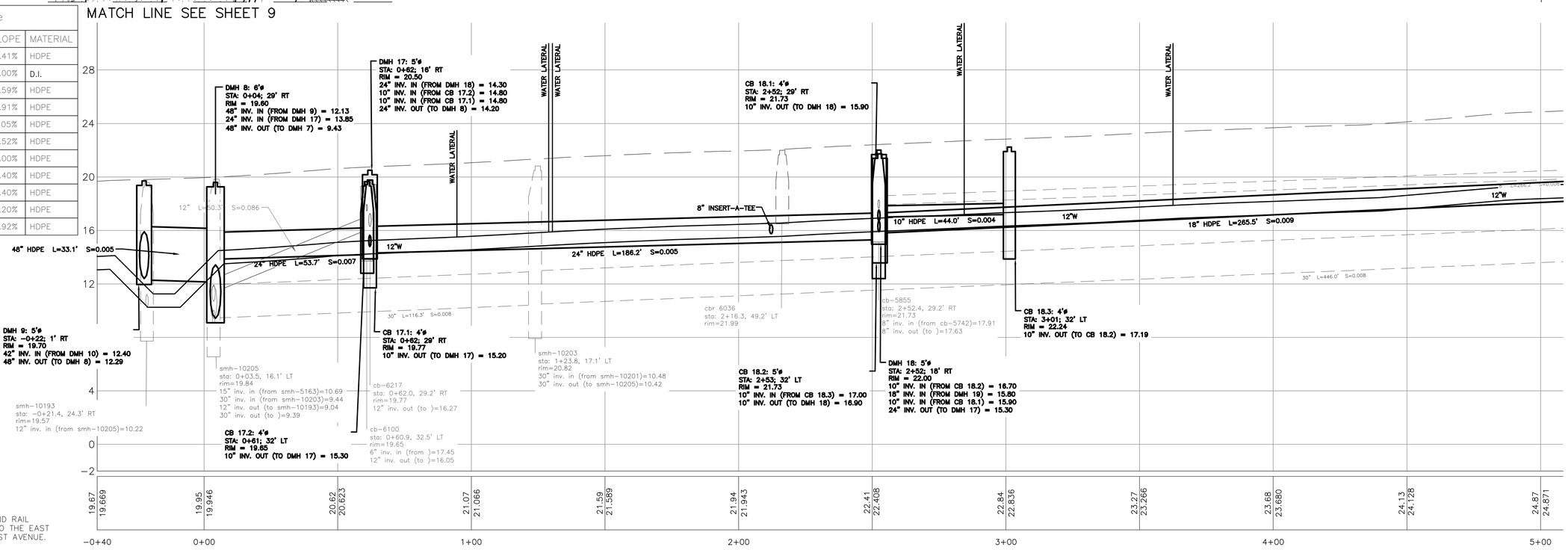
NOTE:
1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.

PLAN
SCALE: 1"=20'

NOTES:
1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table

NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 9	48"	38.60'	0.41%	HDPE
SD 10	42"	90.89'	0.00%	D.I.
SD 17	24"	59.23'	0.59%	HDPE
SD 17.1	10"	13.72'	2.91%	HDPE
SD 17.2	10"	47.53'	1.05%	HDPE
SD 18	24"	191.23'	0.52%	HDPE
SD 18.1	10"	11.21'	0.00%	HDPE
SD 18.2	10"	50.20'	0.40%	HDPE
SD 18.3	10"	48.48'	0.40%	HDPE
SD 18.4	8"	66.12'	0.20%	HDPE
SD 19	18"	270.53'	0.92%	HDPE



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP FOREST AVE.dwg, TAB:FOREST AVE PP1

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE ROBERT A. McSORLEY No. 4569 LICENSED PROFESSIONAL ENGINEER

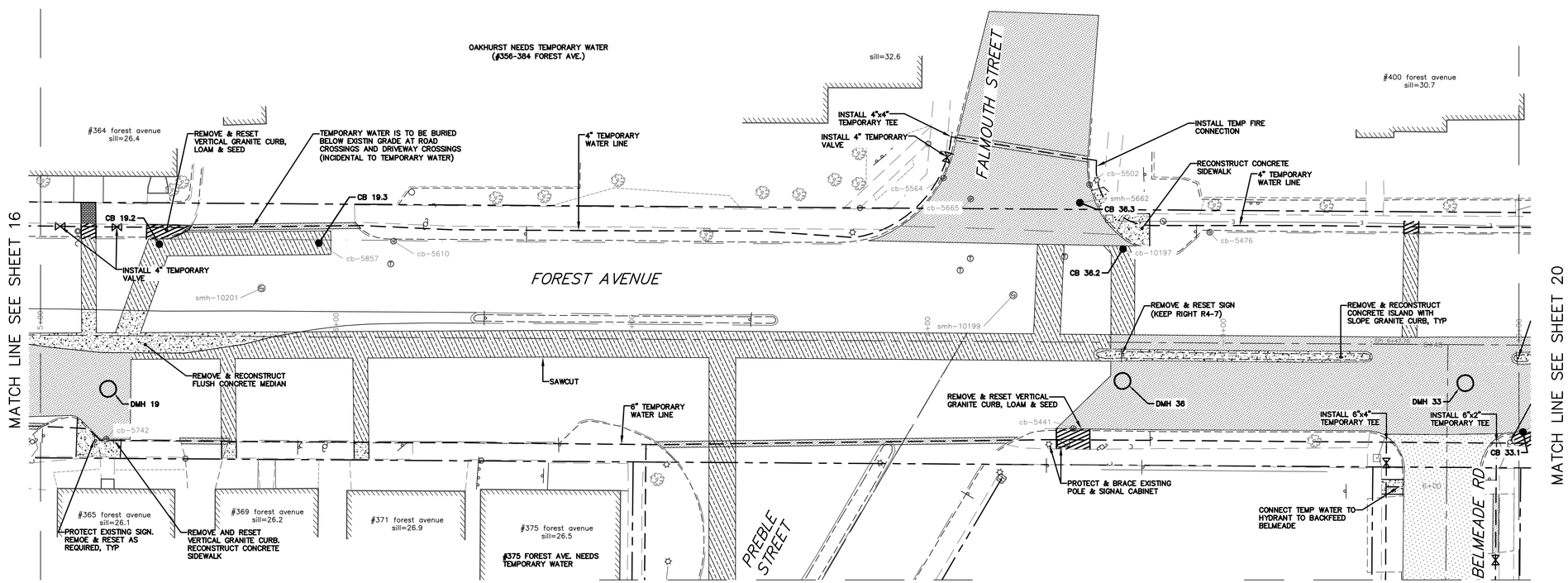
BEDFORD STREET
SEWER SEPERATION PROJECT
PLAN & PROFILE - FOREST AVENUE
STA. 0+00 TO STA. 5+00

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

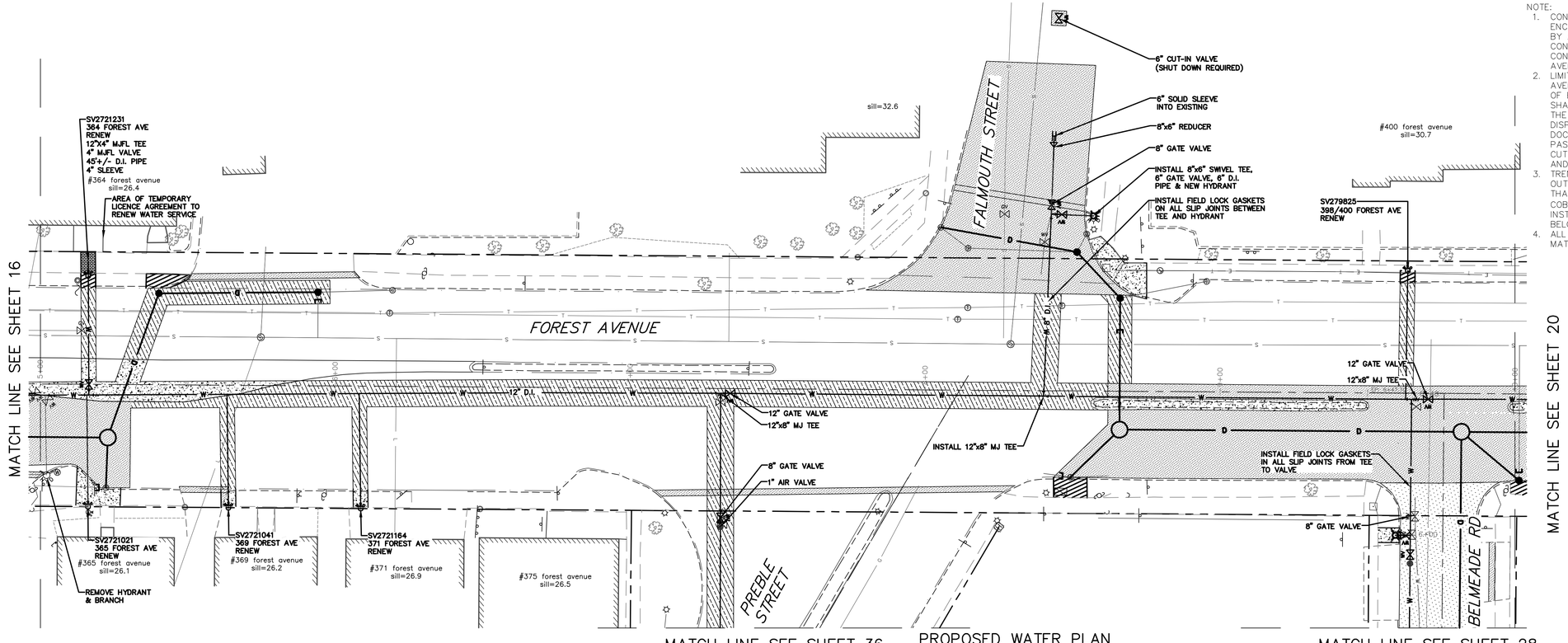
SHEET #
17 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



PROPOSED WATER PLAN

SCALE: 1"=20'

NOTE:

1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.
4. ALL STRIPING TO BE RESTORED TO MATCH EXISTING STRIPING.

BOX CUT
TRENCH
OVERLAY
RIPRAP
NEW CONCRETE SIDEWALK
COBBLE STONE GUTTER
BIT. SIDEWALK REPAIR
LOAM & SEED

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name: 17112 PP FOREST AVE.dwg, TAB:FOREST AVE L02

CITY PROPERTY PLAN BOOK SHEETS: I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. McSORLEY No. 2558 LICENSED PROFESSIONAL ENGINEER

02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT

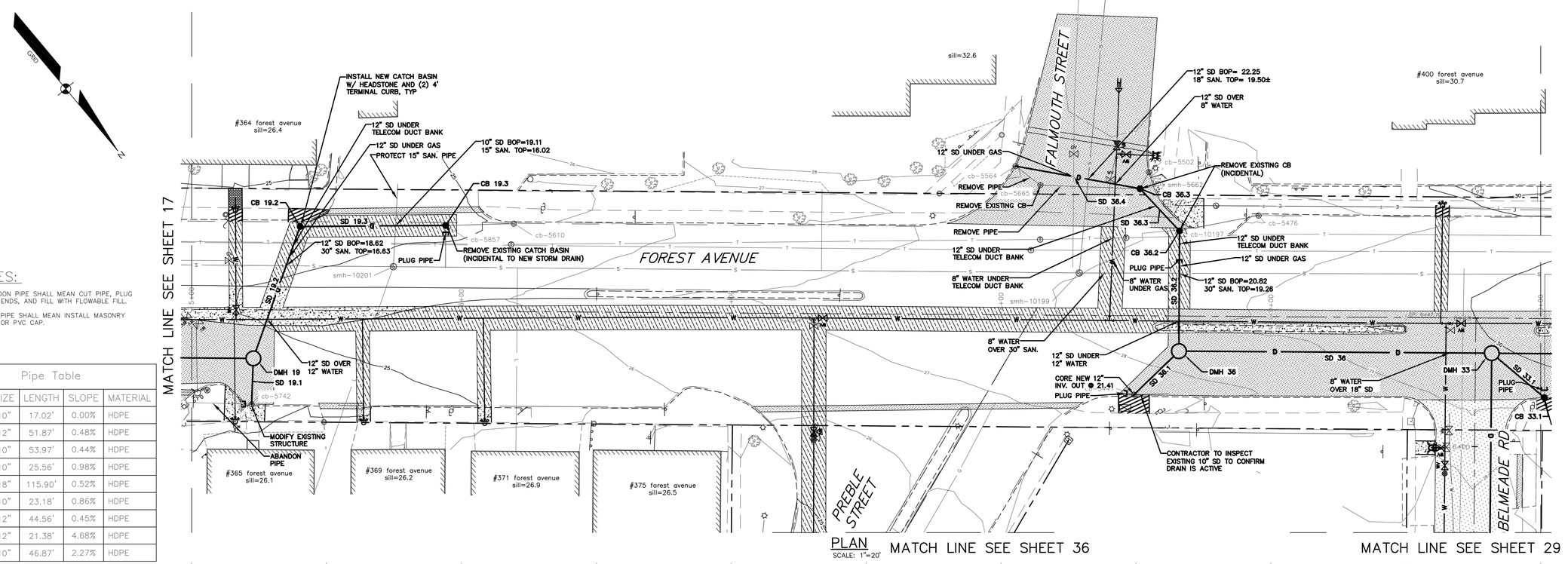
FOREST AVENUE LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET # 18 OF 46

PLAN NUMBER



PLAN
SCALE: 1"=20'

MATCH LINE SEE SHEET 36

MATCH LINE SEE SHEET 29

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

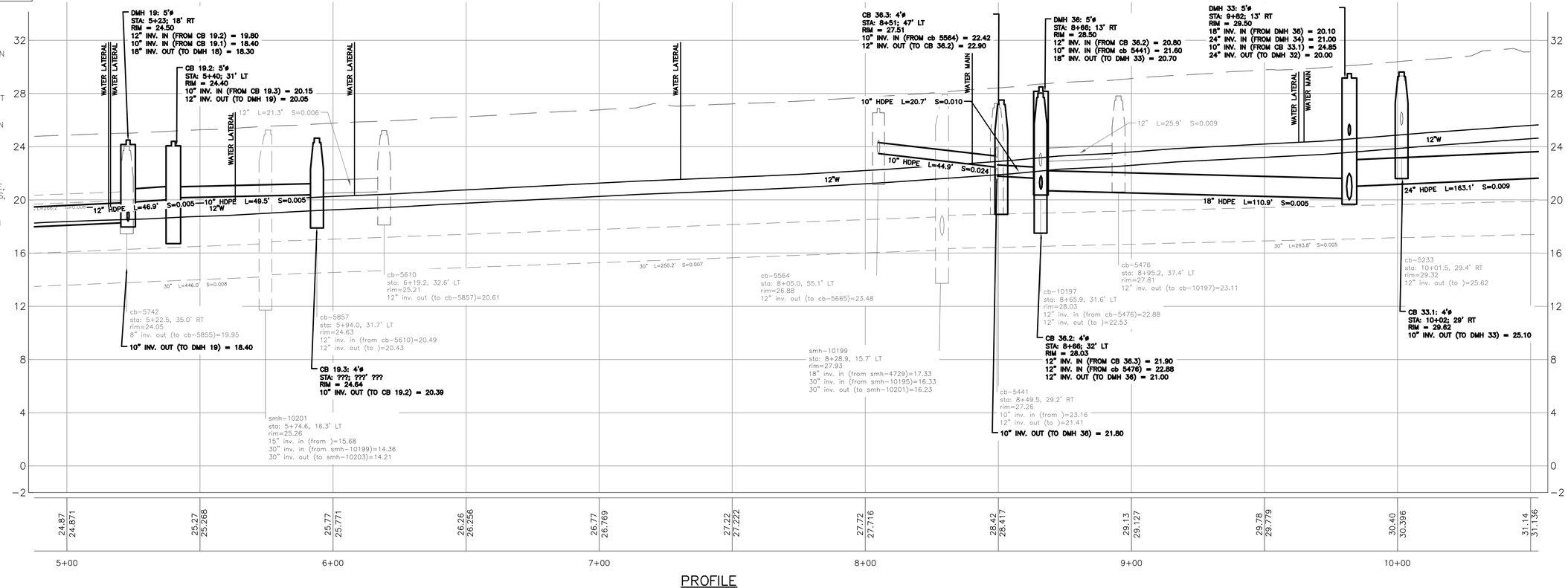
Pipe Table

NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 19.1	10"	17.02'	0.00%	HDPE
SD 19.2	12"	51.87'	0.48%	HDPE
SD 19.3	10"	53.97'	0.44%	HDPE
SD 33.1	10"	25.56'	0.98%	HDPE
SD 36	18"	115.90'	0.52%	HDPE
SD 36.1	10"	23.18'	0.86%	HDPE
SD 36.2	12"	44.56'	0.45%	HDPE
SD 36.3	12"	21.38'	4.68%	HDPE
SD 36.4	10"	46.87'	2.27%	HDPE

NOTE:

1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP FOREST AVE.dwg, TAB:FOREST AVE PP2

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-H

REFERENCES:

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. McSPADDEN No. 4256 PROFESSIONAL ENGINEER

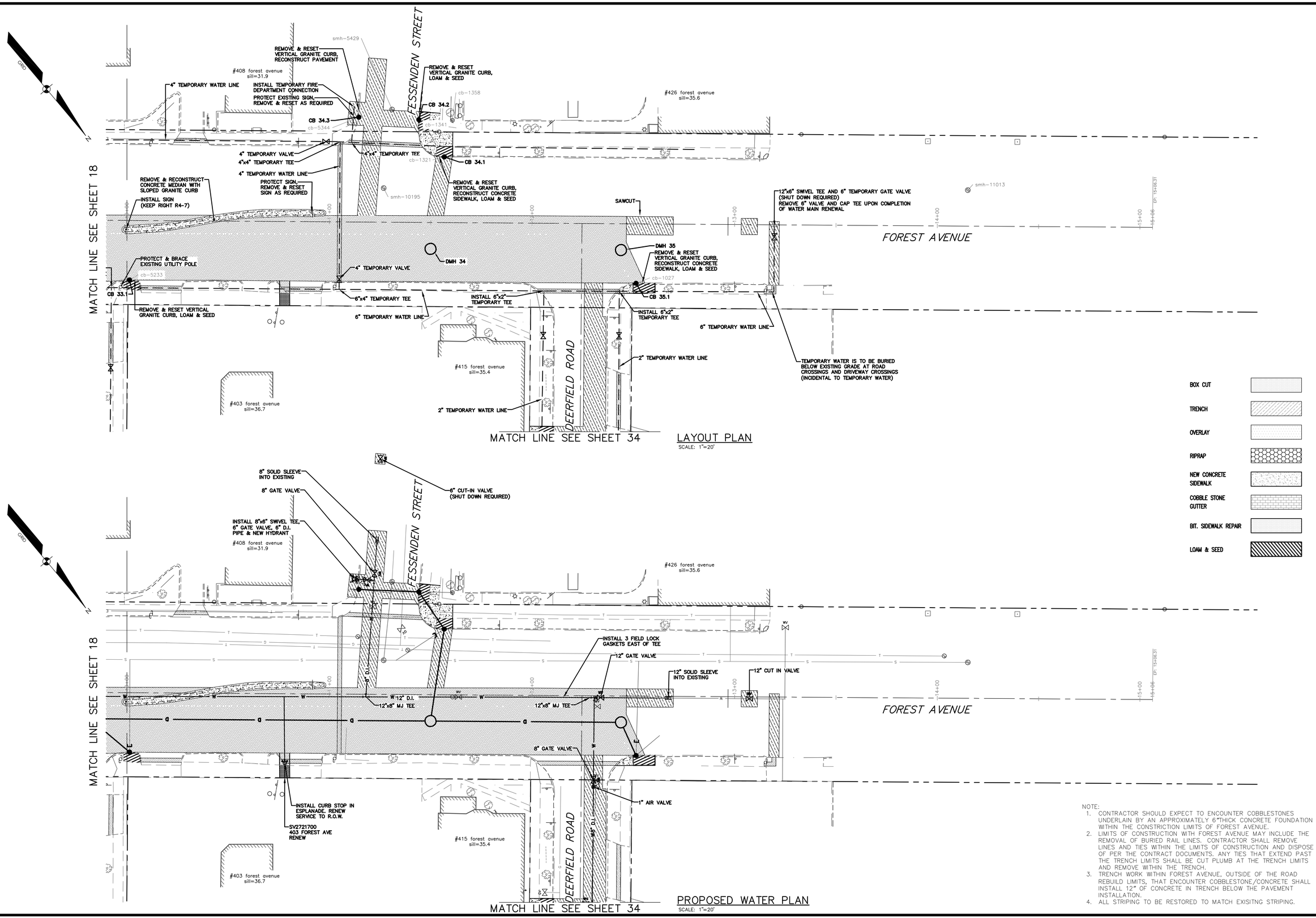
BEDFORD STREET
SEWER SEPERATION PROJECT
PLAN & PROFILE - FOREST AVENUE
STA. 5+00 TO STA. 10+00

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
19 OF 46

PLAN NUMBER



NOTE:

1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.
4. ALL STRIPING TO BE RESTORED TO MATCH EXISITNG STRIPING.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP FOREST AVE.dwg, TAB:FOREST AVE LO3

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE ROBERT A. McSORLEY No. 4586 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

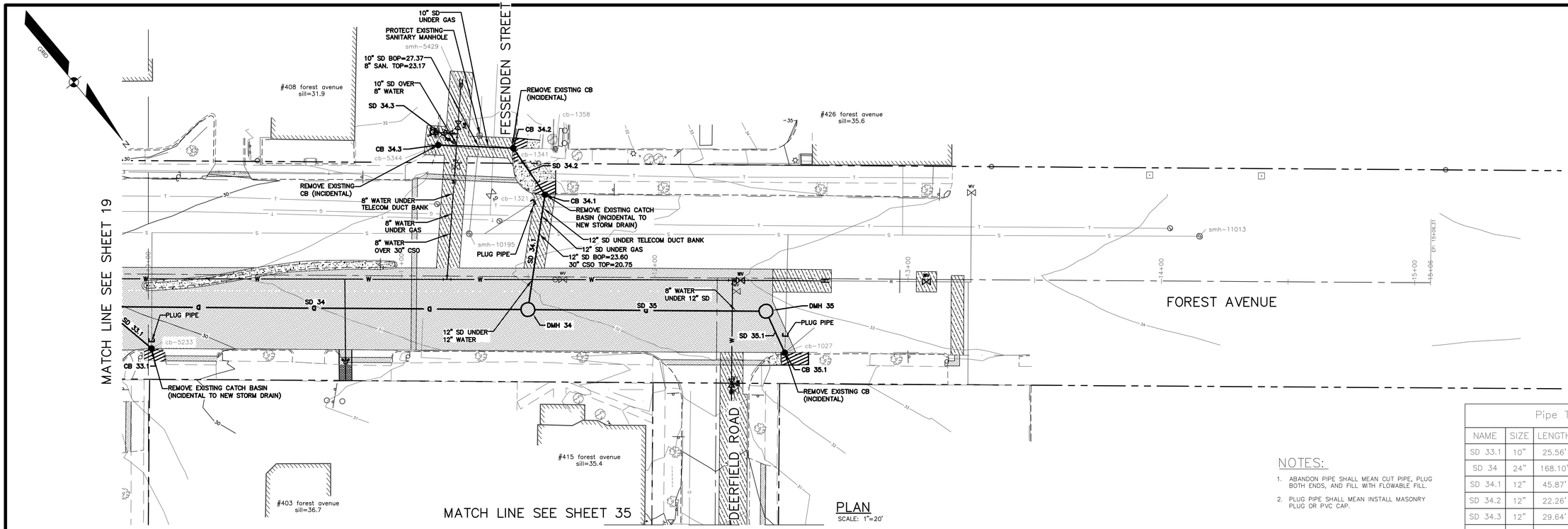
FOREST AVENUE LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
20 OF 46

PLAN NUMBER



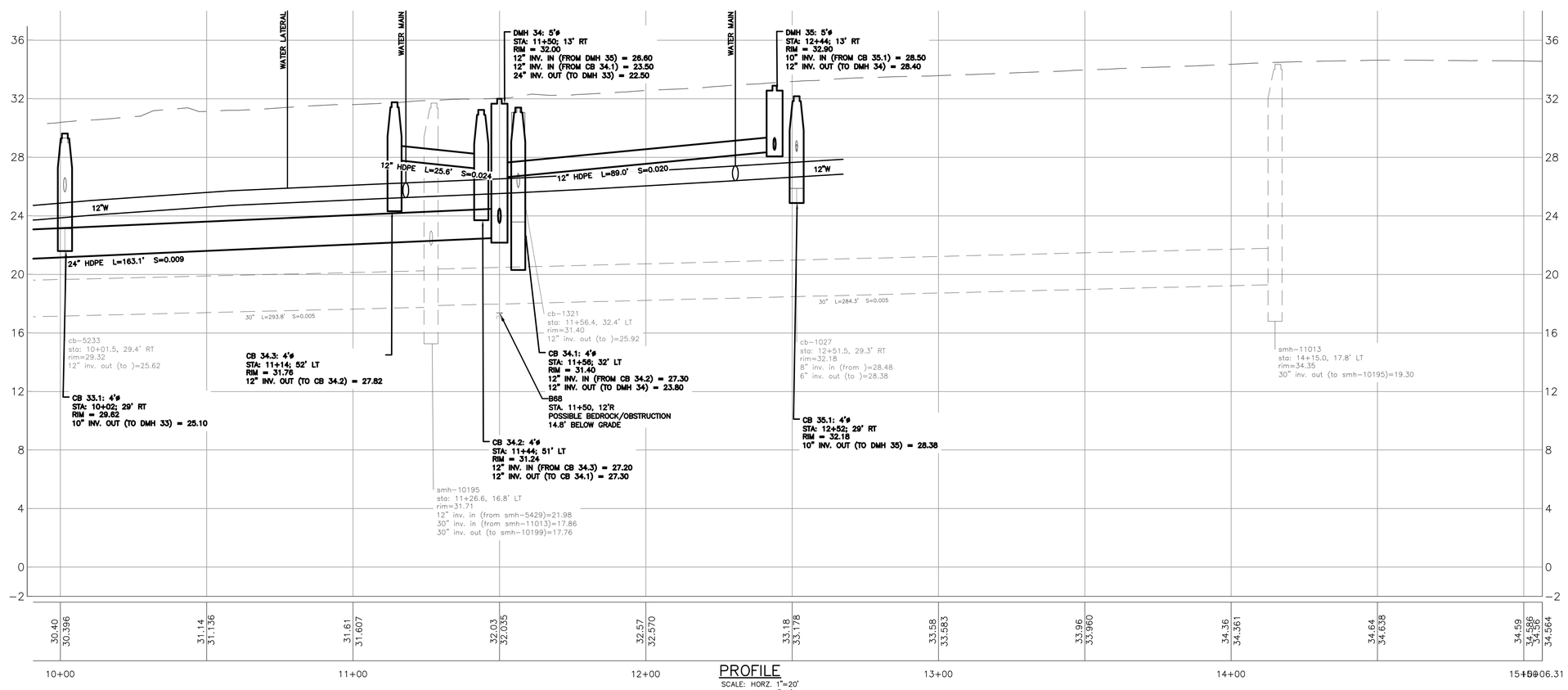
PLAN
SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table

NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 33.1	10"	25.56'	0.98%	HDPE
SD 34	24"	168.10'	0.89%	HDPE
SD 34.1	12"	45.87'	0.65%	HDPE
SD 34.2	12"	22.26'	0.00%	HDPE
SD 34.3	12"	29.64'	2.09%	HDPE
SD 35	12"	94.00'	1.91%	HDPE
SD 35.1	10"	17.99'	−0.67%	HDPE



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

NOTE:

1. CONTRACTOR SHOULD EXPECT TO ENCOUNTER COBBLESTONES UNDERLAIN BY AN APPROXIMATELY 6"THICK CONCRETE FOUNDATION WITHIN THE CONSTRICTION LIMITS OF FOREST AVENUE.
2. LIMITS OF CONSTRUCTION WITH FOREST AVENUE MAY INCLUDE THE REMOVAL OF BURIED RAIL LINES. CONTRACTOR SHALL REMOVE LINES AND TIES WITHIN THE LIMITS OF CONSTRUCTION AND DISPOSE OF PER THE CONTRACT DOCUMENTS. ANY TIES THAT EXTEND PAST THE TRENCH LIMITS SHALL BE CUT PLUMB AT THE TRENCH LIMITS AND REMOVE WITHIN THE TRENCH.
3. TRENCH WORK WITHIN FOREST AVENUE, OUTSIDE OF THE ROAD REBUILD LIMITS, THAT ENCOUNTER COBBLESTONE/CONCRETE SHALL INSTALL 12" OF CONCRETE IN TRENCH BELOW THE PAVEMENT INSTALLATION.

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP FOREST AVE.dwg, TAB:FOREST AVE PP3

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE
ROBERT A. McSORLEY
No. 2559
LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

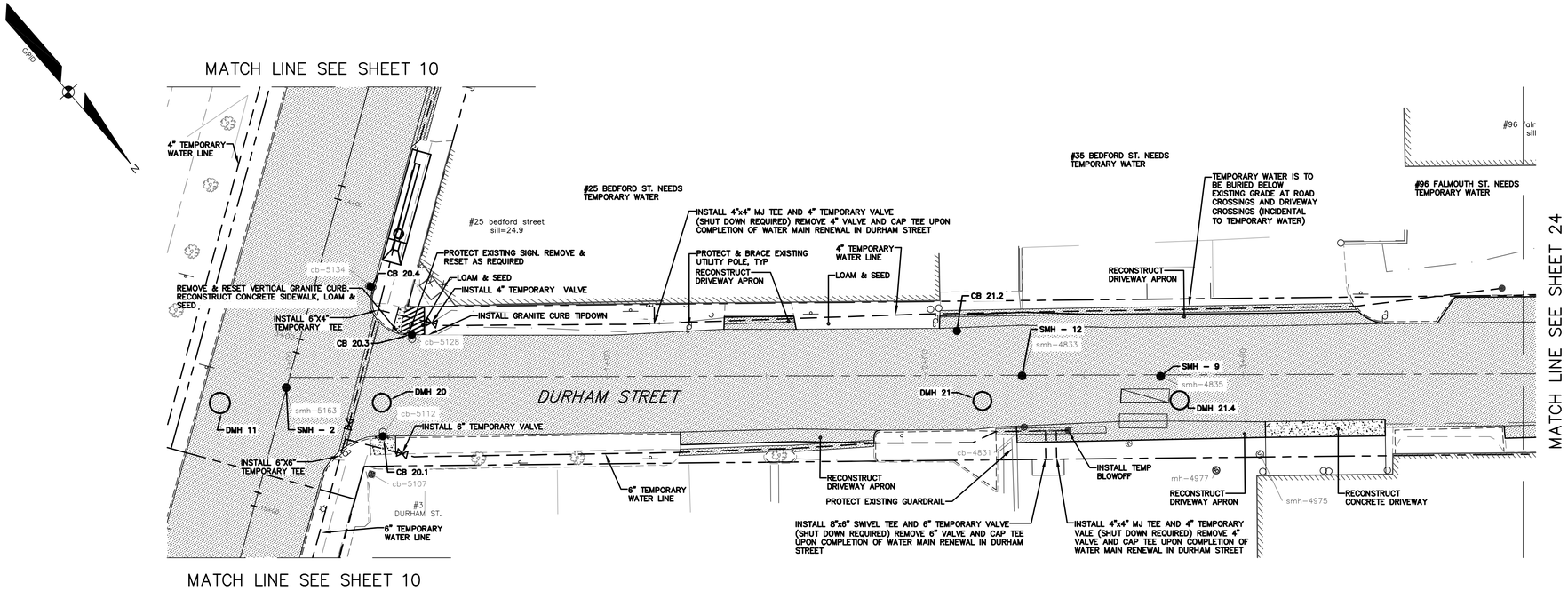
PLAN & PROFILE - FOREST AVENUE
STA. 10+00 TO STA. 15+00

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

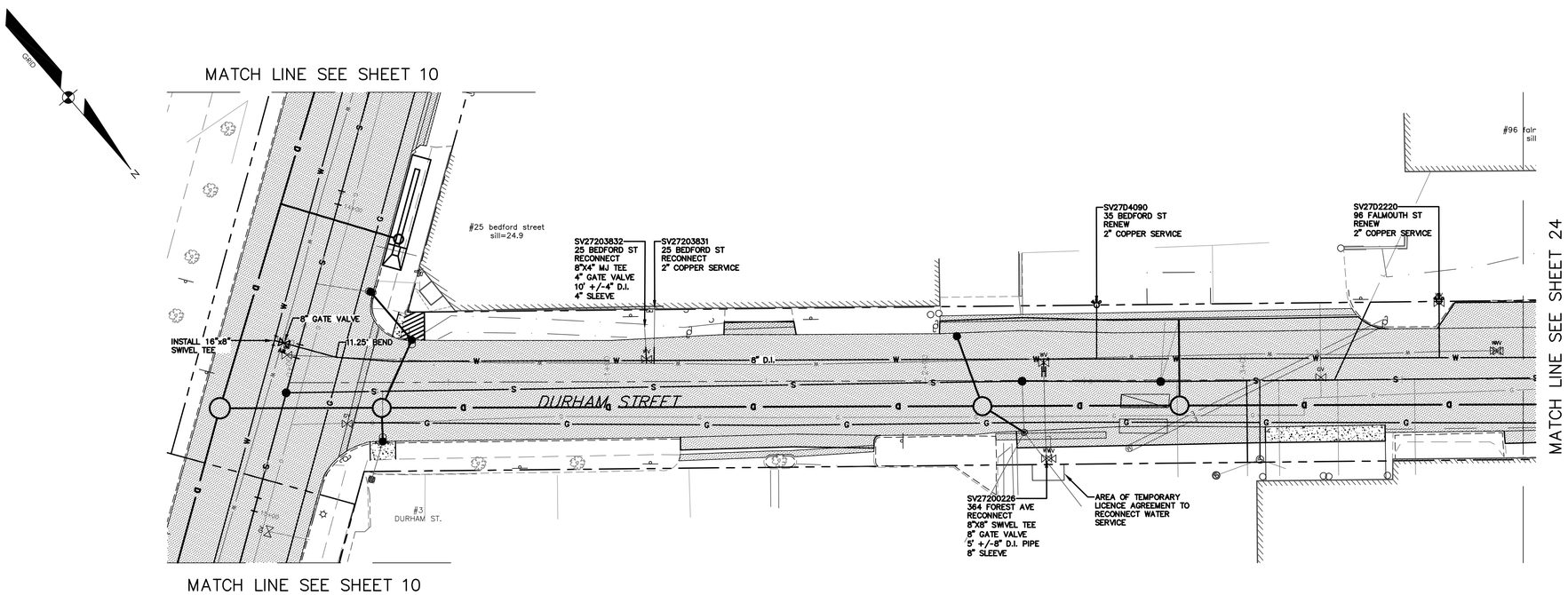
SHEET #
21 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



WATER PLAN

SCALE: 1"=20'

BOX CUT	
TRENCH	
OVERLAY	
RIPRAP	
NEW CONCRETE SIDEWALK	
COBBLE STONE GUTTER	
BIT. SIDEWALK REPAIR	
LOAM & SEED	

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DURHAM STREET.dwg, TAB:DURHAM STREET LO1

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-H

DESIGN BY:	RLM
DRAWN BY:	AAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. McSORLEY No. 6258 PROFESSIONAL ENGINEER

02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT

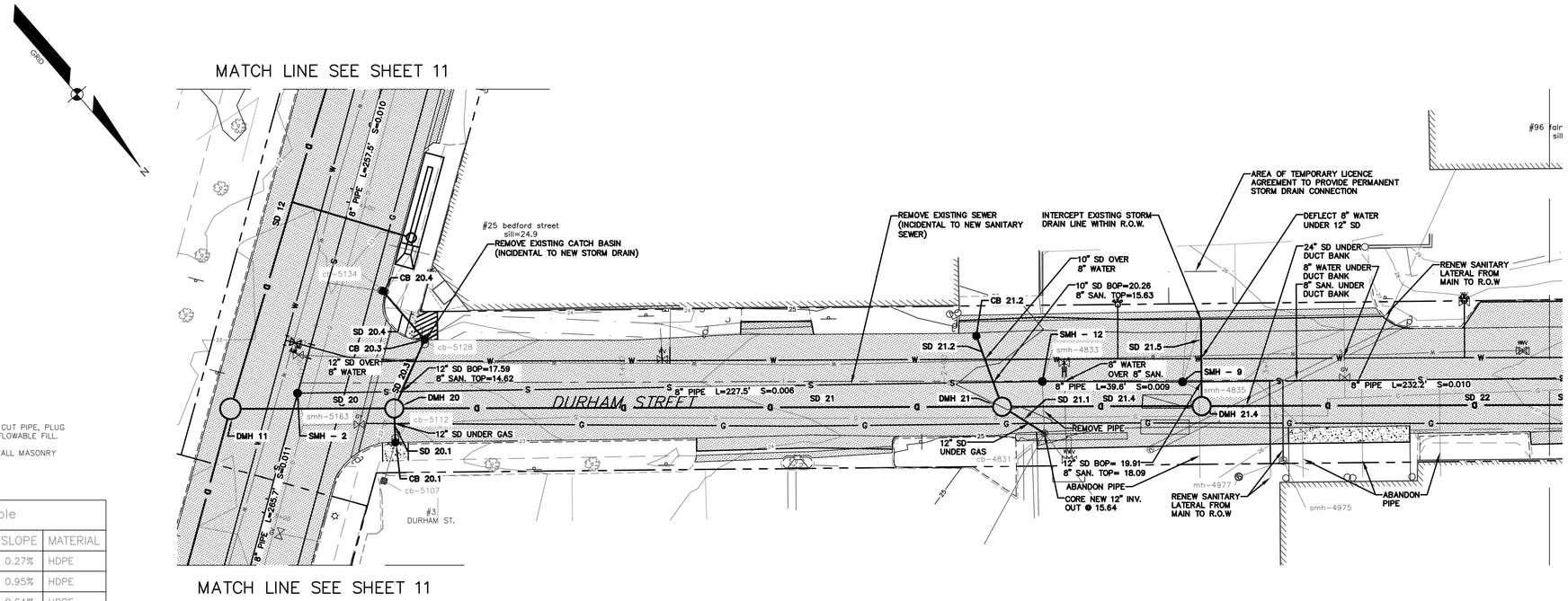
DURHAM STREET LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET # 22 OF 46

PLAN NUMBER



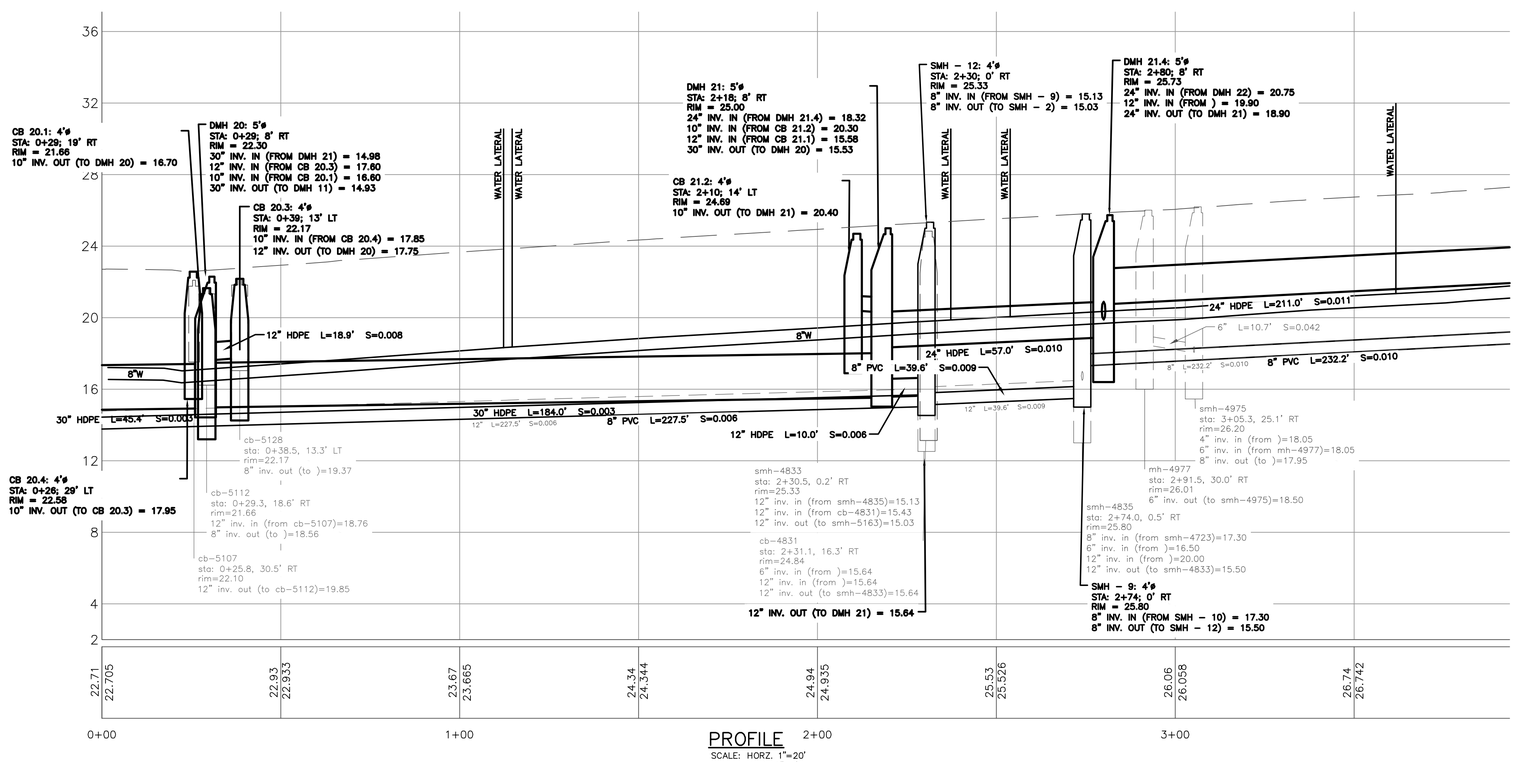
NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 20	30"	50.91'	0.27%	HDPE
SD 20.1	10"	10.57'	0.95%	HDPE
SD 20.3	12"	23.36'	0.64%	HDPE
SD 21	30"	189.00'	0.29%	HDPE
SD 21.1	12"	15.50'	0.39%	HDPE
SD 21.2	10"	23.41'	0.43%	HDPE
SD 21.4	24"	62.00'	0.94%	HDPE
SD 21.5	12"	26.75'	1.12%	HDPE
SD 22	24"	216.00'	1.04%	HDPE

PLAN

SCALE: 1"=20'



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP DURHAM STREET.dwg, TAB:DURHAM STREET PP1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16.2018

STATE OF MAINE
ROBERT L. MCSPERLEY
No. 8569
LICENSED
PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

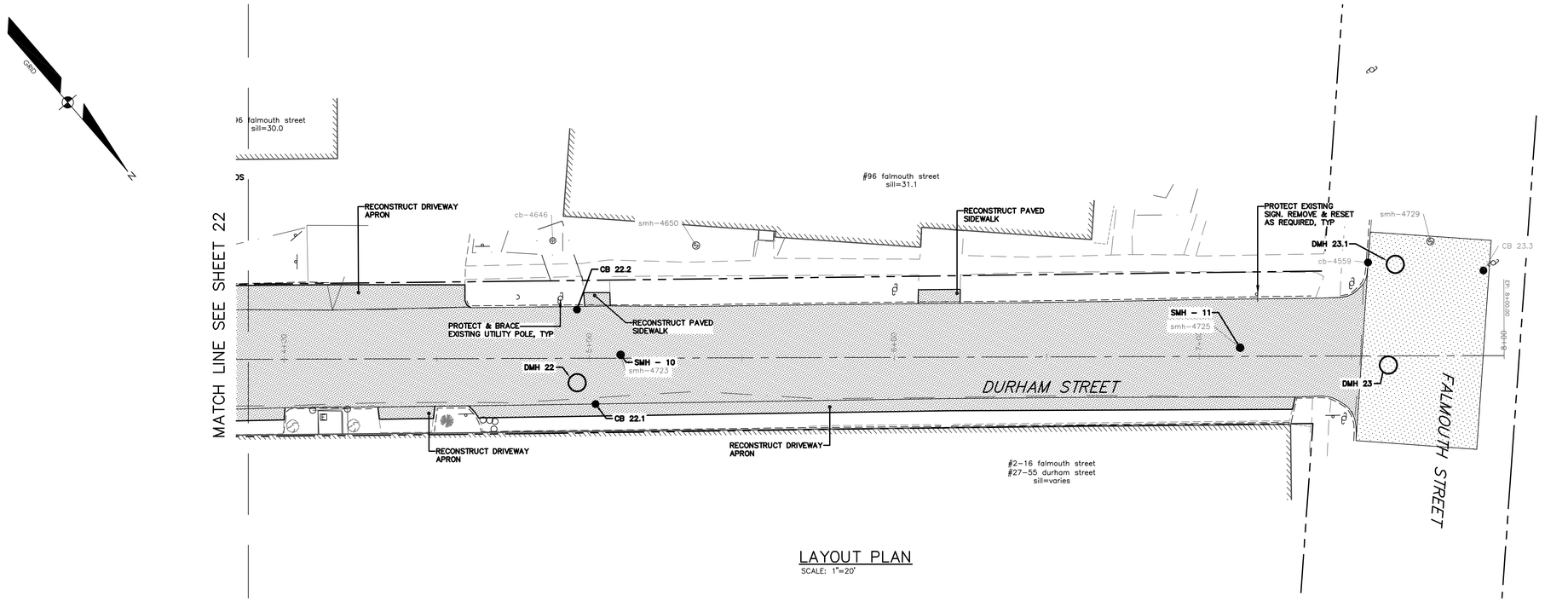
PLAN & PROFILE - DURHAM STREET
STA. 0+00 TO STA. 3+75

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM
CITY OF PORTLAND, MAINE

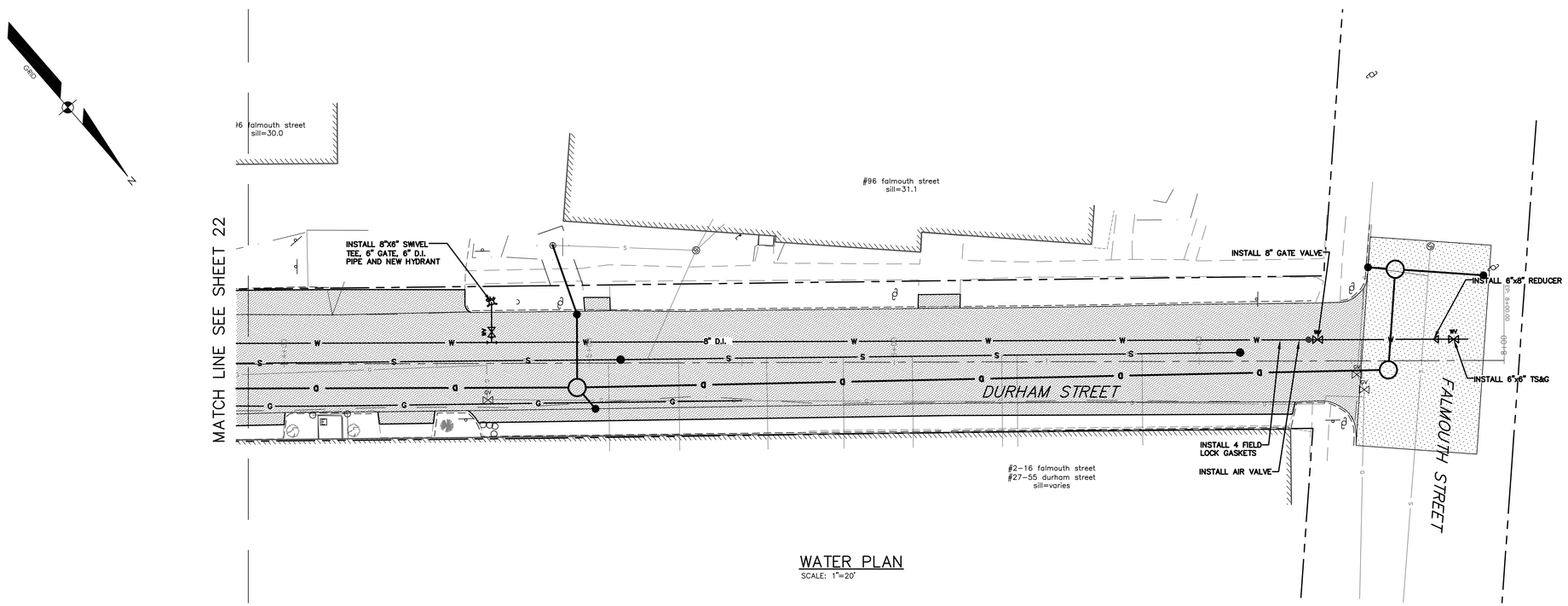
SHEET #
23 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



WATER PLAN

SCALE: 1"=20'

BOX CUT

TRENCH

OVERLAY

RIPRAP

NEW CONCRETE SIDEWALK

COBBLE STONE GUTTER

BIT. SIDEWALK REPAIR

LOAM & SEED

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DURHAM STREET.dwg, TAB:DURHAM STREET LO2

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY: RLM	DATE: 02. 16. 2018
DRAWN BY: SAP	
CHECKED BY: RAM	
SCALE: 1" = 20'	

STATE OF MAINE ROBERT A. McSORLEY No. 4568 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

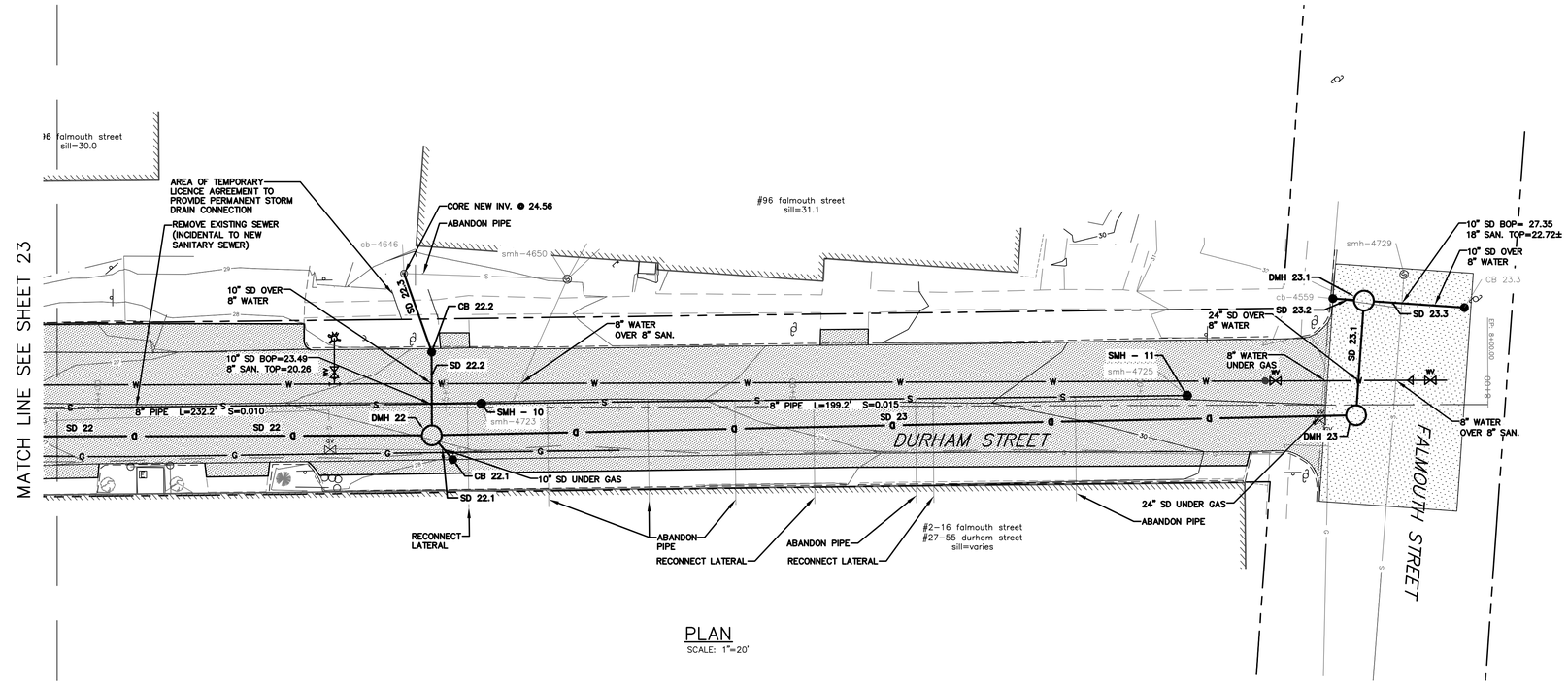
DURHAM STREET LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
24 OF 46

PLAN NUMBER



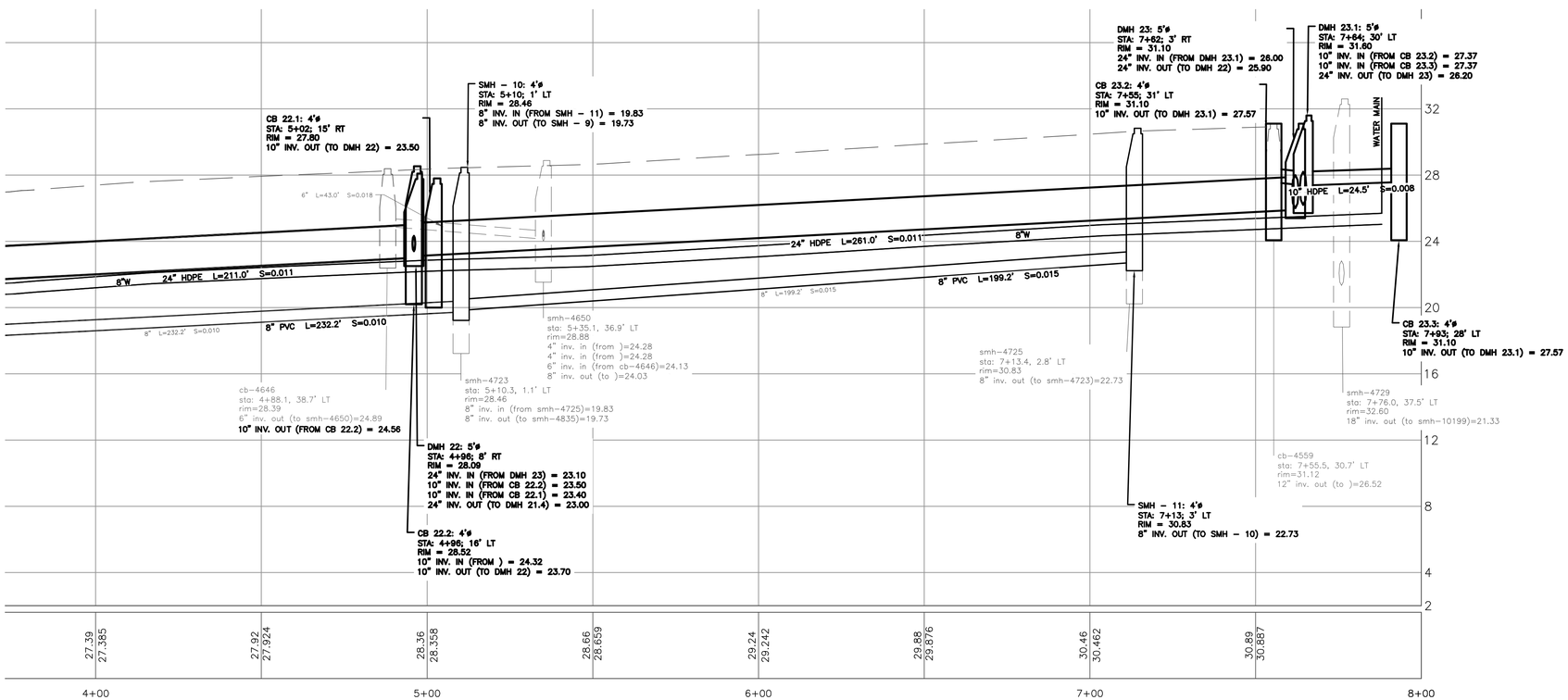
PLAN

SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 22	24"	216.00'	1.04%	HDPE
SD 22.1	10"	9.22'	1.08%	HDPE
SD 22.2	10"	24.00'	0.83%	HDPE
SD 22.3	10"	23.99'	1.00%	HDPE
SD 23	24"	266.05'	1.05%	HDPE
SD 23.1	24"	33.11'	0.60%	HDPE
SD 23.2	10"	8.94'	2.24%	HDPE
SD 23.3	10"	28.99'	0.69%	HDPE



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DURHAM STREET.dwg, TAB:DURHAM STREET PP2

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

REFERENCES:

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16. 2018

STATE OF MAINE
ROBERT McSORLEY
No. 5569
LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

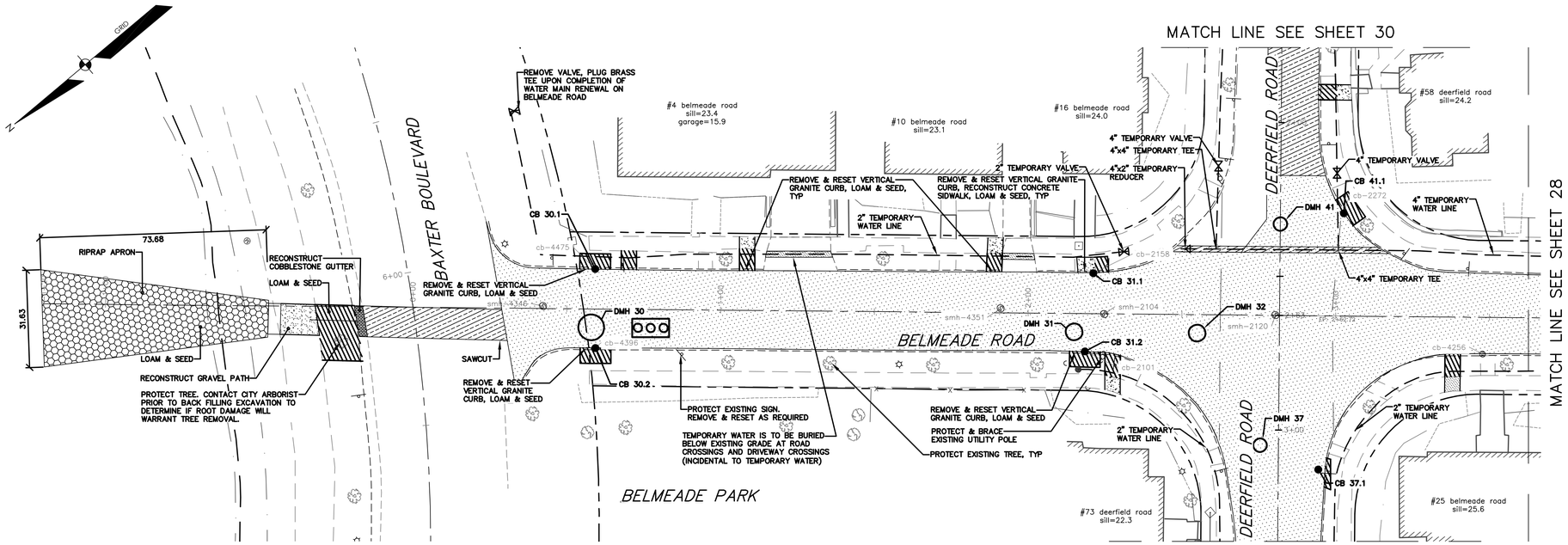
PLAN & PROFILE - DURHAM STREET
STA. 3+75 TO STA. 7+60

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
RESURGAM

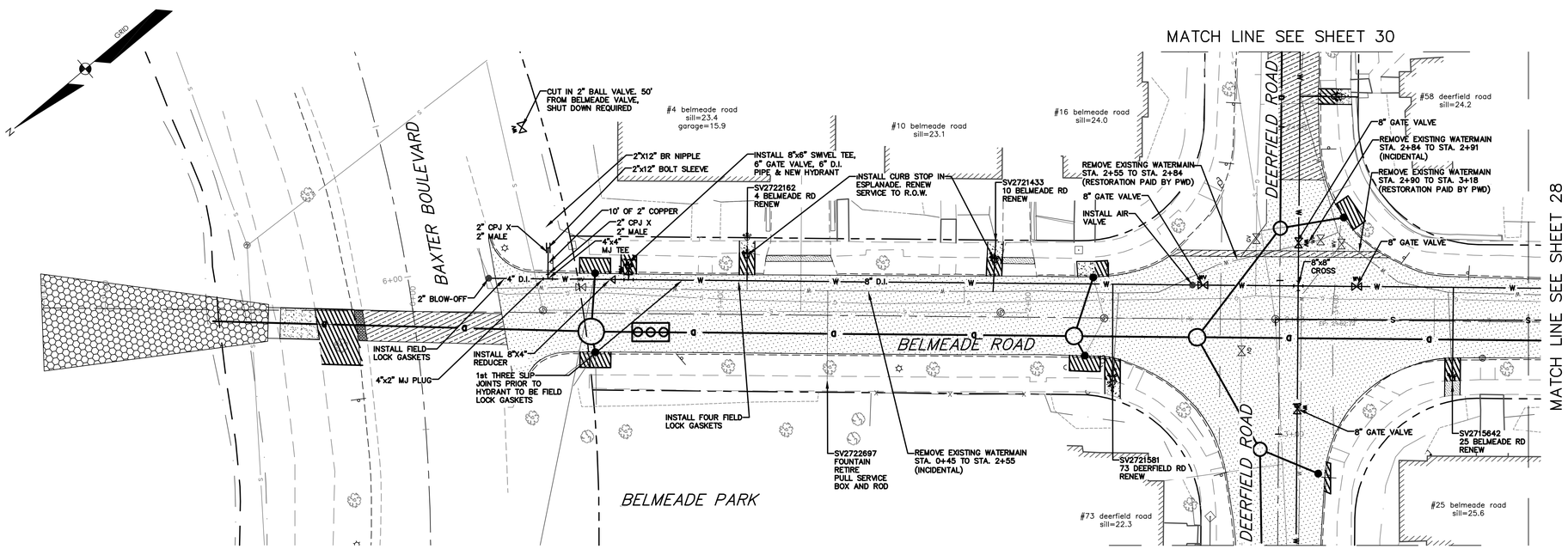
SHEET #
25 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



WATER PLAN

SCALE: 1"=20'

BOX CUT

TRENCH

OVERLAY

RIPRAP

NEW CONCRETE SIDEWALK

COBBLE STONE GUTTER

BIT. SIDEWALK REPAIR

LOAM & SEED

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name: 17112 PP BELMEADE ROAD.dwg, TAB:BELMEADE ROAD LO1

CITY PROPERTY PLAN BOOK SHEETS: I & J SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16.2018

STATE OF MAINE ROBERT A. MCSPERLEY No. 4569 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

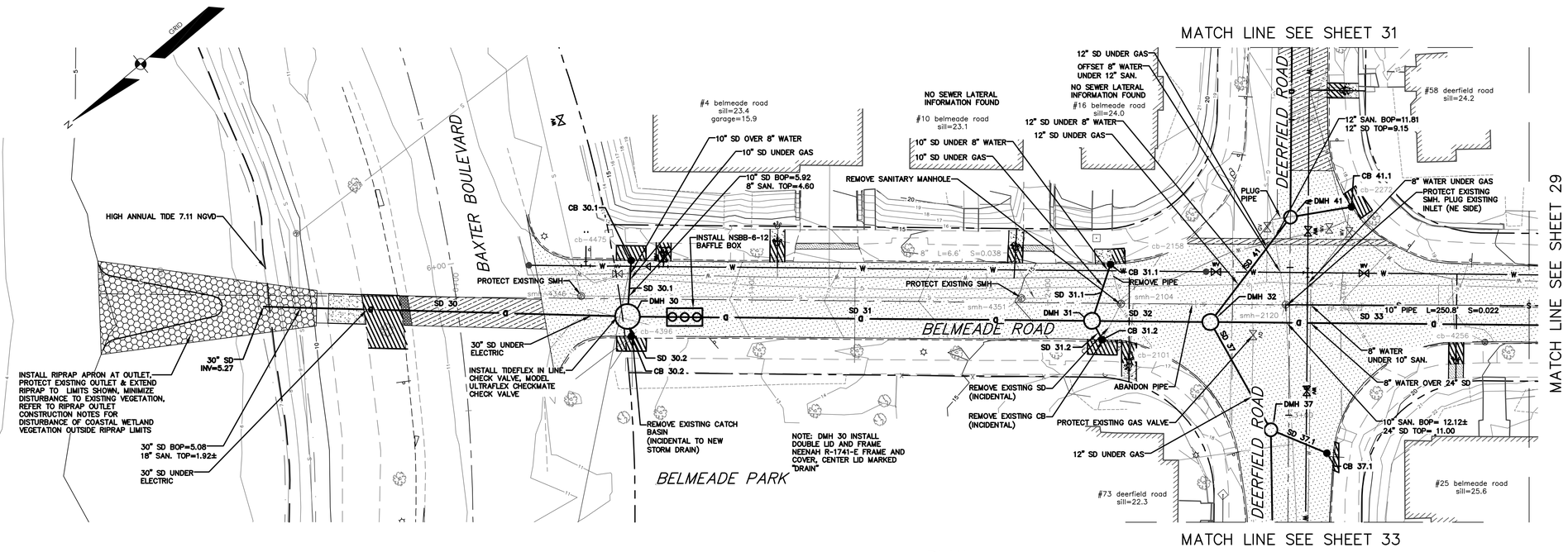
BELMEADE ROAD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET # 26 OF 46

PLAN NUMBER

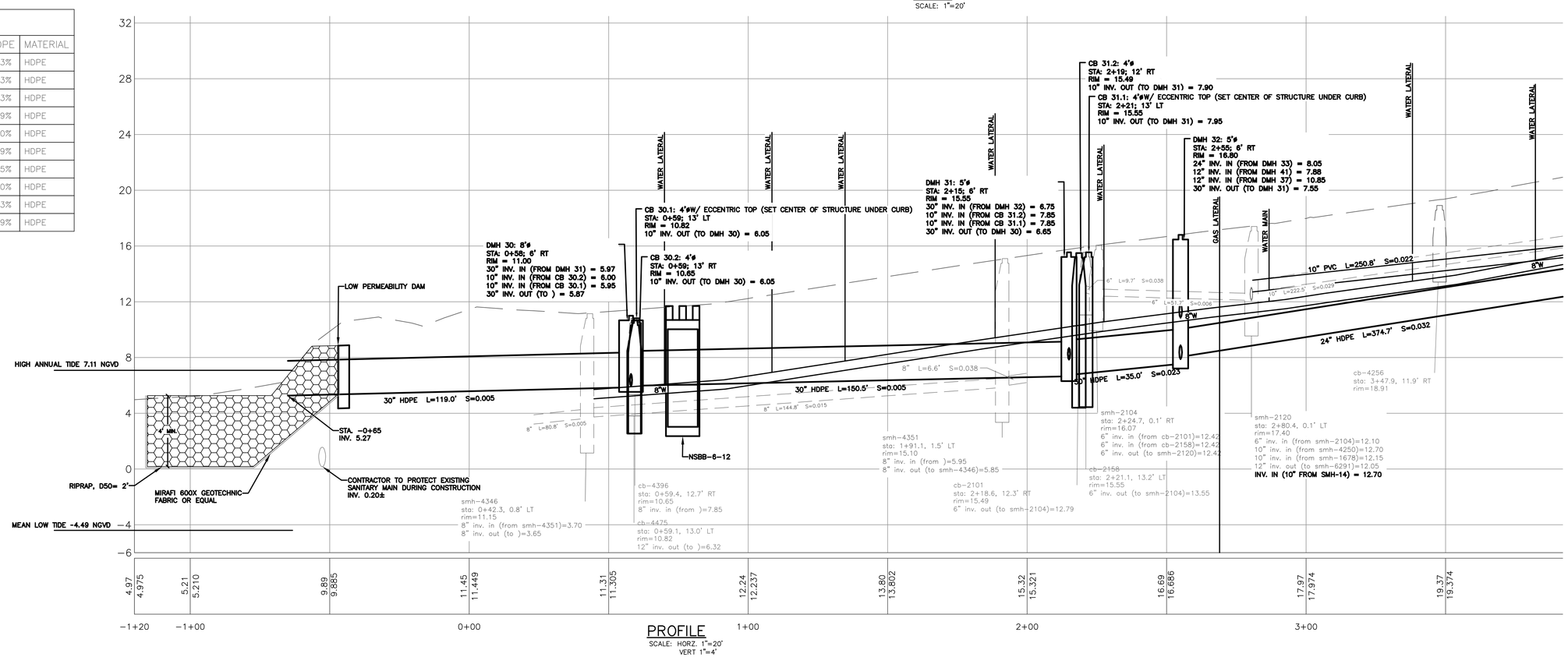


PLAN
SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 37	12"	41.81'	3.13%	HDPE
SD 30.2	10"	6.85'	0.73%	HDPE
SD 30.1	10"	19.03'	0.53%	HDPE
SD 31.2	10"	7.23'	0.69%	HDPE
SD 31.1	10"	20.09'	0.50%	HDPE
SD 41	12"	44.60'	0.49%	HDPE
SD 33	24"	379.71'	3.15%	HDPE
SD 32	30"	40.00'	2.00%	HDPE
SD 31	30"	157.00'	0.43%	HDPE
SD 30	30"	122.99'	0.49%	HDPE



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP BELMEADE ROAD.dwg, TAB:BELMEADE ROAD PP1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	BLM
DRAWN BY:	AJP
CHECKED BY:	RAM
SCALE:	1"=20'
DATE:	02.16.2018

STATE OF MAINE
ROBERT A. MOORE
No. 6059
LICENSED
PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

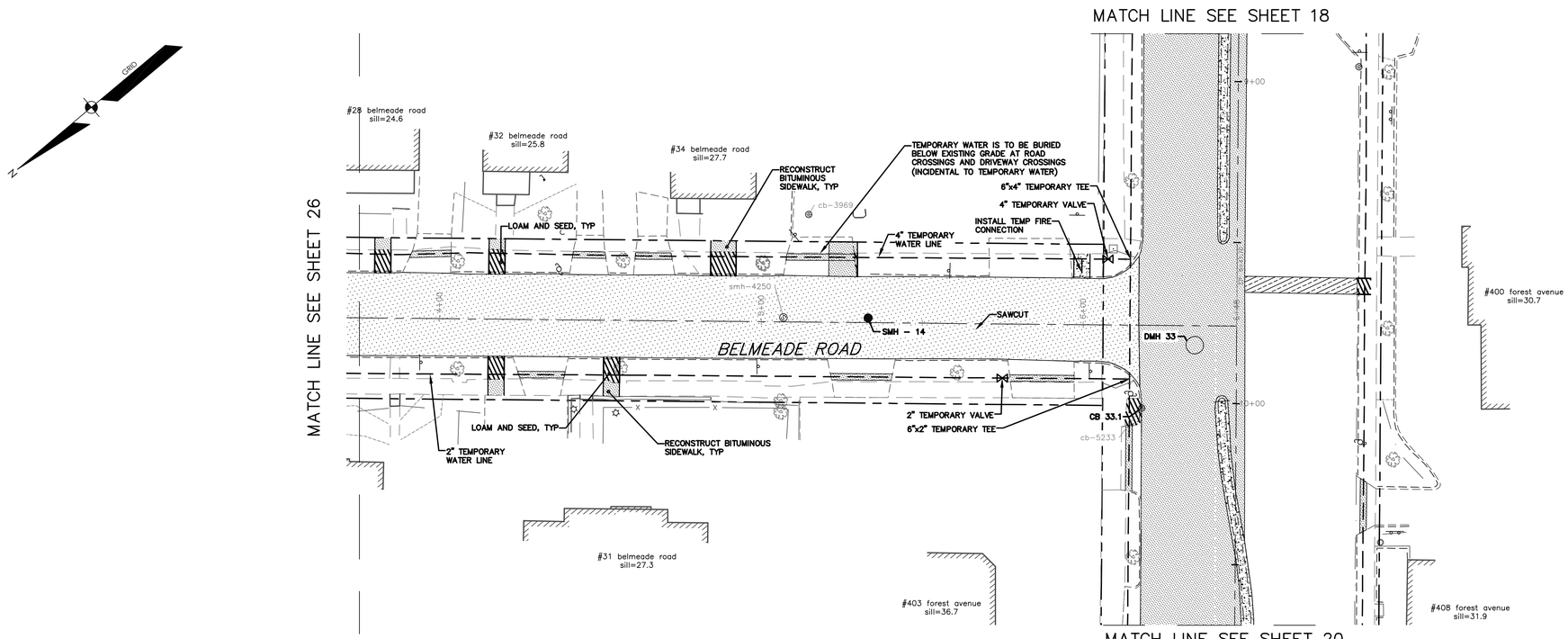
PLAN & PROFILE - BELMEADE ROAD
STA. -0+85 TO STA. 3+75

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

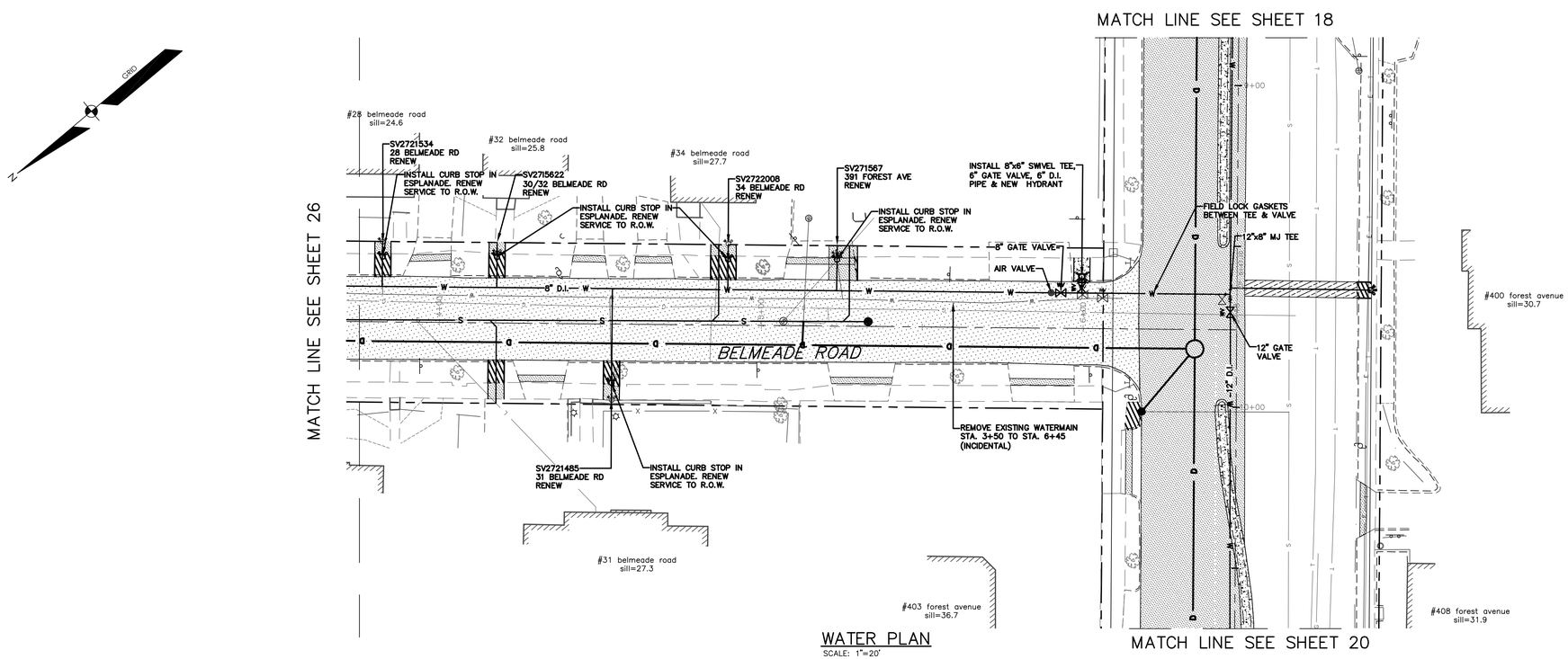
SHEET #
27 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



WATER PLAN

SCALE: 1"=20'

BOX CUT

TRENCH

OVERLAY

RIPRAP

NEW CONCRETE SIDEWALK

COBBLE STONE GUTTER

BIT. SIDEWALK REPAIR

LOAM & SEED

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP BELMEADE ROAD.dwg, TAB:BELMEADE ROAD LO2

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
1 & 1 SHEETS: 111-9, 111-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MCSPARLIN No. 6958 PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

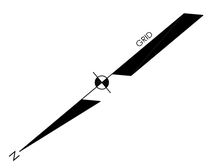
BELMEADE ROAD LAYOUT & WATER PLAN

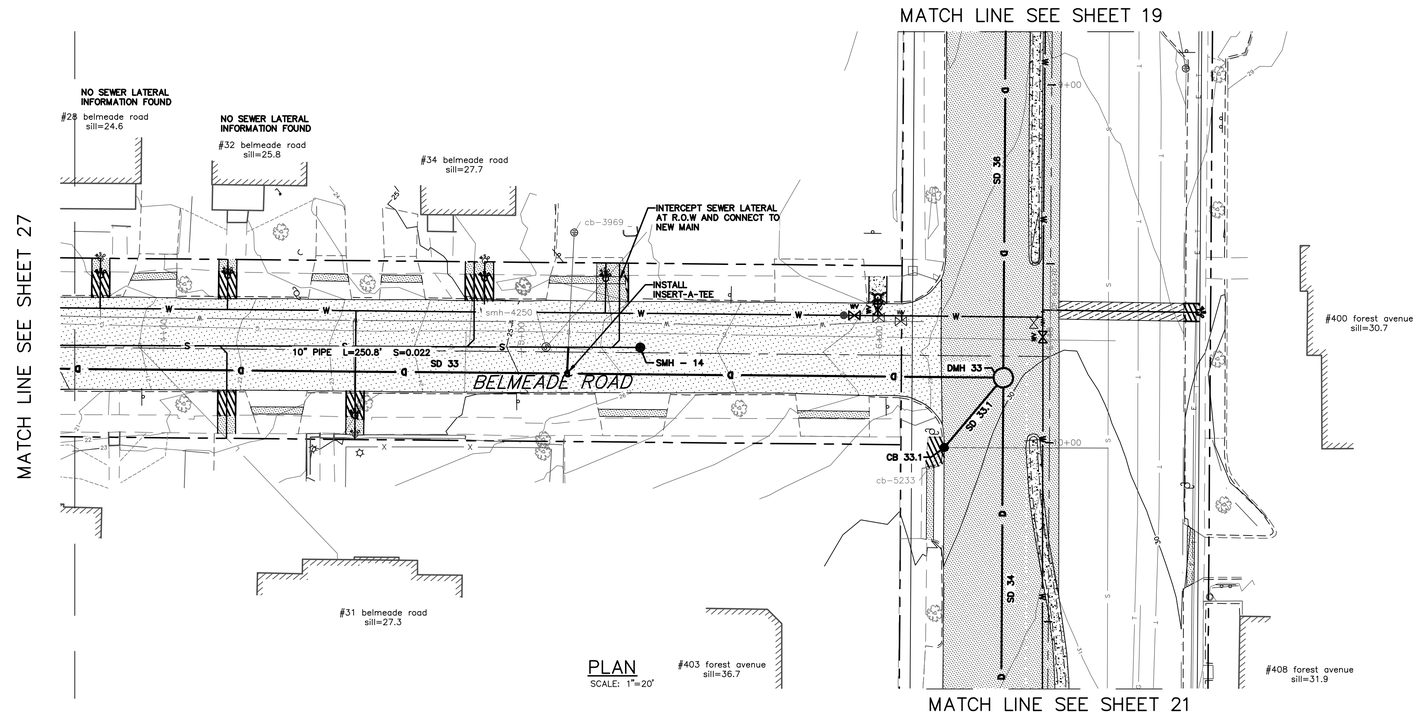
CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
28 OF 46

PLAN NUMBER

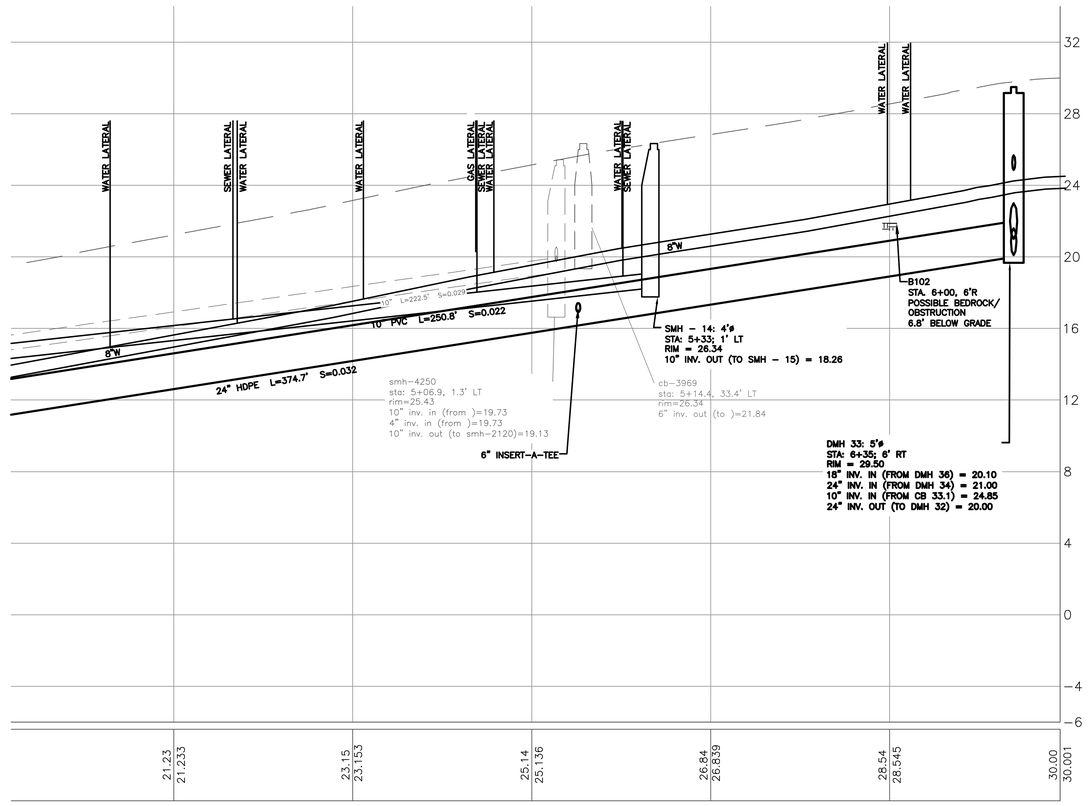




PLAN
SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.
3. FIELD LOCATE EXISTING SEWER LATERALS AND RENEW FROM MAIN TO R.O.W (TYPICAL IN AREAS WITH NEW SEWER INSTALLATION)



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 33.1	10"	25.56'	0.98%	HDPE
SD 36	18"	115.90'	0.52%	HDPE
SD 34	24"	168.10'	0.89%	HDPE
SD 33	24"	379.71'	3.15%	HDPE

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP BELMEADE ROAD.dwg, TAB:BELMEADE ROAD PP2

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
1 & 1 SHEETS: 111-9, 111-11

DESIGN BY:	RLM
DRAWN BY:	AAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MCSORLEY No. 2559 PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

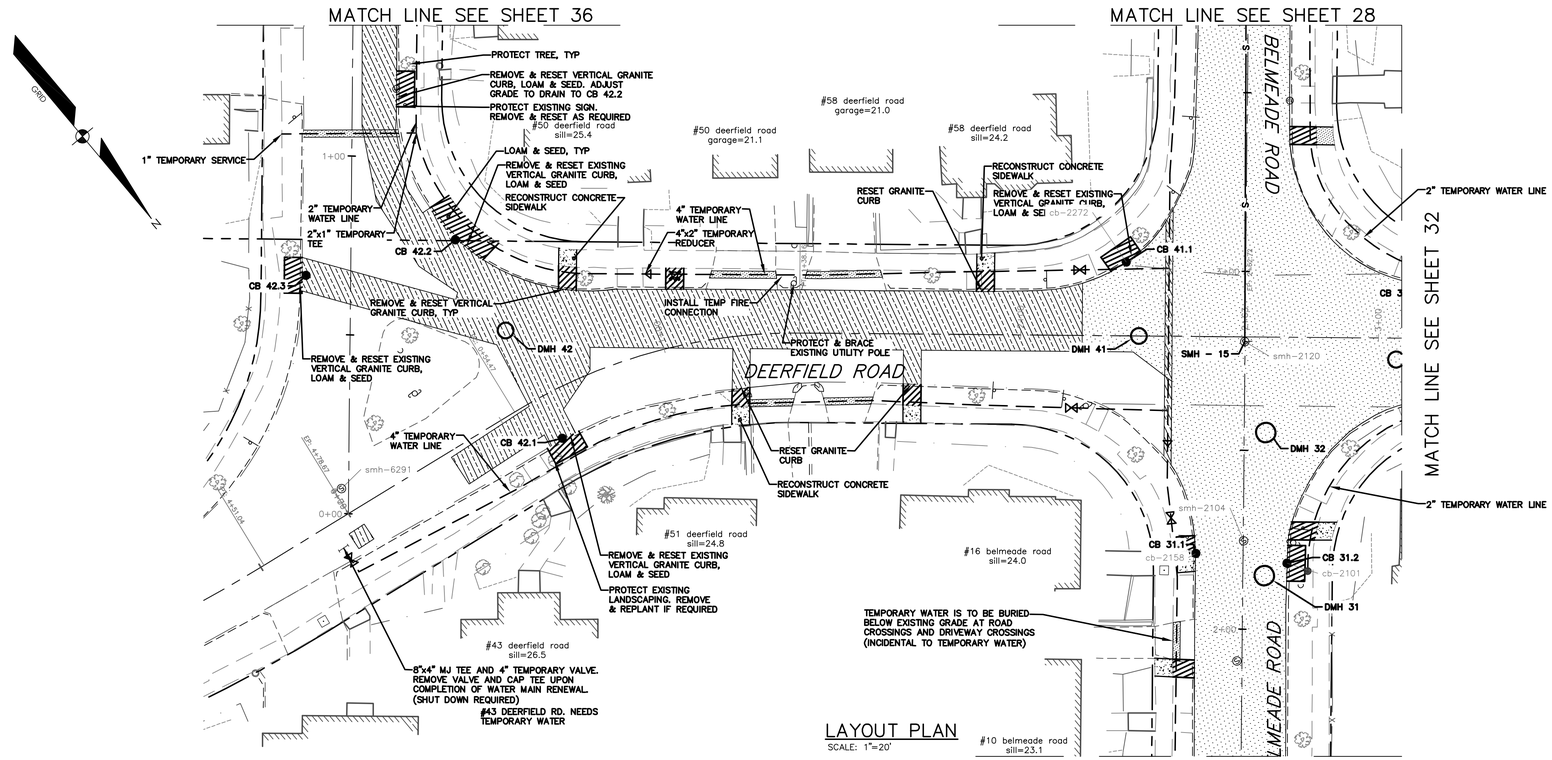
PLAN & PROFILE - BELMEADE ROAD
STA. 3+75 TO STA 6+47.69

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

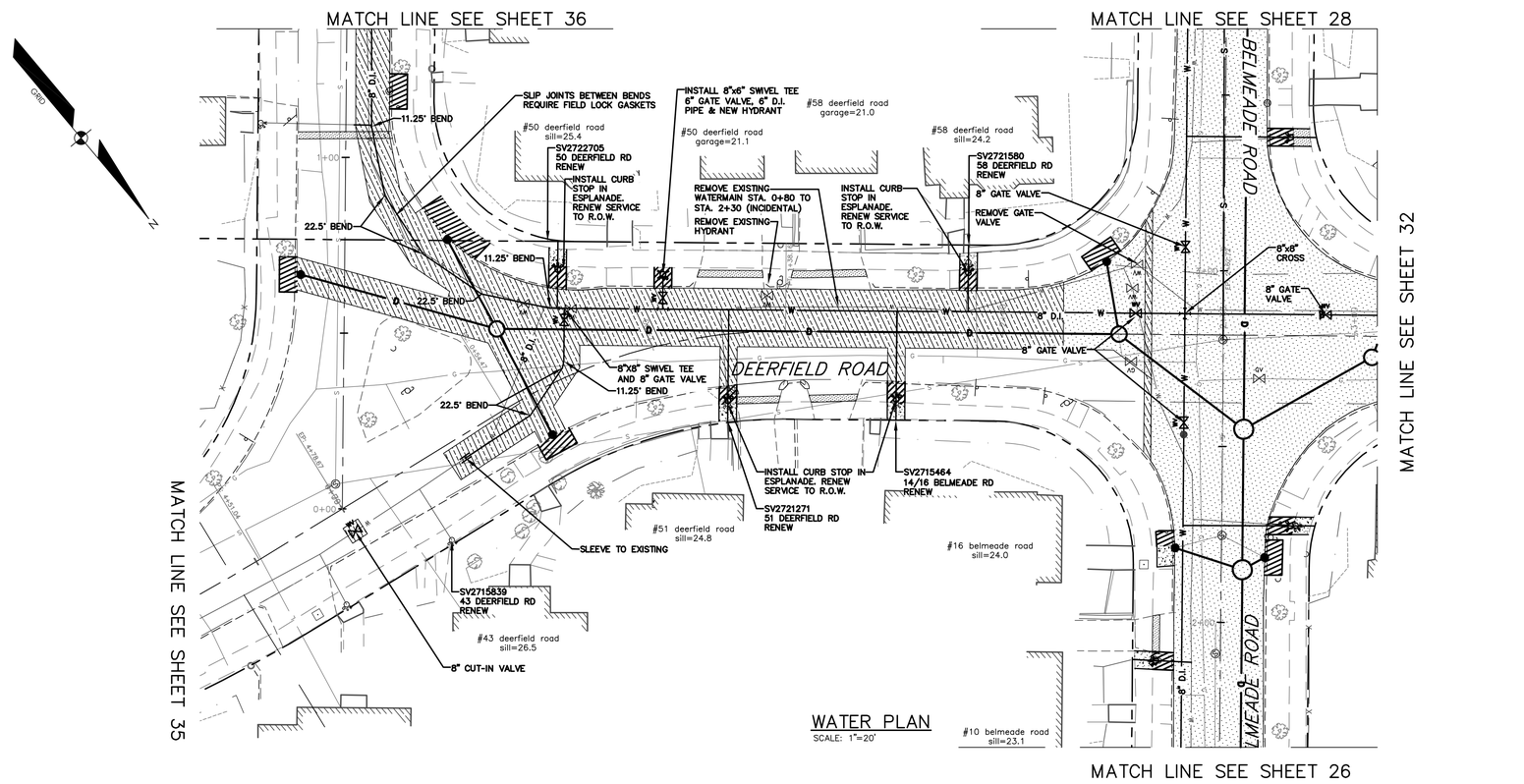
RESURGAM CITY OF PORTLAND, MAINE

SHEET #
29 OF 46

PLAN NUMBER



LAYOUT PLAN
SCALE: 1"=20'



WATER PLAN
SCALE: 1"=20'

BOX CUT	
TRENCH	
OVERLAY	
RIPRAP	
NEW CONCRETE SIDEWALK	
COBBLE STONE GUTTER	
BIT. SIDEWALK REPAIR	
LOAM & SEED	

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD CENTER L01

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16. 2018

STATE OF MAINE ROBERT A. MCSORLEY No. 4556 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

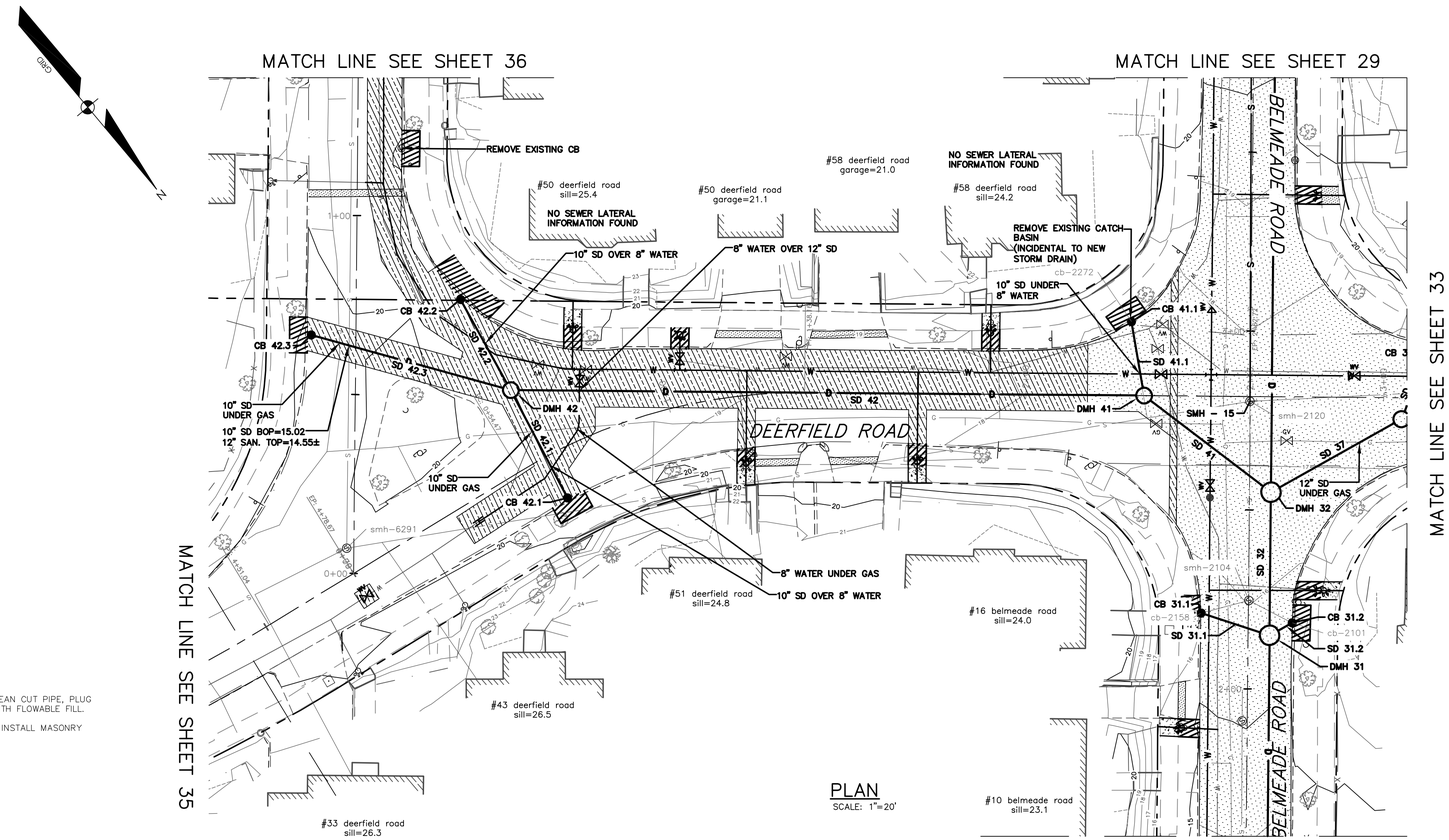
DEERFIELD ROAD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
30 OF 46

PLAN NUMBER

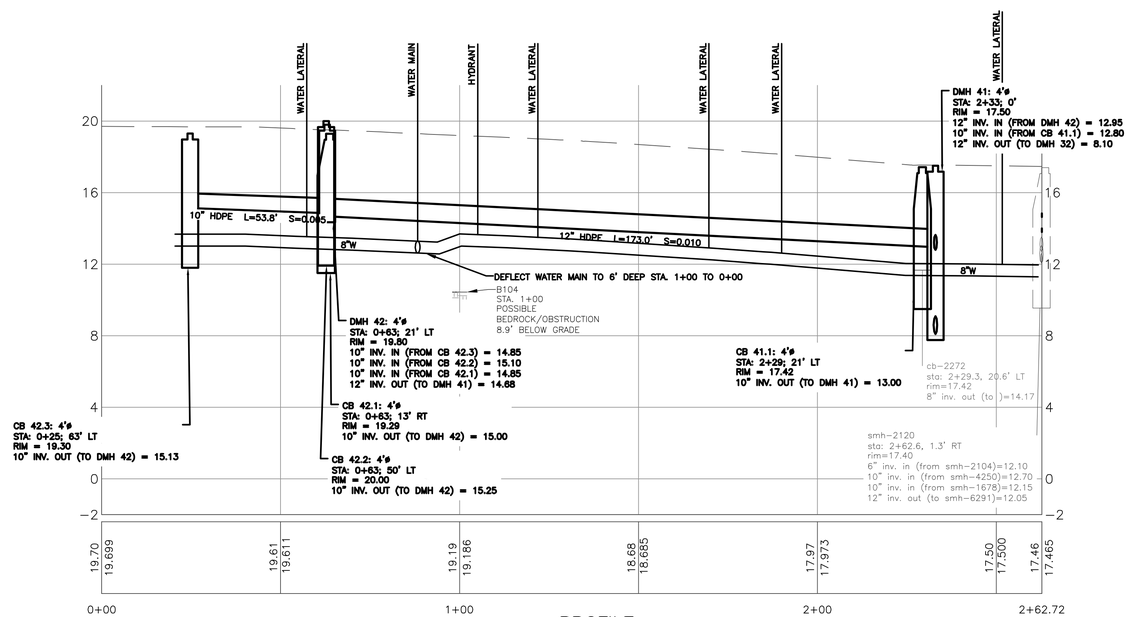


PLAN

SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 41	12"	44.60'	0.49%	HDPE
SD 41.1	10"	20.92'	0.96%	HDPE
SD 42	12"	176.99'	0.98%	HDPE
SD 42.1	10"	34.02'	0.44%	HDPE
SD 42.2	10"	28.98'	0.52%	HDPE
SD 42.3	10"	57.82'	0.48%	HDPE

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD CENTER PP1

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: I#-9, I#-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16. 2018

STATE OF MAINE ROBERT A. McSPIRLEY No. 8589 LICENSED PROFESSIONAL ENGINEER

02. 16. 2018

BEDFORD STREET SEWER SEPERATION PROJECT

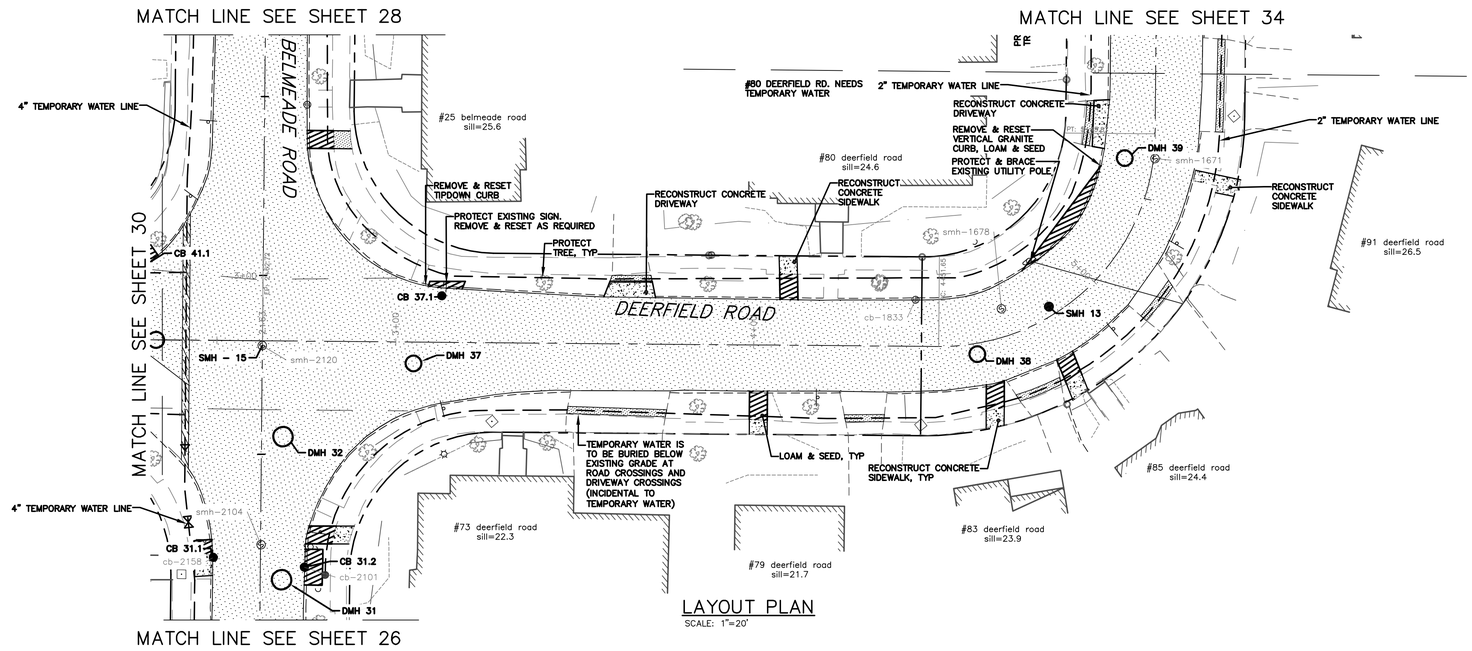
PLAN & PROFILE - DEERFIELD ROAD
STA 0+00 TO STA. 2+62.72

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
31 OF 46

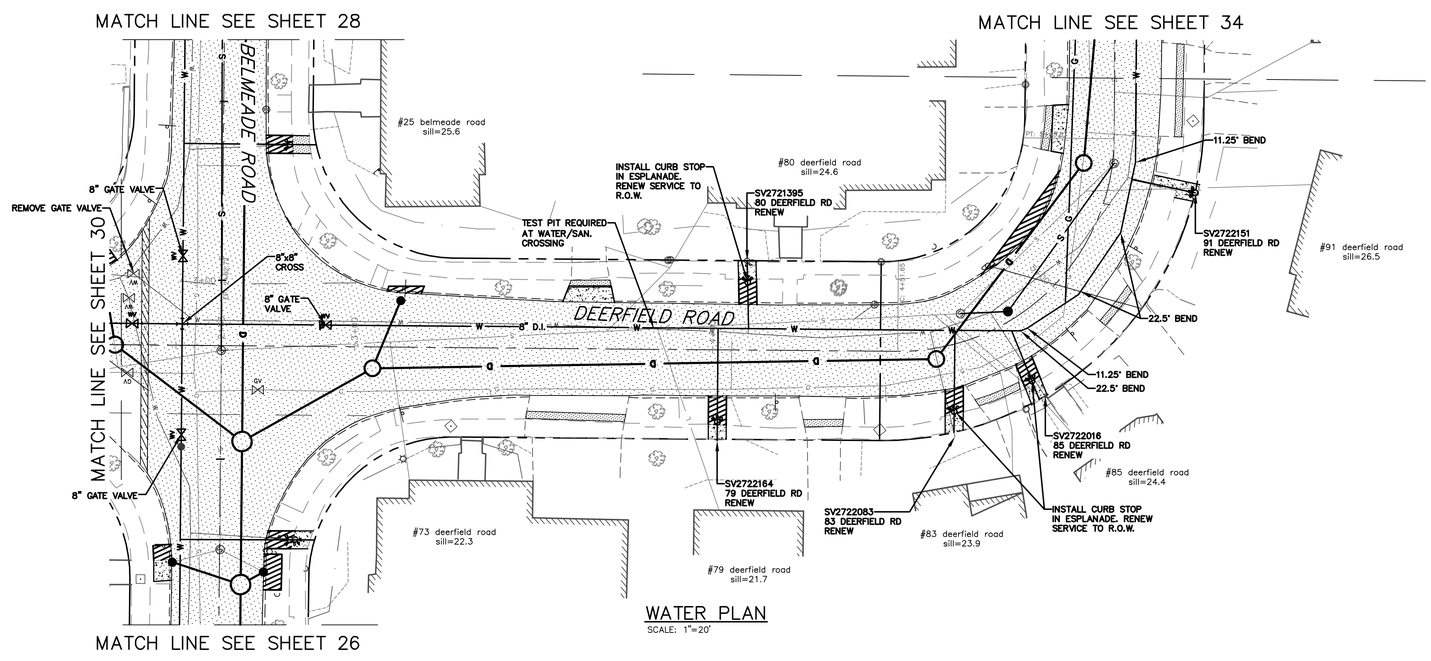
PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'

BOX CUT	
TRENCH	
OVERLAY	
RIPRAP	
NEW CONCRETE SIDEWALK	
COBBLE STONE GUTTER	
BIT. SIDEWALK REPAIR	
LOAM & SEED	



WATER PLAN

SCALE: 1"=20'

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD WEST L01

CITY PROPERTY PLAN BOOK SHEETS:
1 & 1 SHEETS: III-9, III-11

REFERENCES:

DESIGN BY:	RLM
DRAWN BY:	AJP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MCSORLEY No. 5558 PROFESSIONAL ENGINEER 02.16.2018

BEDFORD STREET
SEWER SEPERATION PROJECT

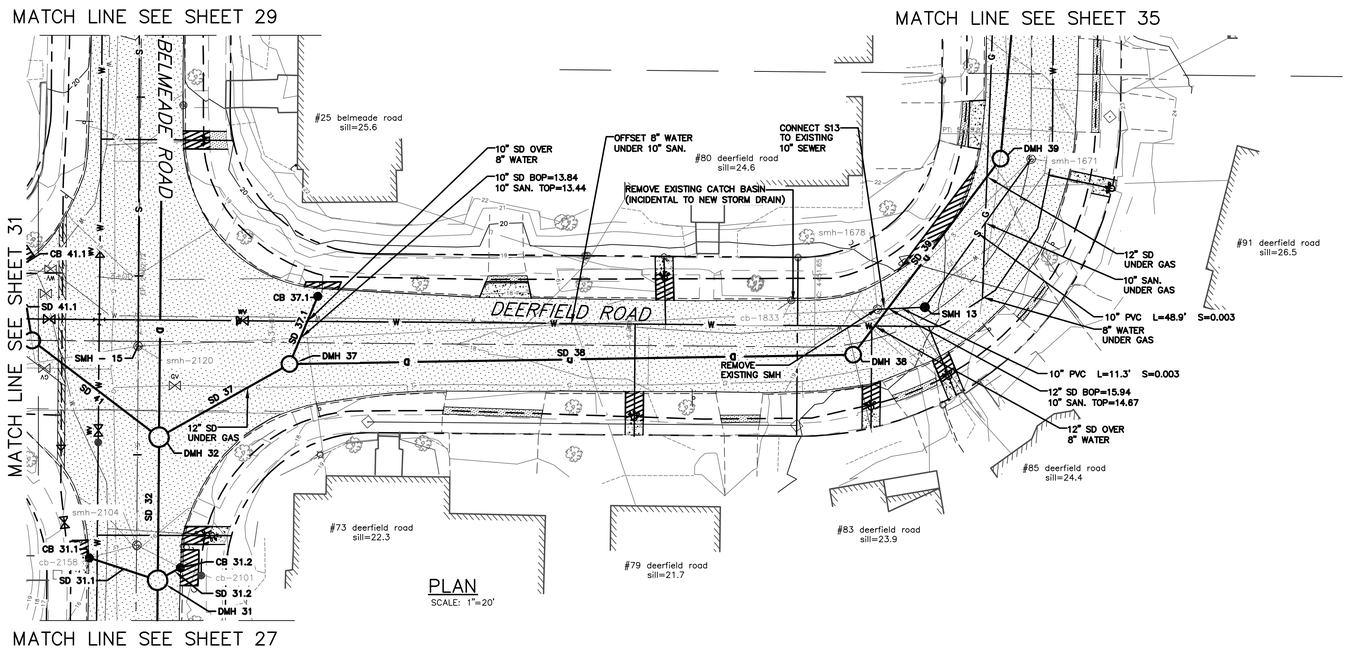
DEERFIELD ROAD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CIVITAS RESURGAM IN PORTLAND, MAINE

SHEET #
32 OF 46

PLAN NUMBER



PLAN

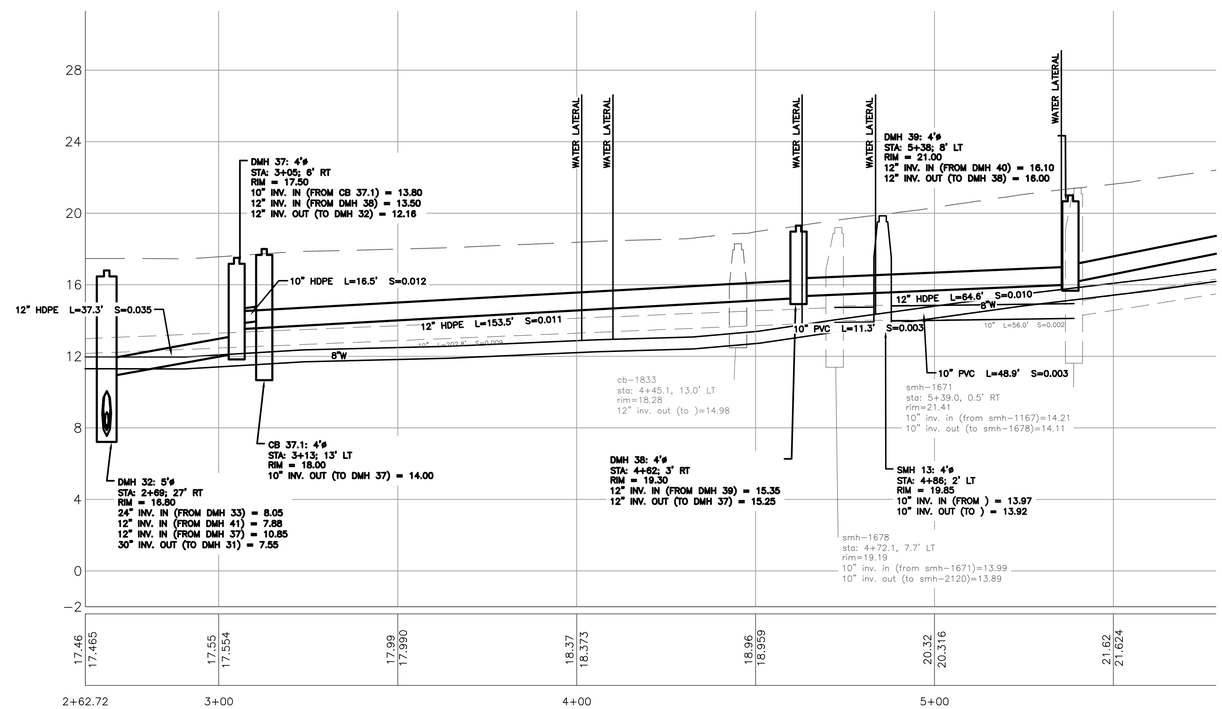
SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table

NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 32	30"	40.00'	2.00%	HDPE
SD 37	12"	41.81'	3.13%	HDPE
SD 37.1	10"	20.51'	0.98%	HDPE
SD 38	12"	157.51'	1.11%	HDPE
SD 39	12"	68.61'	0.95%	HDPE
SD 41	12"	44.60'	0.49%	HDPE



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD WEST PP1

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. McSPERLEY No. 5456 LICENSED PROFESSIONAL ENGINEER

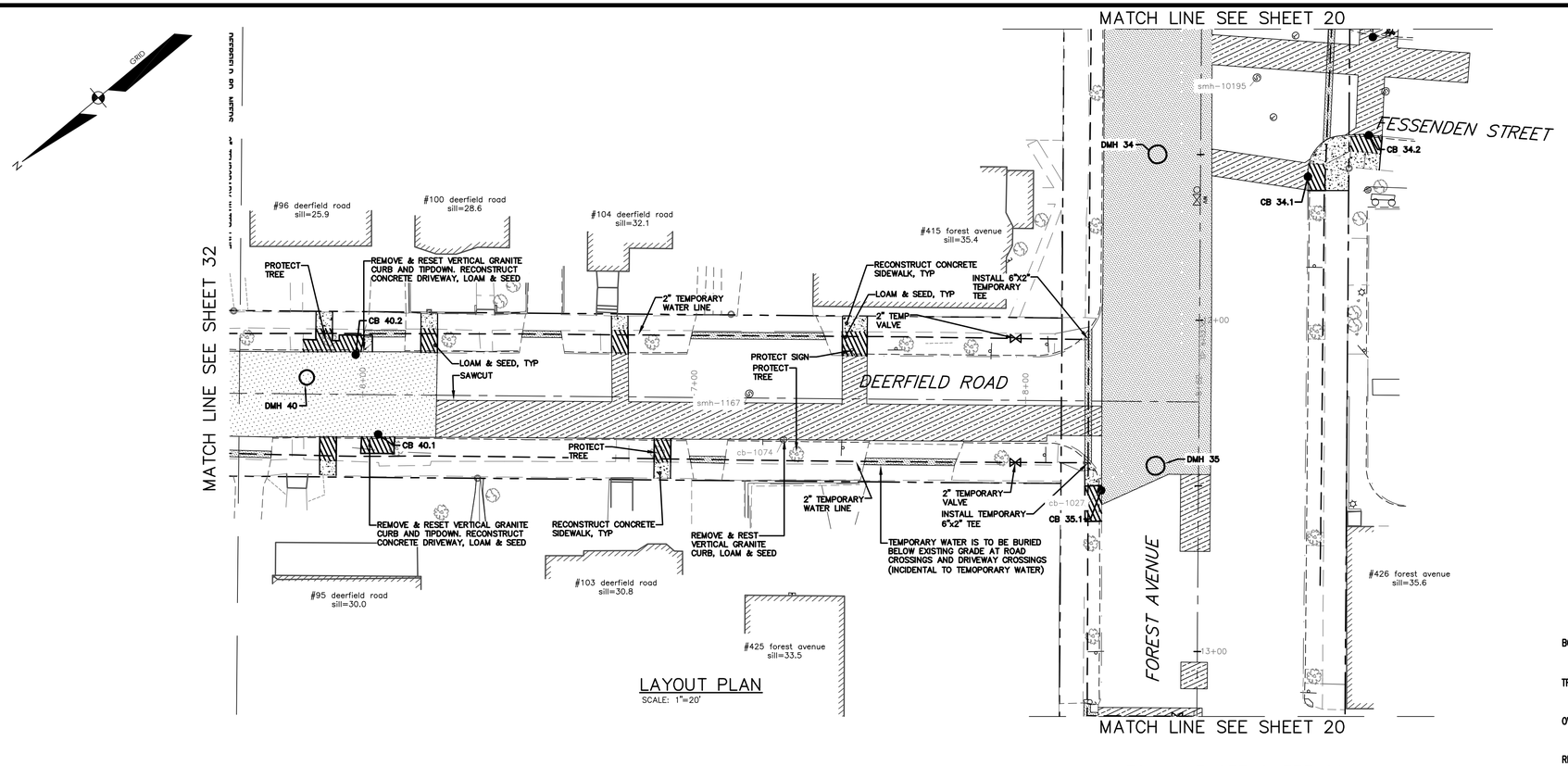
BEDFORD STREET
SEWER SEPERATION PROJECT

PLAN & PROFILE - DEERFIELD ROAD
STA. 2+62 TO STA. 5+75

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

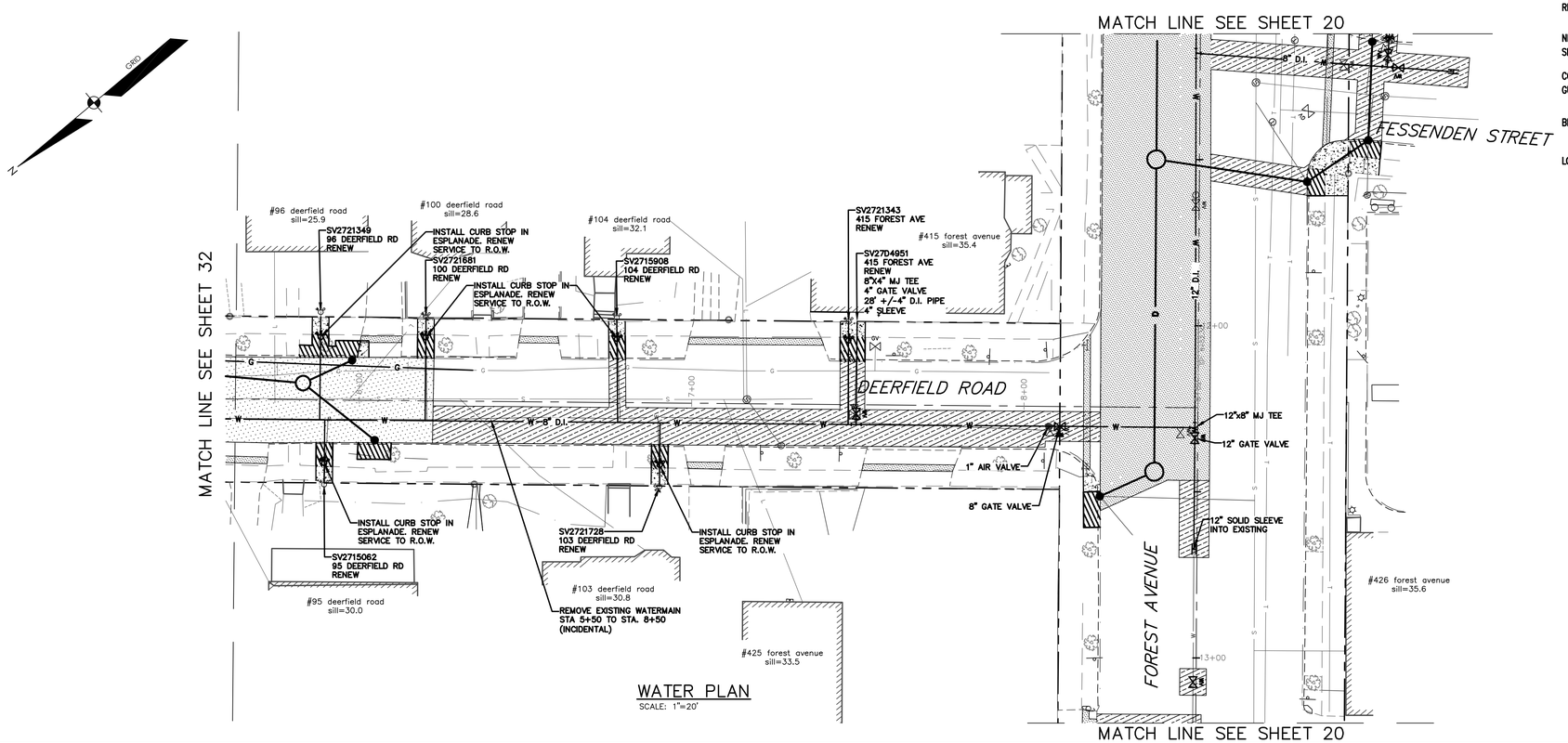
SHEET #
33 OF 46

PLAN NUMBER



LAYOUT PLAN

SCALE: 1"=20'



WATER PLAN

SCALE: 1"=20'

BOX CUT

TRENCH

OVERLAY

RIPRAP

NEW CONCRETE SIDEWALK

COBBLE STONE GUTTER

BIT. SIDEWALK REPAIR

LOAM & SEED

FEBRUARY 2018

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD WEST L02

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16.2018

STATE OF MAINE ROBERT A. MCSPERLEY No. 8568 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

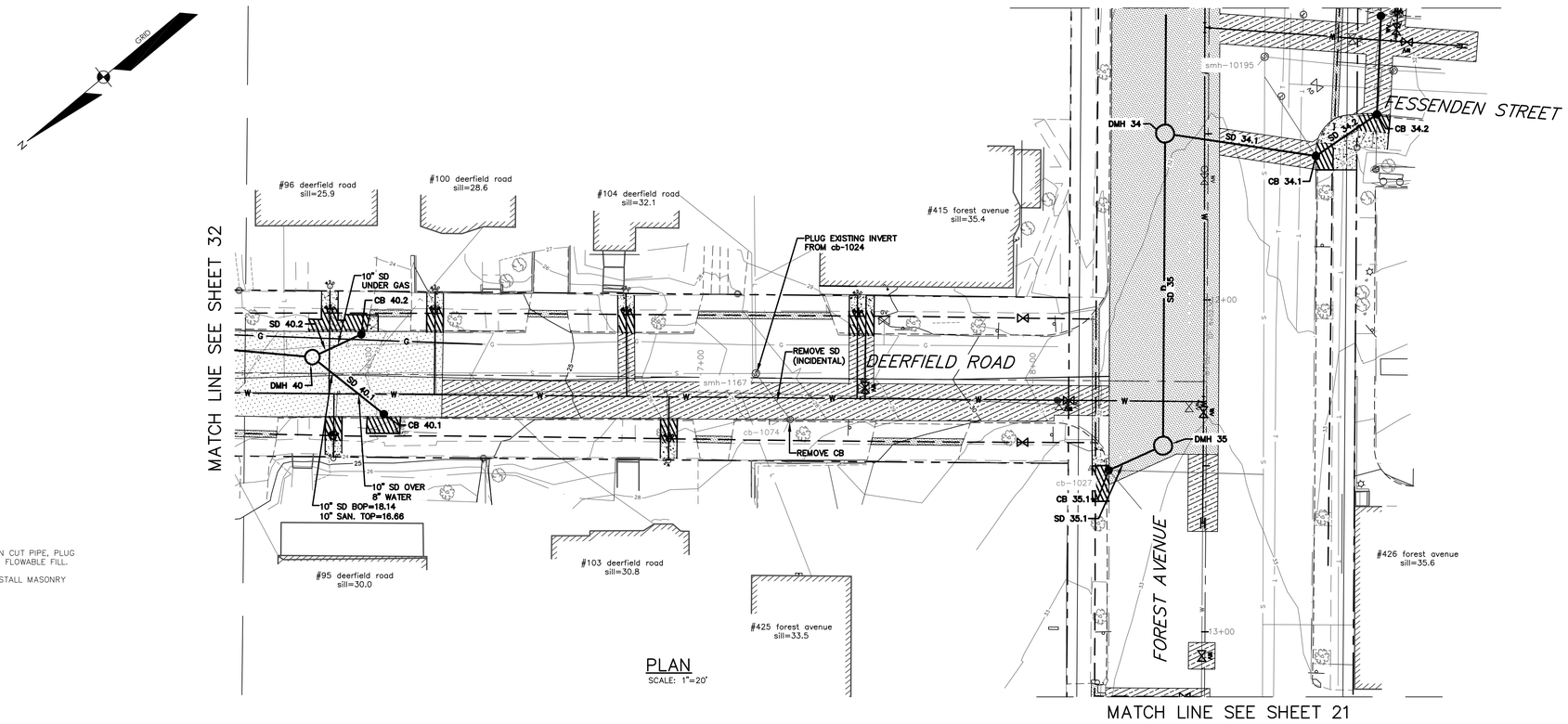
DEERFIELD ROAD LAYOUT & WATER PLAN

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
34 OF 46

PLAN NUMBER

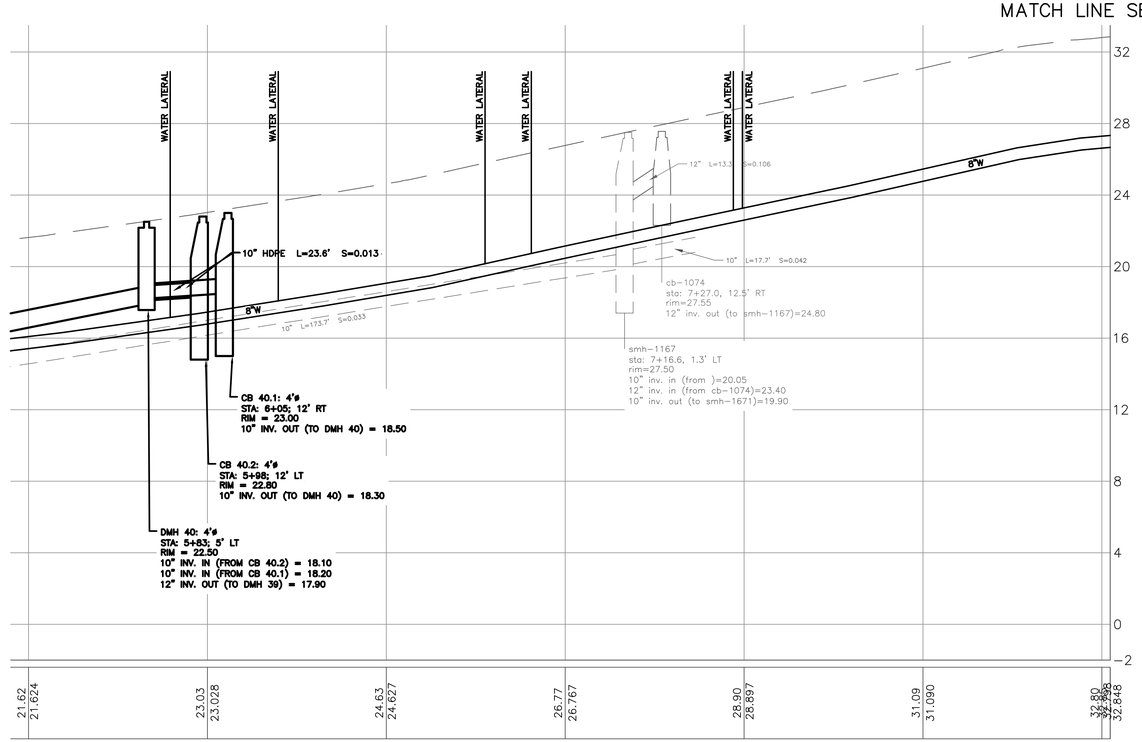


PLAN
SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 40	12"	44.10'	4.08%	HDPE
SD 40.1	10"	27.58'	1.09%	HDPE
SD 40.2	10"	16.30'	1.23%	HDPE



PROFILE
SCALE: HORZ. 1"=20'
VERT 1"=4'

NOTE: THAT CONTRACTOR MAY ENCOUNTER REMNANT PORTLAND RAIL COMPANY RAILROAD TRACKS TO THE EAST OF THE CENTER LINE OF FOREST AVENUE.

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP DEERFIELD ROAD.dwg, TAB:DEERFIELD WEST PP2

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE
ROBERT A. McSORLEY
No. 4558
LICENSED
PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

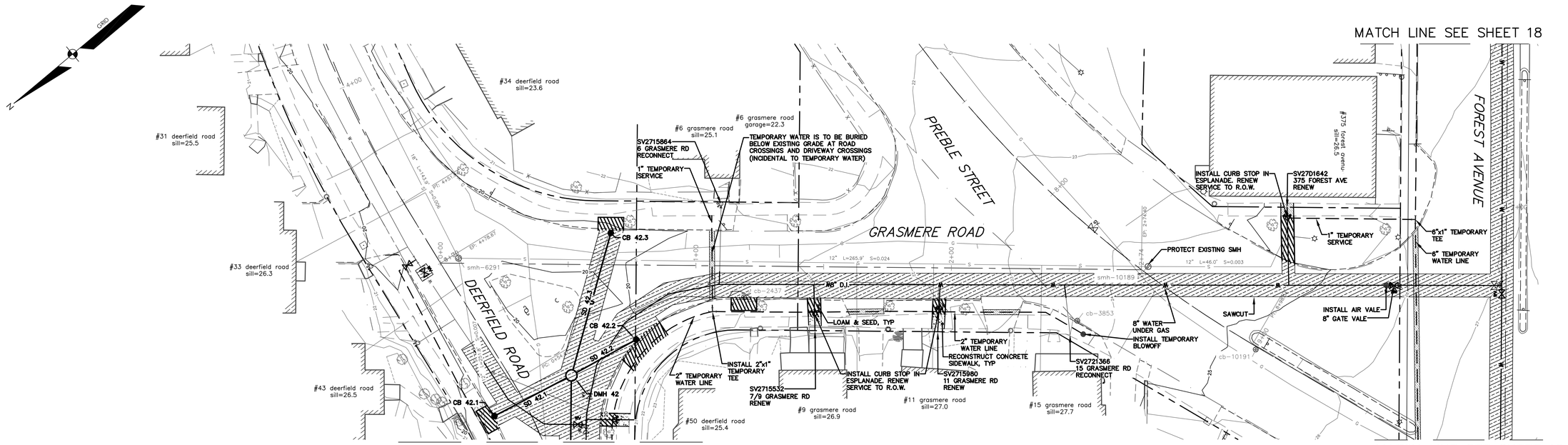
PLAN & PROFILE - DEERFIELD ROAD STA. 5+75 TO STA. 8+52.30

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
RESURGAM

SHEET #
35 OF 46

PLAN NUMBER



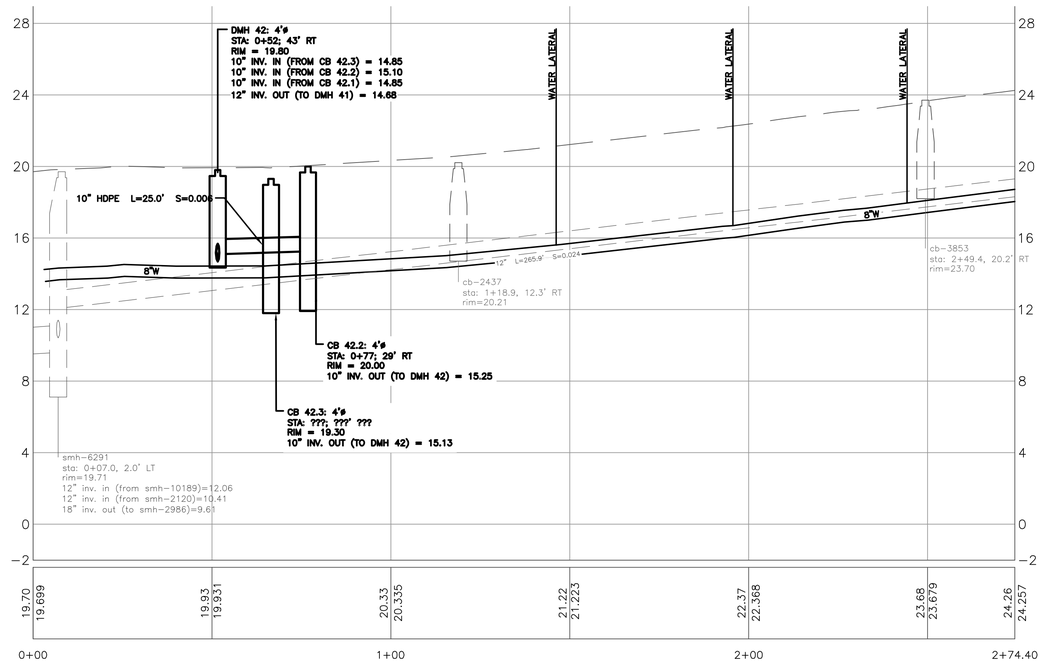
PLAN

SCALE: 1"=20'

NOTES:

1. ABANDON PIPE SHALL MEAN CUT PIPE, PLUG BOTH ENDS, AND FILL WITH FLOWABLE FILL.
2. PLUG PIPE SHALL MEAN INSTALL MASONRY PLUG OR PVC CAP.

Pipe Table				
NAME	SIZE	LENGTH	SLOPE	MATERIAL
SD 42.1	10"	34.02'	0.44%	HDPE
SD 42.3	10"	57.82'	0.48%	HDPE
SD 42.2	10"	28.98'	0.52%	HDPE



PROFILE

SCALE: HORZ. 1"=20'
VERT 1"=4'

FEBRUARY 2018

Civil 3D 2013 Drawing Name:
17112 PP GRASMERE ROAD.dwg, TAB:GRASMERE ROAD PP1

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: 1#9, 1#11

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16.2018

STATE OF MAINE
ROBERT M. SPOFFORD
No. 8569
LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

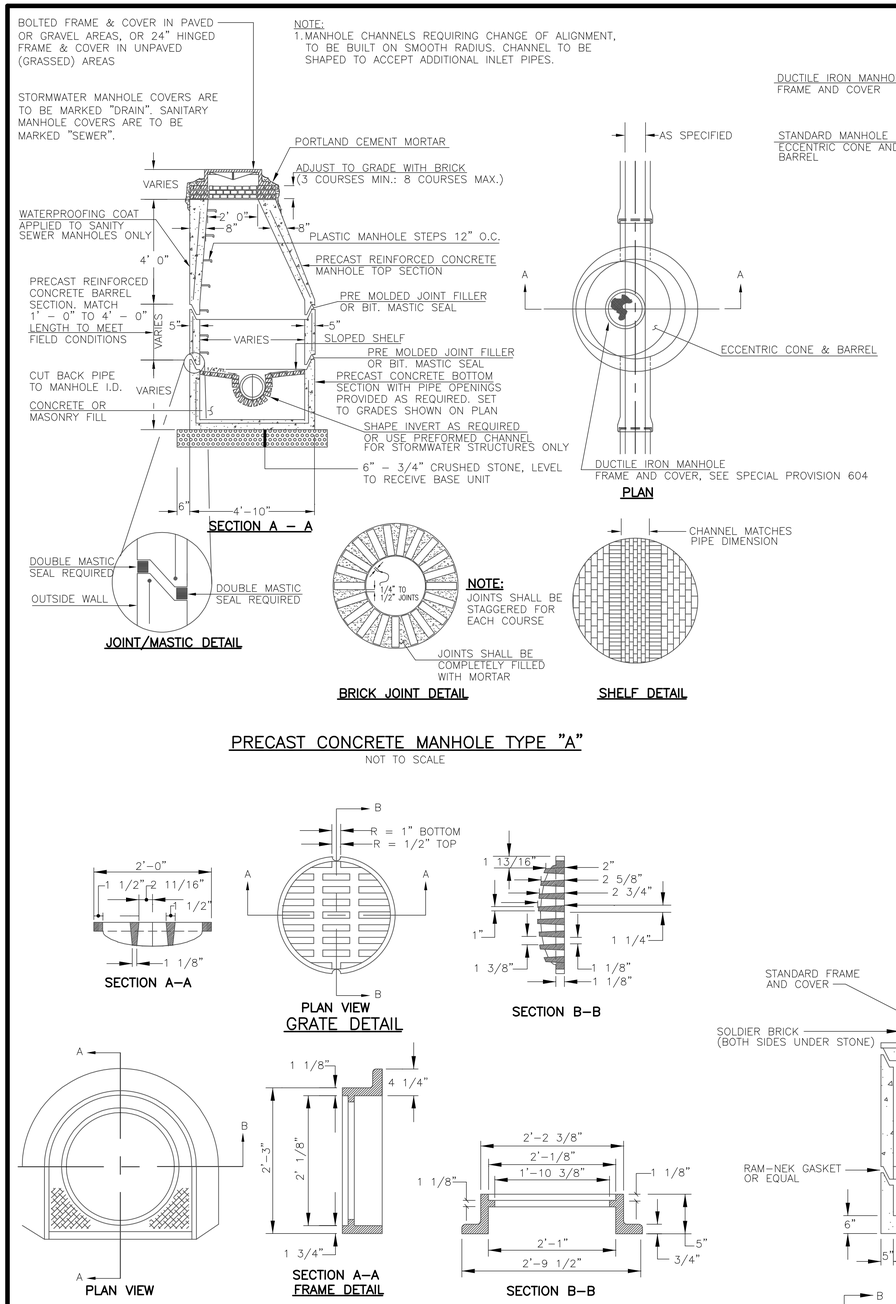
PLAN & PROFILE - GRASMERE ROAD
STA. 0+00 TO STA. 2+75

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE
RESURGAM

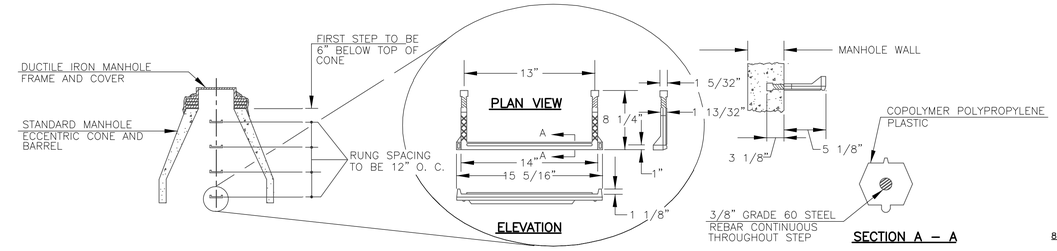
SHEET #
36 OF 46

PLAN NUMBER



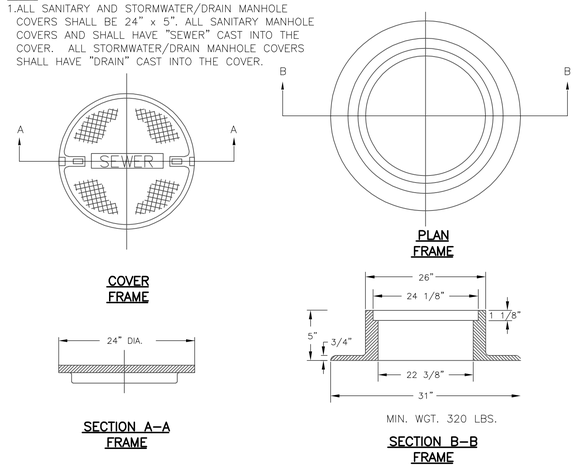
PRECAST CONCRETE MANHOLE TYPE "A"

NOT TO SCALE



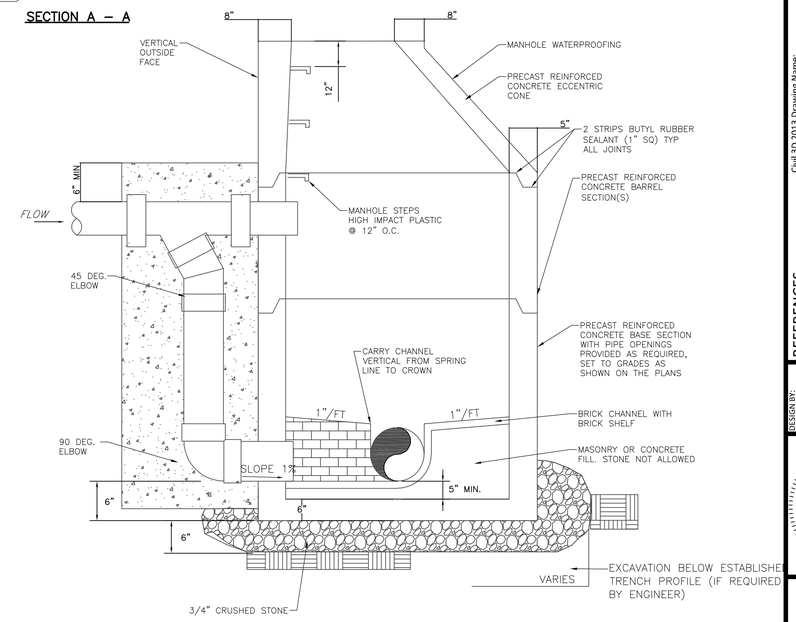
PLASTIC MANHOLE STEPS

NOT TO SCALE



CAST IRON MANHOLE FRAME AND COVER

NOT TO SCALE



NOTES:

1. MANHOLE CHANNELS REQUIRING CHANGE IN ALIGNMENT ARE TO BE BUILT ON A SMOOTH RADIUS. IF SIDE PIPES ENTER CHANNEL, SHAPE TO RECEIVE ADDED SIDE FLOW.

2. USE FLAT SLAB TOP MANHOLE WHEN THE DIFFERENCE BETWEEN INVERT AND RIM IS LESS THAN 6'-0" AND WHEN MANHOLE DIAMETER IS GREATER THAN 4'-0".

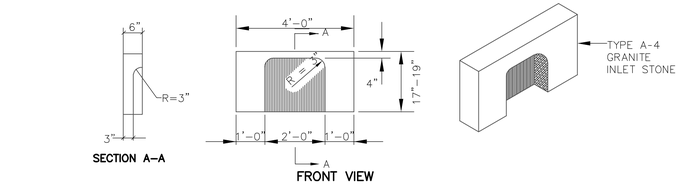
3. ALL BACKFILL WITHIN 3 FEET OF STRUCTURE SHALL BE SELECT FILL PLACED IN 8" MAXIMUM LIFTS.

OUTSIDE DROP SANITARY MANHOLE DETAIL

N.T.S.

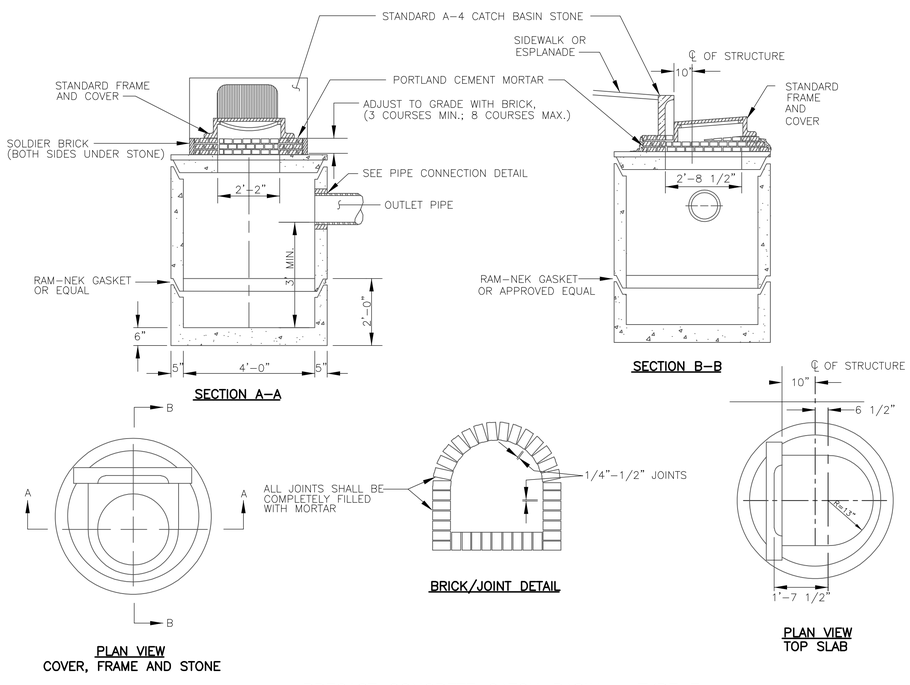
CATCH BASIN TYPE "D" - FRAME & COVER DETAIL

NOT TO SCALE



TYPE A-4 GRANITE CATCH BASIN INLET STONE DETAIL

NOT TO SCALE



PRECAST CONCRETE CATCH BASIN - TYPE E

NOT TO SCALE

GENERAL NOTES FOR MANHOLES & CATCH BASINS

1. ALL CONCRETE SHALL BE CLASS "A" AND HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4000 lbs. PER SQ. INCH AT THE END OF 28 DAYS, UNLESS OTHERWISE NOTED.
2. PRECAST REINFORCED CONE BARREL MANUFACTURED PER ASTM SPEC. C-478-67
3. SEWER BRICK SHALL CONFORM TO ASTM SPEC. DESIGNATE ON C-32-63, GRADE MA AND SA.
4. SANITARY SEWER MANHOLES SHALL HAVE A BITUMINOUS WATERPROOFING APPLIED TO THE EXTERIOR SURFACE. IF CONSTRUCTED OF BRICK MASONRY, SURFACE SHALL BE PLASTERED WITH A SMOOTH MORTAR FINISH 3/8" THICK. AFTER THE MORTAR HAS SET, THE SURFACE SHALL BE WATERPROOFED AS REQUIRED BY SUPPLEMENTAL SPECIFICATIONS SECTION 604.
5. MANHOLES MAY BE CONSTRUCTED OF MASONRY, PRECAST REINFORCED CONCRETE, OR CAST IN PLACE.
6. ALL PRECAST MANHOLES AND CATCH BASINS SHALL BE IDENTIFIED BY STATION AND OFFSET, PAINTED ON THE SIDE OF THE STRUCTURE BY THE MANUFACTURER.
7. EXISTING FRAMES, AND COVERS SHALL BE SALVAGED BY THE CONTRACTOR, AND SHALL REMAIN THE PROPERTY OF THE CITY OF PORTLAND. CONTRACTOR SHALL DELIVER TO CITY STOCKYARD AT NO COST.
8. EXISTING GRANITE COBBLE STONE AND PAVERS SHALL BE STOCKPILE BY THE CONTRACTOR, AND REUSED FOR CONSTRUCTION OF NEW COBBLE STONE GUTTER. GRANITE NOT USED SHALL REMAIN THE PROPERTY OF THE CITY OF PORTLAND.
9. ALL CATCH BASINS SHALL BE INSTALLED WITH A PLASTIC PIPE FABRICATION HOOD OR EQUIVALENT.

REFERENCES:

Civil 3D 2013 Drawing Name: 17112 D.dwg, TAB:D1

CITY PROPERTY PLAN BOOK SHEETS: I & I SHEETS: III-9, III-11

DESIGN BY:	ELM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MCSORLEY No. 3858 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

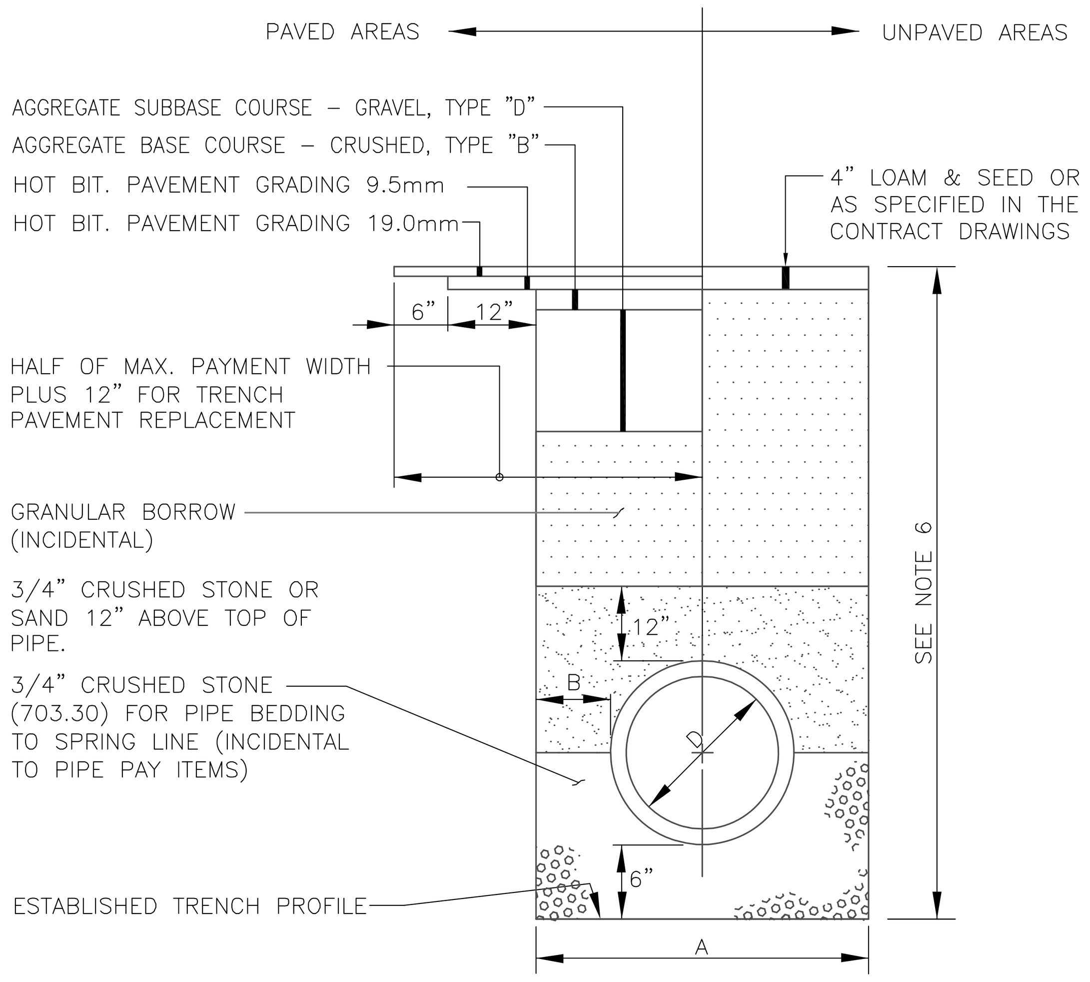
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

CITY OF PORTLAND, MAINE RESURGAM

SHEET # 37 OF 46

PLAN NUMBER



TYPICAL PIPE INSTALLATION DETAIL

NOT TO SCALE

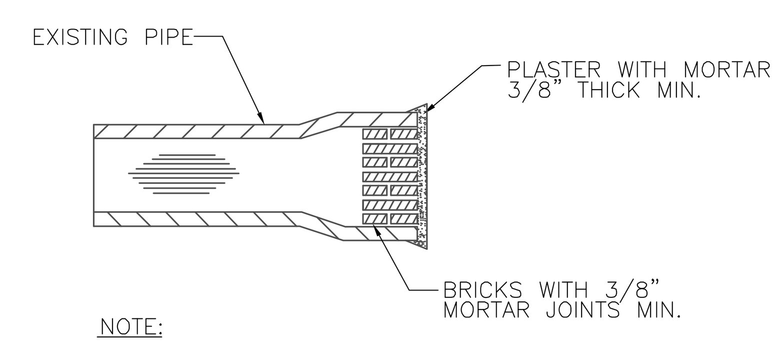
NOTE

WHERE COBBLE STONES AND CONCRETE BASE IS ENCOUNTERED IN THE TRENCHES OUTSIDE OF THE RE-BUILD SECTION OF FOREST AVENUE, CONTRACTOR SHALL INSTALL 12" OF CONCRETE BELOW THE PAVEMENT COURSES ON THE TRENCH

NOTES

1. ALTERNATIVE CONSTRUCTION METHODS OR PAYMENT METHODS SHALL BE APPROVED IN ADVANCE BY THE CITY.
2. IN PAVED AREAS REFER TO BITUMINOUS PAVEMENT SECTION FOR DEPTHS OF GRAVEL AND HOT MIX ASPHALT PAVEMENT BASED ON THE CORRESPONDING STREET CLASSIFICATION.
3. DIMENSION "B" SHALL BE SUFFICIENT TO ALLOW CRUSHED STONE BEDDING TO BE PLACED AND COMPACTED UNDER THE HAUNCHES OF THE PIPE; BUT IN ALL CASES "B" SHALL BE AT LEAST 9".
4. DIMENSION "A" IS THE MAXIMUM WIDTH ALLOWED FOR CALCULATING PAY QUANTITIES UNDER GRANULAR BORROW, CRUSHED STONE, STRUCTURAL EARTH EXCAVATION, AND STRUCTURAL ROCK EXCAVATION. DIMENSION "A" SHALL BE BASED ON PIPE DIAMETER "D", AS SET FORTH IN THE FOLLOWING TABLE.
5. EXCAVATION BELOW ESTABLISHED TRENCH PROFILE (IF ORDERED). PAY ITEM 206.061.
6. EXCAVATION INCIDENTAL TO PIPE PAY ITEMS (PAVED AND SEEDED AREAS)
7. DEPTH OF BITUMINOUS PAVEMENT AND AGGREGATE COURSES SHALL BE DETERMINED BY STREET CLASSIFICATION.
8. ANY ALTERNATE TRENCHING OR PAYMENT METHODS SHALL BE APPROVED IN ADVANCE BY THE CITY OF PORTLAND, DEPARTMENT OF PUBLIC SERVICES.
9. INSTALL TRENCH INSULATION WHERE SPECIFIED ON DRAWINGS OR WHERE LESS THAN 4' OF COVER IS PROVIDED.

PIPE DIAMETER, "D" (INCHES)	MAX. TRENCH WIDTH, "A" (FEET)
4	4.0
6	4.0
8	4.0
10	4.0
12	4.0
15	4.0
18	5.0
21	5.0
24	5.5
27	6.0
30	6.0
36	7.0
42	8.0
48	8.0

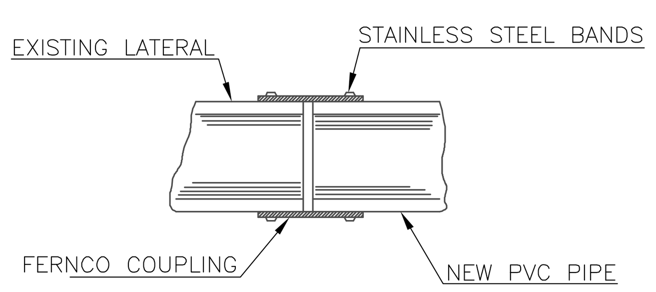


NOTE:

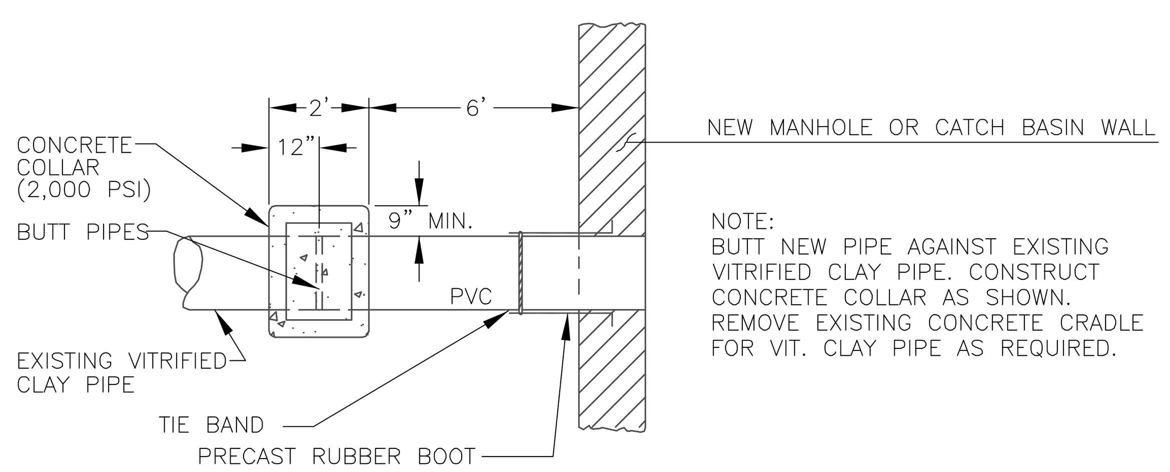
1. USE CAP OR PLUG FOR PVC PIPE

MASONRY PLUG DETAIL

NOT TO SCALE



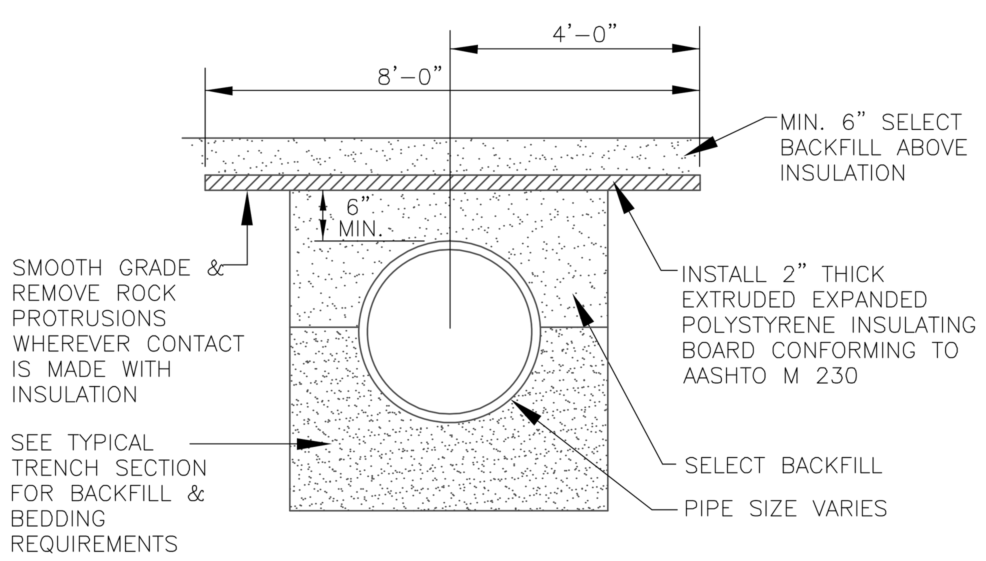
FERNCO COUPLING FOR REPAIR OR REPLACEMENT



NOTE:
BUTT NEW PIPE AGAINST EXISTING VITRIFIED CLAY PIPE. CONSTRUCT CONCRETE COLLAR AS SHOWN. REMOVE EXISTING CONCRETE CRADLE FOR VIT. CLAY PIPE AS REQUIRED.

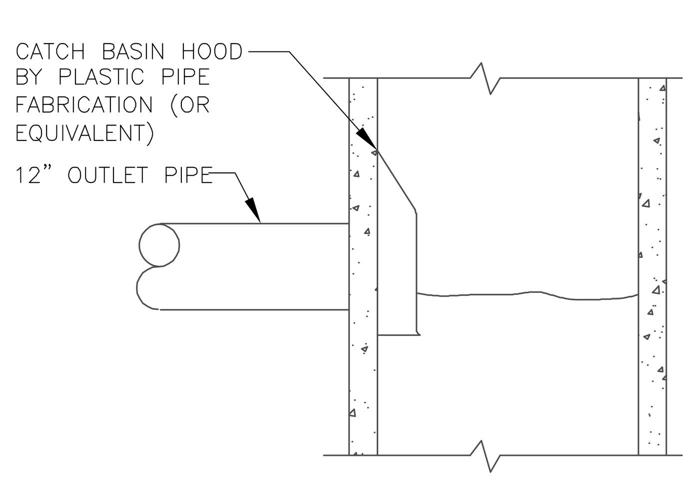
EXISTING VITRIFIED CLAY PIPE INTO NEW STRUCTURE

NOT TO SCALE



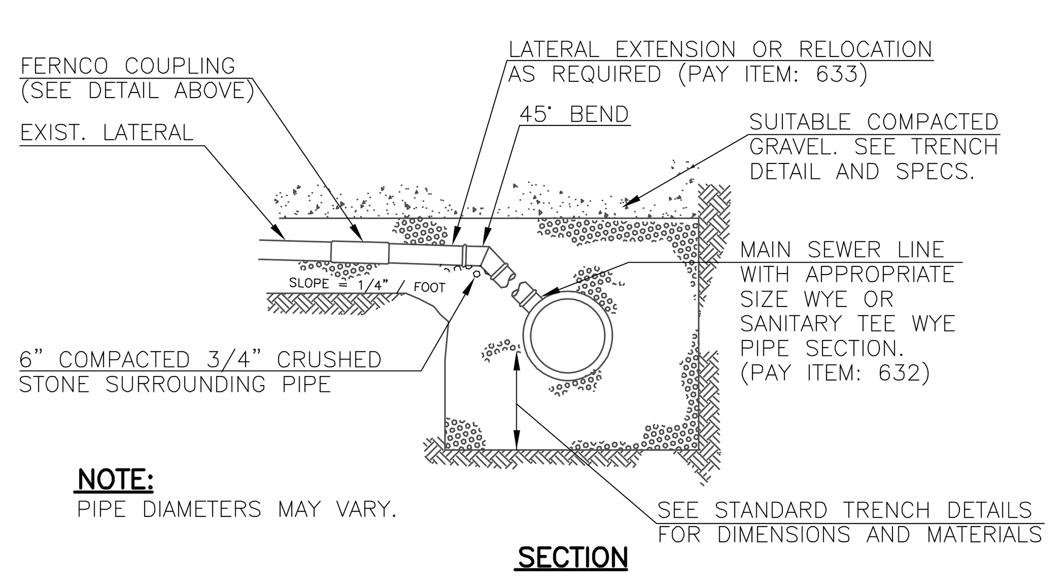
PIPE INSULATION DETAIL

NOT TO SCALE



PPF CATCH BASIN HOOD

NOT TO SCALE



NOTE:
PIPE DIAMETERS MAY VARY.

SECTION

NOTE:

1. LOCATIONS AND ELEVATIONS OF STUBS SHOWN ON THE PLANS ARE TO BE CONSIDERED AS APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED TO SUIT FIELD CONDITIONS.
2. HOUSE CONNECTIONS AND CATCH BASINS CONNECTIONS TO THE MAIN LINE OF THE SEWER, SHALL CONSIST OF AN APPROPRIATE "Y" BRANCH CONNECTION AS SHOWN ON THE PLANS, OR AS DIRECTED. ACTUAL "Y" LOCATIONS FOR HOUSE CONNECTIONS AND CATCH BASIN CONNECTIONS SHALL BE DETERMINED DURING CONSTRUCTION. THE CONTRACTOR SHALL KEEP A COMPLETE RECORD OF "Y" LOCATIONS WHICH SHALL BE GIVEN TO THE CITY OF PORTLAND UPON COMPLETION OF THE CONTRACT.
3. LOCATION / WARNING TAPE SHALL BE INSTALLED OVER CENTERLINE OF PIPE AT A MAXIMUM OF 24 INCHES BELOW FINISH GRADE.

TYPICAL EXISTING SEWER LATERAL CONNECTION DETAILS

NOT TO SCALE

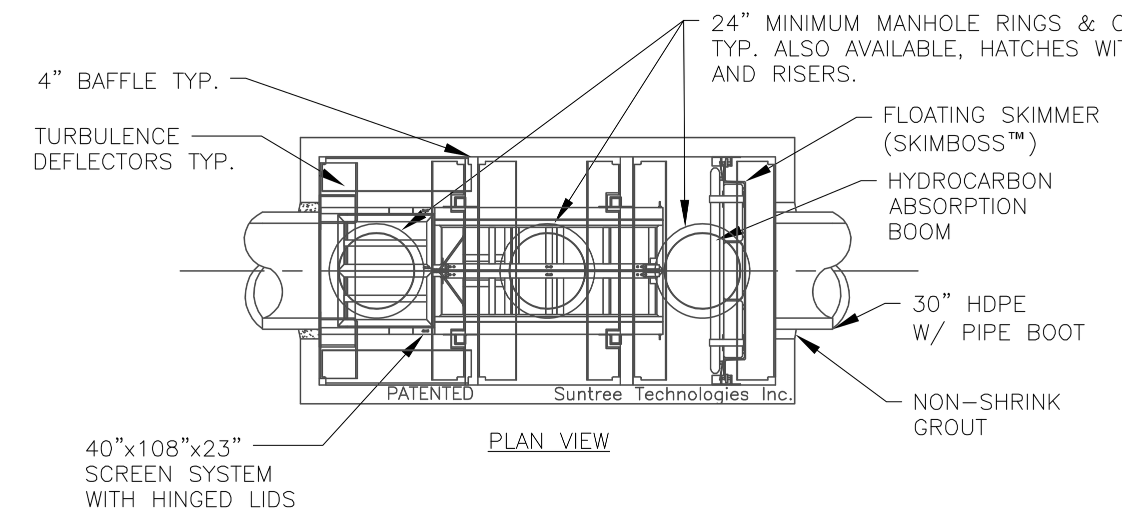
FLOW & BY-PASS SPECIFICATIONS FOR BIOMASS SEPARATING SCREEN SYSTEM, SEDIMENT COLLECTION CHAMBERS, AND SKIMMER SPECIFICATIONS

1. PIPE INFLOW AREA (DRAWN AS 30" HDPE) 4.91 SQ.FT.

SCREEN SPECIFICATIONS:
2. OPEN ORIFICE AREA IN SCREEN SYSTEM 36.04 SQ.FT.
3. OPEN ORIFICE AREA IN SCREEN SYSTEM WITH 50% BLOCKAGE 18.02 SQ.FT.
4. OPEN ORIFICE AREA IN SCREEN SYSTEM WITH 75% BLOCKAGE 9.01 SQ.FT.
5. MINIMUM BY-PASS THROUGH SCREEN SYSTEM BELOW THE CEILING OF THE PIPE 4.13 SQ.FT.
6. MINIMUM BY-PASS AROUND SCREEN SYSTEM BELOW THE CEILING OF THE PIPE 5.20 SQ.FT.
7. SCREEN SYSTEM STORAGE VOLUME 51.23 CU.FT.

SEDIMENT STORAGE:
8. VOLUME OF FIRST SEDIMENT CHAMBER 76.67 CU.FT.
9. VOLUME OF SECOND SEDIMENT CHAMBER 75.00 CU.FT.
10. VOLUME OF THIRD SEDIMENT CHAMBER 75.00 CU.FT.
11. TOTAL SEDIMENT VOLUME 226.67 CU.FT.

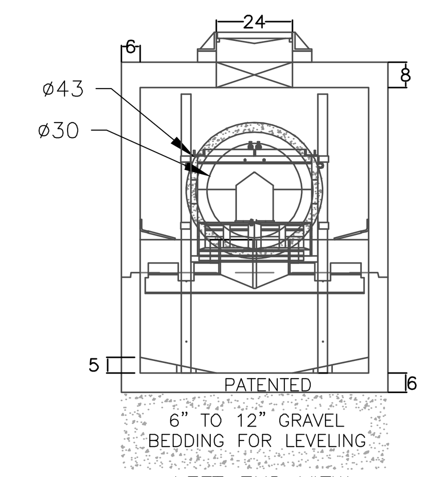
SKIMMER SPECIFICATIONS:
12. FLOW AREA UNDER SKIMMER 8.75 SQ.FT.
13. AREA OF PIPE IN LINE WITH SKIMMER 2.52 SQ.FT.
14. AREA BETWEEN THE SKIMMER AND THE OUTFLOW PIPE PARALLEL WITH THE SURFACE OF THE PIPE 4.3 SQ.FT.



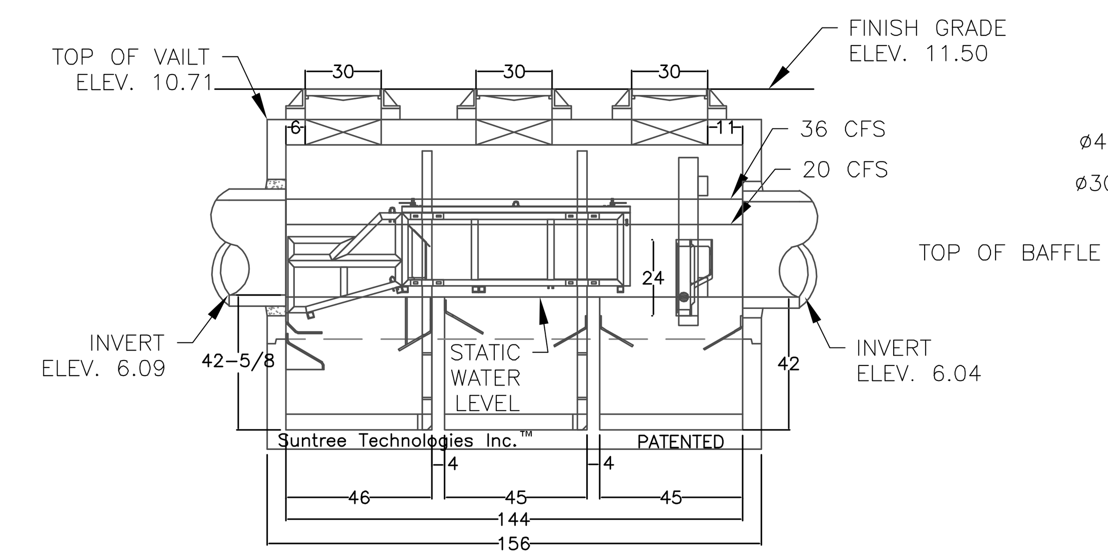
PLAN VIEW

NOTES:

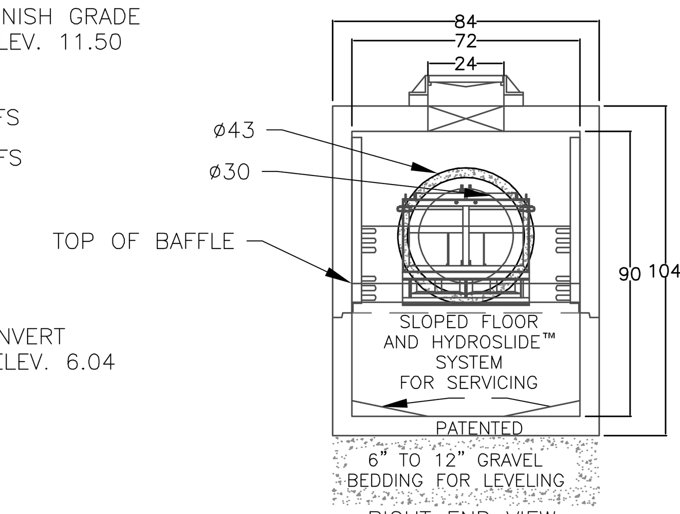
1. CONCRETE 28 DAY COMPRESSIVE STRENGTH FC=5000 PSI
2. REINFORCING: ASTM A-615 GRADE 60
3. SUPPORTS AN H20 LOADING AS INDICATED BY AASHTO.
4. JOINT SEALANT: BUTYL RUBBER SS-S-00210
5. ALL WALLS TO BE 6" THICK, BOTTOM TO BE 6" THICK, AND TOP TO BE 8" THICK.
6. TREATMENT DESIGN FLOW FOR 80% REMOVAL EFFICIENCY OF TSS IS 24 CFS.
7. INFLOW AND OUTFLOW PIPES ARE TO BE FLUSH WITH THE INSIDE SURFACE OF THE CONCRETE STRUCTURE. (CAN NOT INTRUDE BEYOND FLUSH)
8. BAFFLES ARE TO BE SEALED WITH GROUT TO FORM 3 WATER TIGHT CHAMBERS.



LEFT END VIEW



FRONT SIDE VIEW



RIGHT END VIEW

BAFFLE BOX: NSBB-6-12-90

NOT TO SCALE

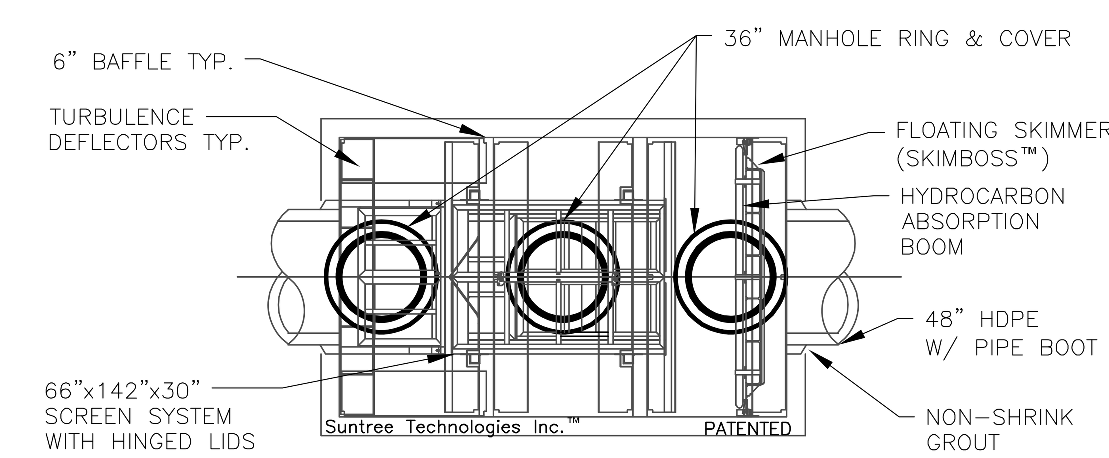
FLOW & BY-PASS SPECIFICATIONS FOR BIOMASS SEPARATING SCREEN SYSTEM, SEDIMENT COLLECTION CHAMBERS, AND SKIMMER SPECIFICATIONS

1. PIPE INFLOW AREA (DRAWN AS 48" HDPE) 12.57 SQ.FT.

SCREEN SPECIFICATIONS:
2. OPEN ORIFICE AREA IN SCREEN SYSTEM 83.37 SQ.FT.
3. OPEN ORIFICE AREA IN SCREEN SYSTEM WITH 50% BLOCKAGE 41.68 SQ.FT.
4. OPEN ORIFICE AREA IN SCREEN SYSTEM WITH 75% BLOCKAGE 20.84 SQ.FT.
5. MINIMUM BY-PASS THROUGH SCREEN SYSTEM BELOW THE TOP SURFACE OF THE PIPE 26.57 SQ.FT.
6. MINIMUM BY-PASS AROUND SCREEN SYSTEM BELOW THE TOP SURFACE OF THE PIPE 27.11 SQ.FT.
7. SCREEN SYSTEM STORAGE VOLUME 140.52 CU.FT.

SEDIMENT STORAGE:
8. VOLUME OF FIRST SEDIMENT CHAMBER 236.67 CU.FT.
9. VOLUME OF SECOND SEDIMENT CHAMBER 236.67 CU.FT.
10. VOLUME OF THIRD SEDIMENT CHAMBER 236.67 CU.FT.
11. TOTAL SEDIMENT VOLUME 710.00 CU.FT.

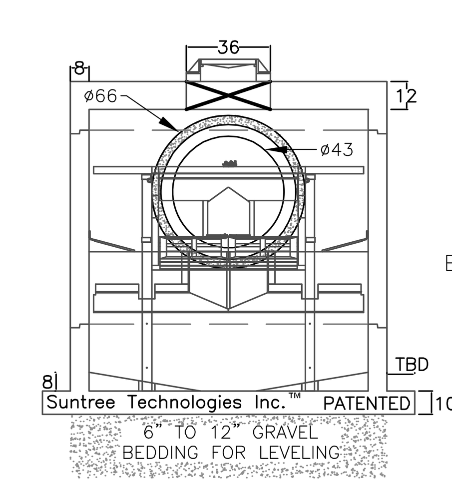
SKIMMER SPECIFICATIONS:
12. FLOW AREA UNDER SKIMMER 19.58 SQ.FT.
13. AREA OF PIPE IN LINE WITH SKIMMER 11.95 SQ.FT.
14. AREA BETWEEN THE SKIMMER AND THE OUTFLOW PIPE PARALLEL WITH THE SURFACE OF THE PIPE 34.01 SQ.FT.



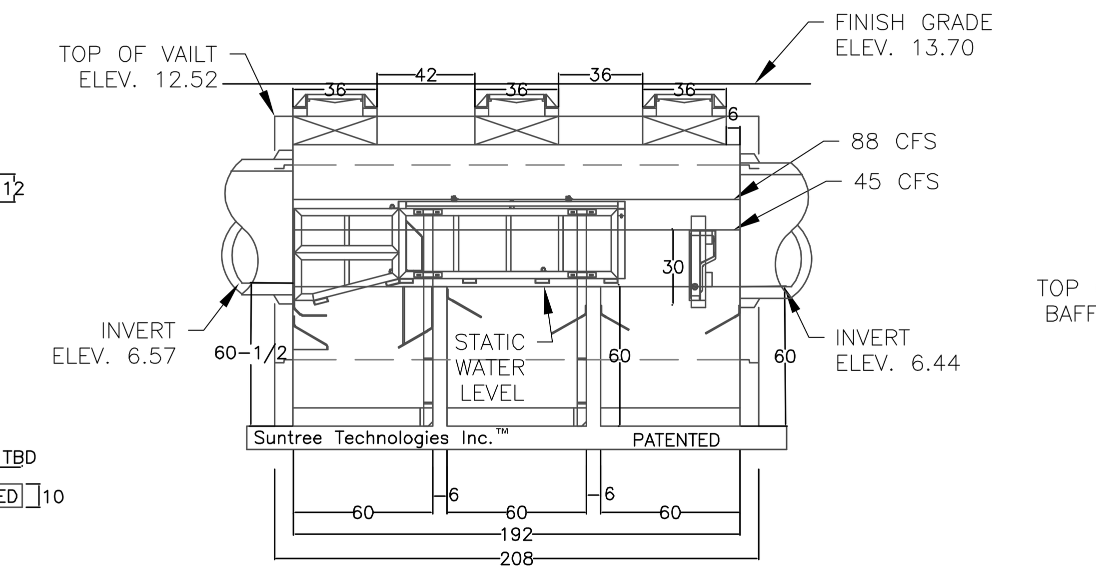
PLAN VIEW

NOTES:

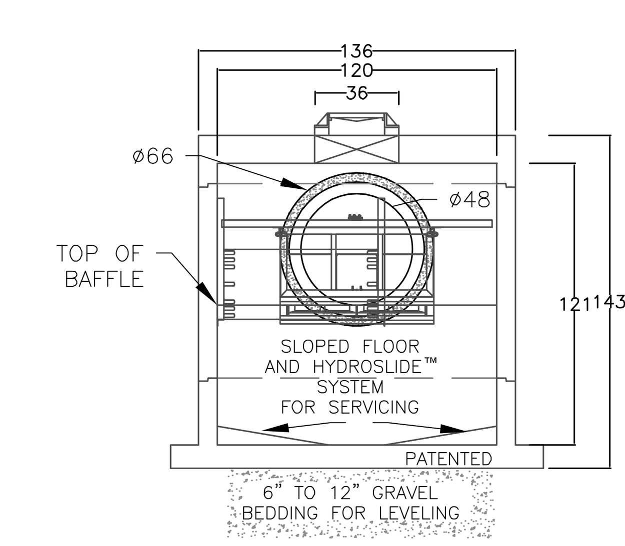
1. CONCRETE 28 DAY COMPRESSIVE STRENGTH FC=5000 PSI
2. REINFORCING: ASTM A-615 GRADE 60
3. SUPPORTS AN H20 LOADING AS INDICATED BY AASHTO.
4. JOINT SEALANT: BUTYL RUBBER SS-S-00210
5. ALL WALLS TO BE 8" THICK, BOTTOM TO BE 10" THICK, AND TOP TO BE 12" THICK.
6. TREATMENT DESIGN FLOW FOR 80% REMOVAL EFFICIENCY OF TSS IS 50 CFS.
7. INFLOW AND OUTFLOW PIPES ARE TO BE FLUSH WITH THE INSIDE SURFACE OF THE CONCRETE STRUCTURE. (CAN NOT INTRUDE BEYOND FLUSH)
8. BAFFLES ARE TO BE SEALED WITH GROUT TO FORM 3 WATER TIGHT CHAMBERS.



LEFT END VIEW



FRONT SIDE VIEW



RIGHT END VIEW

BAFFLE BOX: NSBB-10-16-121

NOT TO SCALE

Civil 3D 2013 Drawing Name:
17112 D.dwg, TAB:D2

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-II

REFERENCES:

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16.2018

STATE OF MAINE ROBERT A. McSORLEY No. 8588 LICENSED PROFESSIONAL ENGINEER 02. 16.2018

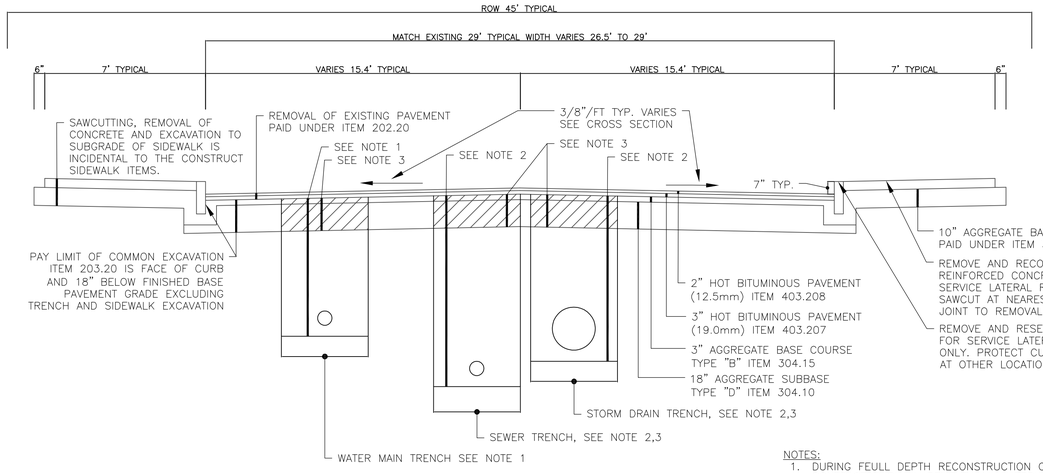
BEDFORD STREET
SEWER SEPERATION PROJECT
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET #
38 OF 46

PLAN NUMBER



TYPICAL ROADWAY SECTION – BEDFORD STREET

NOT TO SCALE

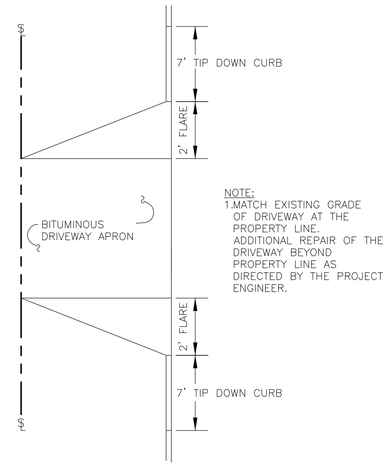
NOTES:
1. DURING FEULL DEPTH RECONSTRUCTION OF BEDFORD STREET CONTRACTOR SHALL REMOVE ALL MATERIALS DOWN TO DEPTH OF SUBBASE.
2. CONTRACTOR SHALL LEAVE 6"–9" OF EXISTING MATERIAL IN FROM OF CURB, UNLESS DIRECTED OTHERWISE BY RESIDENT ENGINEER, TO STABILIZE EXISTING CURB.
3. WHERE BEDROCK IS ENCOUNTERED, CONTRACTOR SHALL EXCAVATE TO BEDROCK ELEVATIONS AND SCARIFY BEDROCK AS NEEDED TO INSTALL AT LEAST THE 3" BASE MATERIAL.

NOTES:
1. TRENCH EXCAVATION AND BACKFILL FOR WATERMAIN IS INCIDENTAL TO THE PIPE AND SEPARATE PAYMENT WILL NOT BE MADE. BASE AND SUBBASE GRAVEL WITHIN WATERMAIN SHALL BE A PLAN QUANTITY.
2. TRENCH EXCAVATION FOR SEWER AND STORM DRAIN IS INCIDENTAL TO THE PIPE AND SEPARATE PAYMENT WILL NOT BE MADE FOR TRENCH EXCAVATION WITHIN THE TRENCH PAY LIMITS.
3. BASE GRAVEL WITHIN STORM DRAIN AND SANITARY SEWER TRENCH PAY LIMITS SHALL BE PAID AS ITEM 304.15 SUBBASE GRAVEL WITHIN STORM DRAIN AND SANITARY SEWER TRENCH PAY LIMITS SHALL BE PAID AS ITEM 304.10. BASE AND SUBBASE GRAVEL FOR WATERMAIN SHALL BE PAID AS A PLAN QUANTITY UNDER THE WATER DISTRICT PAY ITEMS.

RECOMMENDED MINIMUM PLACEMENT TEMPERATURES FOR PAVEMENT

BASE[1] TEMPERATURE °F	MAT THICKNESS, IN INCHES					
	1/2	3/4	1	1 1/2	2	3
+40 – 50	–	–	310	300	285	275
+50 – 60	–	310	300	295	280	270
+60 – 70	310	300	290	285	275	265
+70 – 80	300	290	285	280	270	265
+80 – 90	290	280	275	270	265	260
+90	280	275	270	265	260	255
ROLLING TIME MIN.	4	6	8	12	15	15

[1] BASE ON WHICH MIX IS PLACED.
[2] AND GREATER

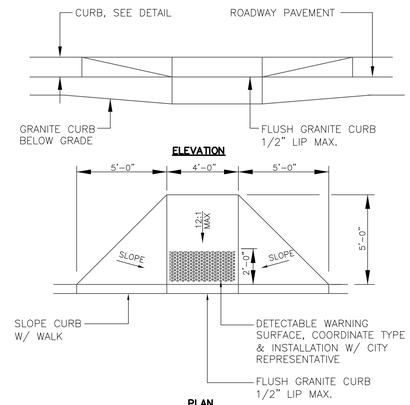


NOTE:
1.MATCH EXISTING GRADE OF DRIVEWAY AT THE PROPERTY LINE. ADDITIONAL REPAIR OF THE DRIVEWAY BEYOND PROPERTY LINE AS DIRECTED BY THE PROJECT ENGINEER.

PLAN VIEW

TYPICAL DRIVEWAY APRON LAYOUT

NOT TO SCALE

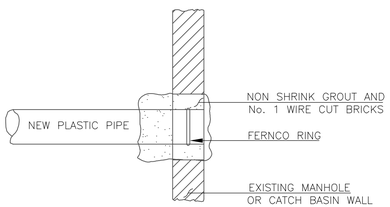


NOTE:
1.INSTALL CONCRETE PEDESTRIAN RAMP WITH 10" MINIMUM AGGREGATE BASE COURSE, GRAVEL – TYPE "B".

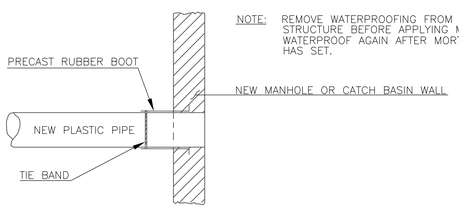
2. CAST IN PLACE CONCRETE SHALL MEET SPECIFICATIONS FOR MDOT CLASS A STRUCTURAL CONCRETE, MINIMUM COMPRESSIVE STRENGTH 4,000 PSI. THE CONCRETE SHALL BE SEALED PRIOR TO SETTING PANELS. THE EXPOSED CONCRETE BORDER SHALL RECEIVE A GROOVED EDGE BETWEEN THE TILE AND CONCRETE, ALONG WITH A UNIFORM BROOM FINISH PERPENDICULAR TO THE FLOW OF PEDESTRIAN TRAFFIC.

CONCRETE PEDESTRIAN RAMP @ CROSSWALK

NOT TO SCALE

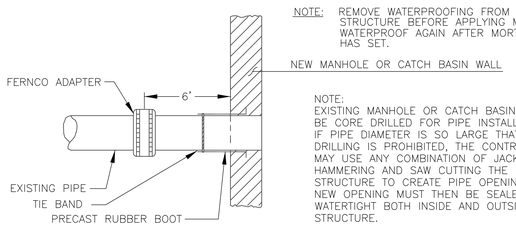


METHOD 3 – NEW PIPE INTO EXISTING STRUCTURE



NOTE: REMOVE WATERPROOFING FROM STRUCTURE BEFORE APPLYING MORTAR. WATERPROOF AGAIN AFTER MORTAR HAS SET.

METHOD 2 – NEW CONSTRUCTION



NOTE: REMOVE WATERPROOFING FROM STRUCTURE BEFORE APPLYING MORTAR. WATERPROOF AGAIN AFTER MORTAR HAS SET.

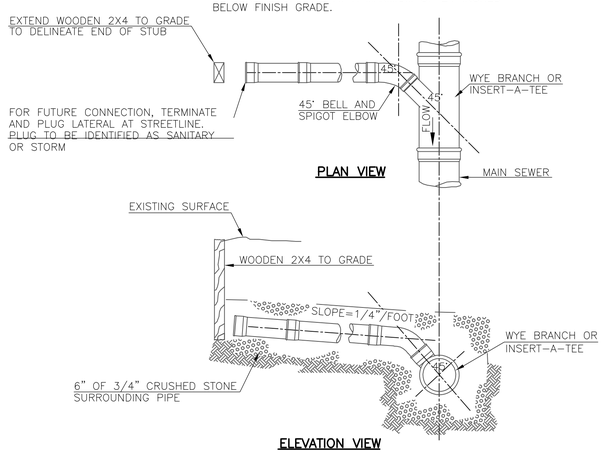
NOTE:
EXISTING MANHOLE OR CATCH BASIN SHALL BE CORE DRILLED FOR PIPE INSTALLATION. IF PIPE DIAMETER IS SO LARGE THAT CORE DRILLING IS PROHIBITED, THE CONTRACTOR MAY USE ANY COMBINATION OF JACK HAMMERING AND SAW CUTTING THE STRUCTURE TO CREATE PIPE OPENING. THE NEW OPENING MUST THEN BE SEALED AND WATERTIGHT BOTH INSIDE AND OUTSIDE THE STRUCTURE.

METHOD 1 – EXISTING PIPE INTO NEW STRUCTURE

PLASTIC PIPE CONNECTION DETAIL

NOT TO SCALE

NOTE
LOCATION / WARNING TAPE SHALL BE INSTALLED OVER CENTERLINE OF PIPE AT A MAXIMUM OF 24 INCHES BELOW FINISH GRADE.

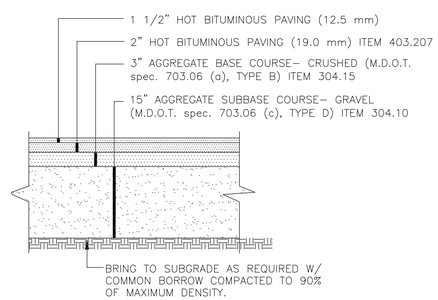


NOTE:
1.LOCATIONS AND ELEVATIONS OF STUBS SHOWN ON THE PLANS ARE TO BE CONSIDERED AS APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED TO SUIT FIELD CONDITIONS.

2.HOUSE CONNECTIONS AND CATCH BASINS CONNECTIONS TO THE MAIN LINE OF THE STORM DRAIN, SHALL CONSIST OF AN APPROPRIATE "Y" BRANCH OR INSERT–A–TEE CONNECTION AS SHOWN ON THE PLANS, OR AS DIRECTED. ACTUAL CONNECTION LOCATIONS FOR HOUSE SERVICES AND CATCH BASIN CONNECTIONS SHALL BE DETERMINED DURING CONSTRUCTION. THE CONTRACTOR SHALL KEEP A COMPLETE RECORD OF THESE LOCATIONS WHICH SHALL BE GIVEN TO THE CITY OF PORTLAND UPON COMPLETION OF THE CONTRACT.

TYPICAL EXISTING STORM DRAIN LATERAL CONNECTION DETAILS

NOT TO SCALE

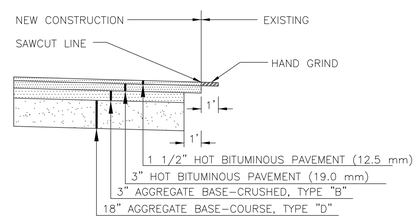


NOTES:
1.COMPACT GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.

2.CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

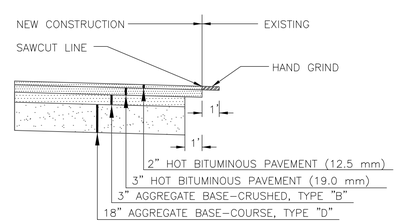
TYPICAL ROADWAY AREA SECTION (LOCAL STREET)

NOT TO SCALE



PAVEMENT BUTT JOINT (LOCAL STREET)

NOT TO SCALE



PAVEMENT BUTT JOINT (ARTERIAL STREET)

NOT TO SCALE

REFERENCES:
Civil 3D 2013 Drawing Name: 17112 D.dwg, TAB.03
CITY PROPERTY PLAN BOOK SHEETS: I & J, SHEETS: III-9, III-11

DESIGN BY: RLM
DRAWN BY: AAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

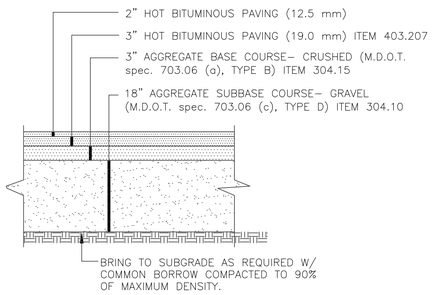
STATE OF MAINE ROBERT A. MOSCHELLA No. 8058 LICENSED PROFESSIONAL ENGINEER 02.16.2018

BEDFORD STREET SEWER SEPERATION PROJECT
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

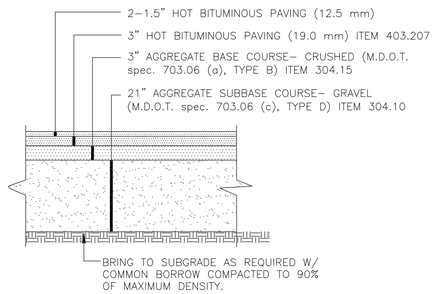
SHEET # 39 OF 46
PLAN NUMBER



NOTES:
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

BAXTER BOULEVARD, DURHAM STREET & BEDFORD STREET SECTION

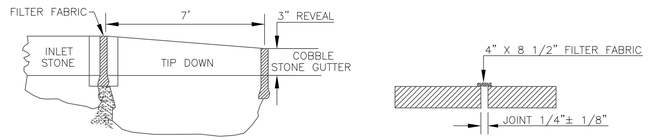
NOT TO SCALE



NOTES:
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

FOREST AVENUE SECTION

NOT TO SCALE



7' TIP DOWN INSTALLATION – INLET TO COBBLE STONE GUTTER

NOT TO SCALE

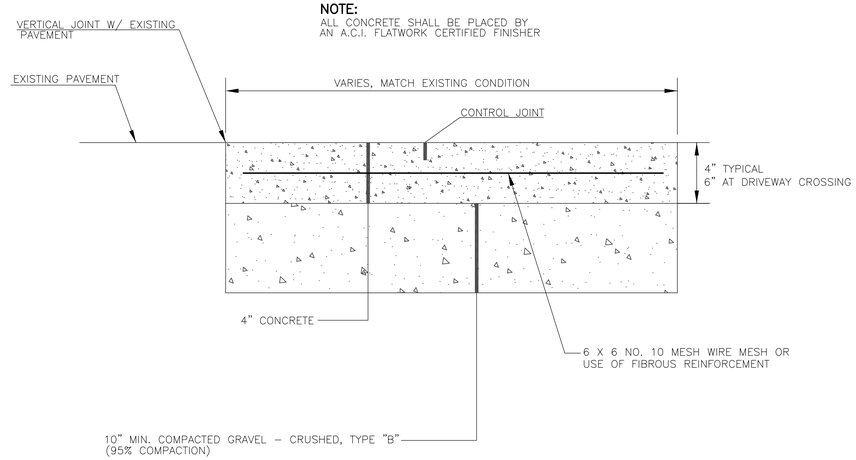
NOTE:
REFER TO CONTRACT FOR MORE DETAIL MATERIAL SPECIFICATIONS.

CONCRETE SPECIFICATION:
- 4000 p.s.i.
- 3/4" AGGREGATE
- 6 – 7 % AIR ENTRAINMENT
- SLUMP – 4" ± 1"

CONTROL JOINT SPECIFICATION:
- SPACING OF JOINTS
  - 10 FEET ON CENTER ALONG LENGTH
  - 6 FEET ON CENTER ALONG WIDTH
- SAW CUT JOINTS AT 1 1/2" MAX. DEPTH

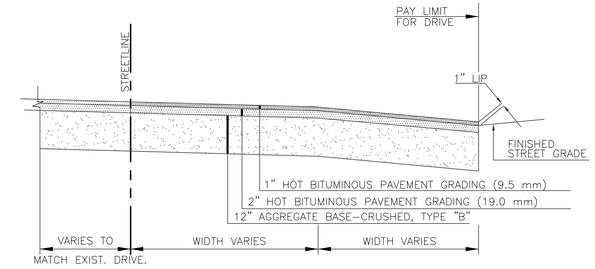
FINISH SPECIFICATION:
- BROOM SWEPT FINISH
- CURE WITH CURE-TO-SPEC MS
- AFTER CONSTRUCTION JOINTS HAVE BEEN FILLED AND SEALED; APPLY "CONSOLIDECK SALTGUARD"

NOTE:
ALL CONCRETE SHALL BE PLACED BY AN A.C.I. FLATWORK CERTIFIED FINISHER



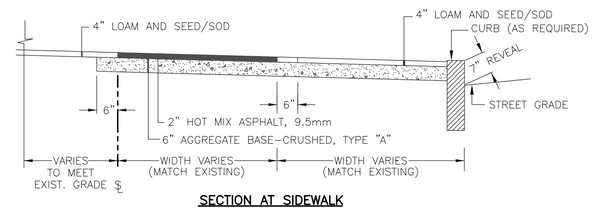
REINFORCED CONCRETE SIDEWALK

NOT TO SCALE



BITUMINOUS DRIVEWAY SECTION

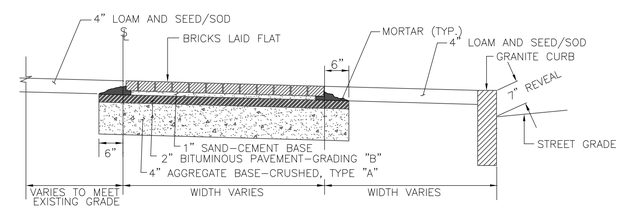
NOT TO SCALE



SECTION AT SIDEWALK

BITUMINOUS SIDEWALK WITH ESPLANADE

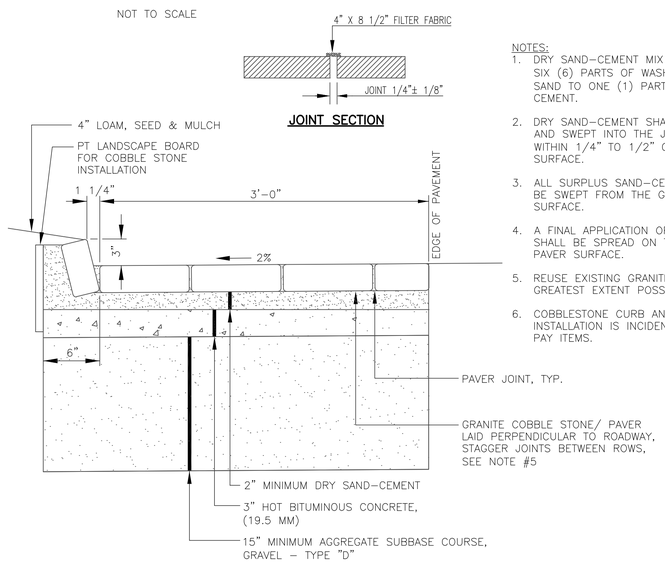
NOT TO SCALE



SECTION

BRICK SIDEWALK DETAIL

NOT TO SCALE

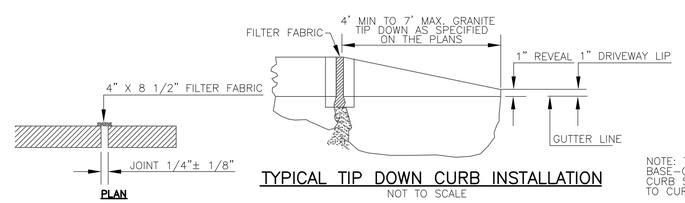


JOINT SECTION

NOTES:
1. DRY SAND-CEMENT MIX SHALL BE: SIX (6) PARTS OF WASHED MORTAR SAND TO ONE (1) PART PORTLAND CEMENT.
2. DRY SAND-CEMENT SHALL BE PLACED AND SWEPT INTO THE JOINTS TO WITHIN 1/4" TO 1/2" OF PAVER SURFACE.
3. ALL SURPLUS SAND-CEMENT SHALL BE SWEPT FROM THE GRANITE PAVER SURFACE.
4. A FINAL APPLICATION OF SAND ONLY SHALL BE SPREAD ON THE GRANITE PAVER SURFACE.
5. REUSE EXISTING GRANITE PAVERS TO GREATEST EXTENT POSSIBLE.
6. COBBLESTONE CURB AND GUTTER INSTALLATION IS INCIDENTAL TO PIPE PAY ITEMS.

COBBLESTONE GUTTER DETAIL

NOT TO SCALE

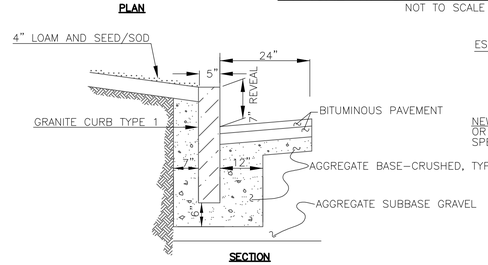


PLAN

TYPICAL TIP DOWN CURB INSTALLATION

NOT TO SCALE

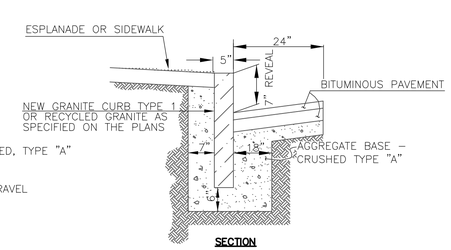
NOTE: THE EXCAVATION AND AGGREGATE BASE-CRUSHED GRAVEL FOR BEDDING THE CURB SHALL BE CONSIDERED INCIDENTAL TO CURB ITEMS.



SECTION

INSTALLATION OF CURB

NOT TO SCALE



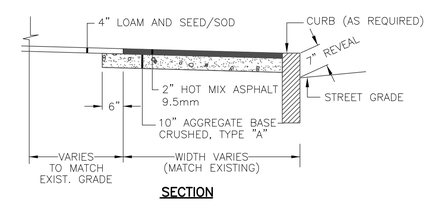
SECTION

CURB REPLACEMENT DETAIL

NOT TO SCALE

TYPICAL INSTALLATION OF CURB

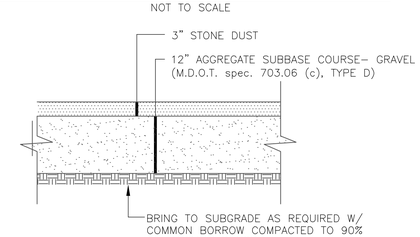
NOT TO SCALE



SECTION

BITUMINOUS SIDEWALK DETAIL – NO ESPLANADE

NOT TO SCALE



NOTES:
1. COMPACT_GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. MATCH EXISTING TRAIL WIDTH.

TYPICAL TRAIL SECTION

NOT TO SCALE

REFERENCES:
Civil 3D 2013 Drawing Name: 17112 D.dwg, TAB:D4
CITY PROPERTY PLAN BOOK SHEETS: I & J SHEETS: III-9, III-11

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

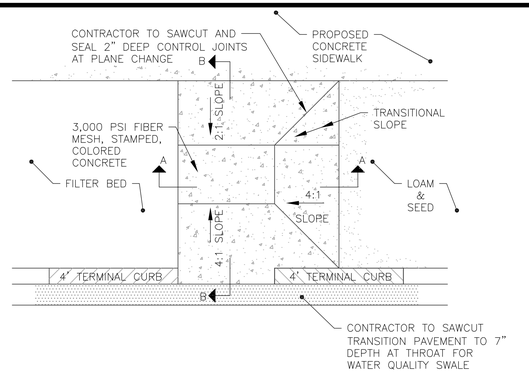
STATE OF MAINE ROBERT A. MCSORLEY No. 8589 LICENSED PROFESSIONAL ENGINEER

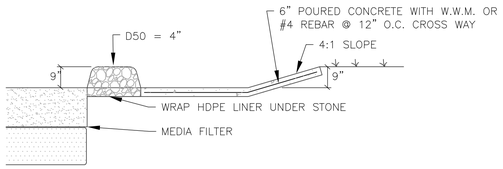
BEDFORD STREET SEWER SEPERATION PROJECT
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

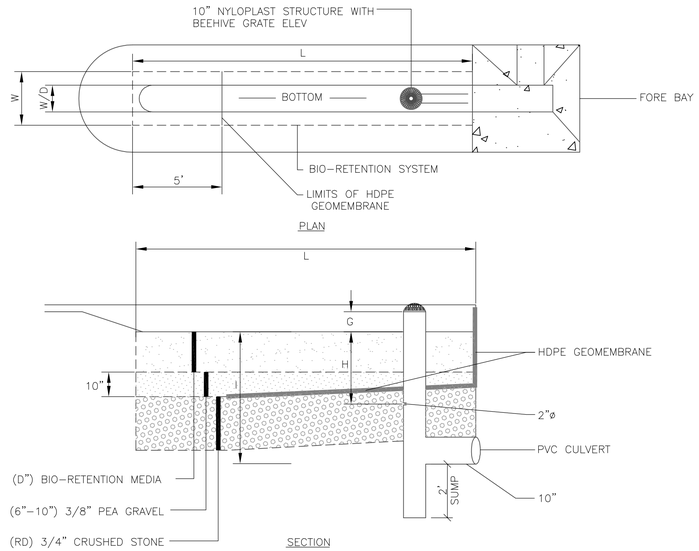
SHEET # 40 OF 46
PLAN NUMBER





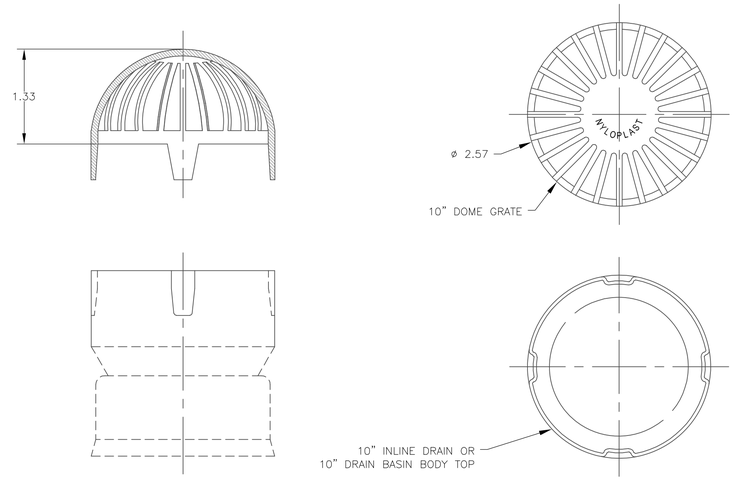
FOREBAY DETAIL

NOT TO SCALE



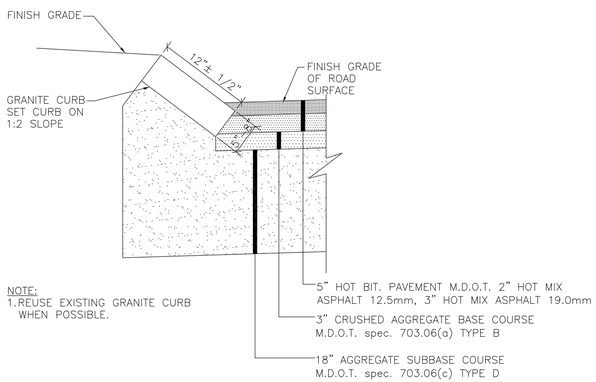
TREATMENT POND DETAIL

NOT TO SCALE



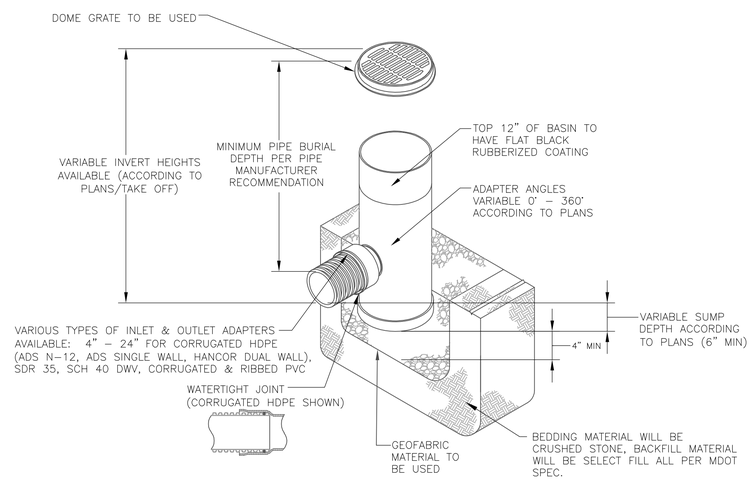
10" NYLOPLAST GRATE ASSEMBLY

NOT TO SCALE



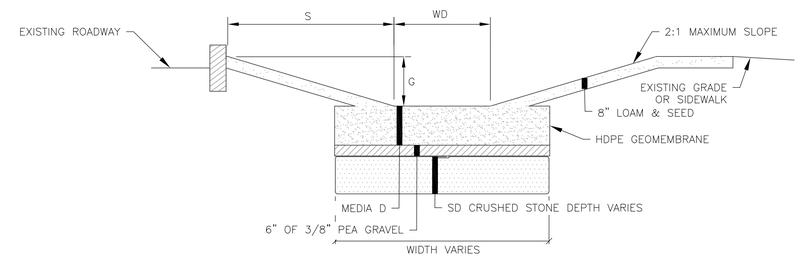
TYPE 5 GRANITE CURB SECTION

NOT TO SCALE



NYLOPLAST DRAIN BASIN

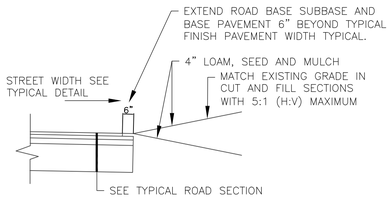
NOT TO SCALE



TYPICAL BIORETENTION SYSTEM DETAIL

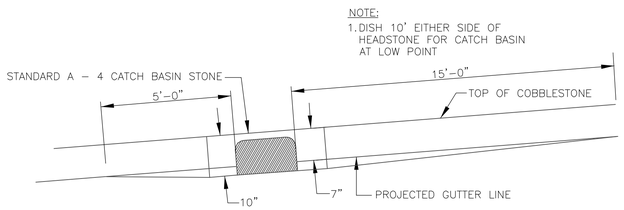
NOT TO SCALE

TREATMENT SWALE	(G, FROM EDGE OF PAVEMENT)	DEPTH TO BLEEDER HOLE (H)	DEPTH TO INVERT (I)	SLOPE FROM CURB (S)	DEPTH OF MEDIA (D)	DEPTH OF CRUSH STONE (SD)	WIDTH OF POND (WD)	WIDTH OF MEDIA FILTER (W)	LENGTH OF SWALE (L)
WQS-1	6''	24''	43''	2'	12''	15''	1.5'	3.0'	25
WQS-2	6''	24''	43''	2'	12''	15''	1.5'	3.0'	25
WQS-3	6''	24''	43''	2'	12''	15''	1.5'	3.0'	25
WQS-4	9''	30''	58''	3'	18''	24''	2.0'	4.0'	30
WQS-5	12''	30''	58''	4'	18''	24''	4.0'	5.0'	30
WQS-6	12''	30''	58''	4'	18''	24''	3.0'	4.0'	25



TYPICAL EDGE TREATMENT FOR UN-CURBED STREET

NOT TO SCALE



TYPICAL PAVEMENT GRADING ON SLOPES FOR CATCH BASIN & INLET

NOT TO SCALE

CONSTRUCTION NOTES FOR UNDERDRAINED SOIL FILTERS & BIORETENTION FILTERS:

1. THE SOIL FILTER MEDIA AND VEGETATION MUST NOT BE INSTALLED UNTIL THE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT OR OTHER STRUCTURE, 90% VEGETATION COVER, OTHER PERMANENT STABILIZATION OR PROTECTION FROM SEDIMENT ACCUMULATING IN THE TREATMENT AREA,. OTHERWISE, THE RUNOFF FROM THE CONTRIBUTING AREA MUST BE DIVERTED AROUND THE FILTER UNTIL STABILIZATION IS COMPLETED.

2. INSPECTION OF THE FILTER BASIN SHALL BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY THE DESIGN ENGINEER OR OWNER REPRESENTATIVE. AT A MINIMUM, THE DESIGN ENGINEER SHALL INSPECT THE CONSTRUCTION AT THE FOLLOWING PHASES:
   A. AFTER PRELIMINARY CONSTRUCTION OF THE FILTER GRADES AND ONCE THE UNDERDRAIN PIPES ARE INSTALLED BUT NOT BACKFILLED.
   B. AFTER THE DRAINAGE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE FILTER MEDIA.
   C. AFTER THE FILTER MEDIA HAS BEEN INSTALLED AND SEEDED.
   D. AFTER ONE YEAR TO INSPECT HEALTH OF THE VEGETATION AND MAKE CORRECTIONS.
   E. ALL MATERIAL USED FOR THE CONSTRUCTION OF THE FILTER BASIN SHALL BE APPROVED BY THE DESIGN ENGINEER AFTER TESTS BY A CERTIFIED LABORATORY SHOW THAT THEY ARE PASSING DEP SPECIFICATIONS.

3. SOIL MIX COMPONENTS SHALL BE BLENDED MIXED THOROUGHLY AND UNIFORMLY IN BATCHES NOT TO EXCEED 20 CUBIC YARDS OR AT THE DISCRETION OF THE SUPERVISING ENGINEER.

4. COMPACTION OF THE SOIL BED MATERIAL SHALL BE AVOIDED. IF COMPACTION OCCURS, ROTOTILL AGAIN PRIOR TO SEEDING OR SODDING.

5. THE CONTRACTOR SHALL IDENTIFY THE LOCATION OF THE SOURCE OF EACH COMPONENT OF THE FILTER MEDIA. ALL RESULTS OF THE FIELD AND LABORATORY TESTING SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR CONFIRMATION. THE CONTRACTOR SHALL
   A. SUBMIT SAMPLES OF EACH TYPE OF MATERIAL TO BE BLENDED FOR THE MIXED FILTER MEDIA AND SAMPLES OF THE UNDERDRAIN BEDDING MATERIAL. SAMPLES MUST BE A COMPOSITE OF THREE GRABS FROM THE STOCKPILE OR PIT FACE. SAMPLE SIZE REQUIRED WILL BE DETERMINED BY THE TESTING LABORATORY.
   B. PERFORM A SIEVE ANALYSIS CONFORMING TO ASTM C136 (STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES, 1996A) ON EACH TYPE OF THE SAMPLE MATERIAL. THE RESULTING SOIL FILTER MEDIA MIXTURE MUST HAVE 8% TO 12% BY WEIGHT PASSING THE #200 SIEVE, A CLAY CONTENT OF LESS THAN 2% (DETERMINED BY HYDROMETER GRAIN SIZE ANALYSIS) AND HAVE 10% DRY WEIGHT OF ORGANIC MATTER.
   C. PERFORM A PERMEABILITY TEST ON THE SOIL FILTER MEDIA CONFORMING TO ASTM D2434 WITH THE MIXTURE COMPACTED TO 90-92% OF MAXIMUM DRY DENSITY BASED ON ASTM D698.
   D. BIORETENTION MEDIA LOAM AND PROCESSED WATER TREATMENT RESIDUALS SHALL BE SUBMITTED FOR APPROVAL FOR THE FOLLOWING TESTS: BASIC COMPOST TEST, SOIL QUALITY ANALYSIS PACKAGE, NUTRIENT MANAGEMENT/GRID SAMPLE PACKAGE WITH MEHLICH-3 EXTRACTION.

UNDERDRAINED & BIORETENTION MEDIA FILTER NOTES:

1. THE UNDERDRAINED SOIL MEDIA SHALL CONSIST OF A SILTY SAND SOIL OR SOIL MIXTURE COMBINED WITH 20% TO 25% BY VOLUME OF A MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH. THE RESULTING MIXTURE MUST HAVE NO LESS THAN 8% PASSING THE 200 SIEVE AND SHALL HAVE A CLAY CONTENT OF LESS THAN 2%. THE SAND USED IN THE MIXTURE SHALL MEET THE FOLLOWING SPECIFICATIONS:
   SIEVE 3/8" – 100 PERCENT PASSING
   SIEVE #4 – 95–100 PERCENT PASSING
   SIEVE #8 – 80–100 PERCENT PASSING
   SIEVE #16 – 50–85 PERCENT PASSING
   SIEVE #30 – 25–60 PERCENT PASSING
   SIEVE #60 – 10–30 PERCENT PASSING
   SIEVE #100 – 2–10 PERCENT PASSING
   SIEVE #200 – 0–5 PERCENT PASSING

2. THE BIORETENTION MEDIA SHALL MEET THE FOLLOWING SPECIFICATIONS:

MATERIAL	BSM SPECIFICATION
%SAND	50
%DOUBLE SHREDDED WOOD CHIPS	20
% PROCESSED WATER TREATMENT RESIDUALS	5–10
% LOAMY TOPSOIL	10–15
CEC (MEQ/100 G)	≥5
TOTAL PHOSPHORUS (MG/KG)	LESS THAN 100 A
PH	5.5–7.5
ORGANIC MATTER (% DRYWEIGHT)	LESS THAN 10%
INFILTRATION RATE (IN./HR)	GREATER THAN 4
OXALATE RATIO	20–40

3. THE PEA GRAVEL FOR THE BIORETENTION AREAS SHALL MEET THE FOLLOWING SPECIFICATIONS:
   SIEVE 1/2" – 100 PERCENT PASSING
   SIEVE 3/8" –85–100 PERCENT PASSING
   SIEVE #4 –10–30 PERCENT PASSING
   SIEVE #8 – 0–10 PERCENT PASSING
   SIEVE #16 – 0–15 PERCENT PASSING

PLANTING NOTES:

1. THE BOTTOM OF THE WATER QUALITY SWALES SHALL BE PLANTED WITH MISCANTHUS SINENSIS 'GRACILLIMUS'. TWO FOOT WIDE AND SWALES SHALL BE PLATED WITH ONE ROW AT 3 FOOT ON CENTER; THREE AND FOUR FOOT WIDE SWALES BE PLANTED WITH TWO ROWS ARE 3 FOOT ON CENTER.

2. CONTRACTOR SHALL INSTALL 3 INCHES OF LOAM IN BOTTOM OF SWALE AND SEED SLOPES WITH EROSION CONTROL BLANKETS.

REFERENCES:

Civil 3D 2013 Drawing Name: 17112 D.dwg, TAB:D5

CITY PROPERTY PLAN BOOK SHEETS: I & I SHEETS: III-9, III-11

DESIGN BY: RLM	DATE: 02.16.2018
DRAWN BY: SAP	
CHECKED BY: RAM	
SCALE: 1" = 20'	

STATE OF MAINE ROBERT A. MCSORLEY No. 6569 PROFESSIONAL ENGINEER

BEDFORD STREET SEWER SEPERATION PROJECT

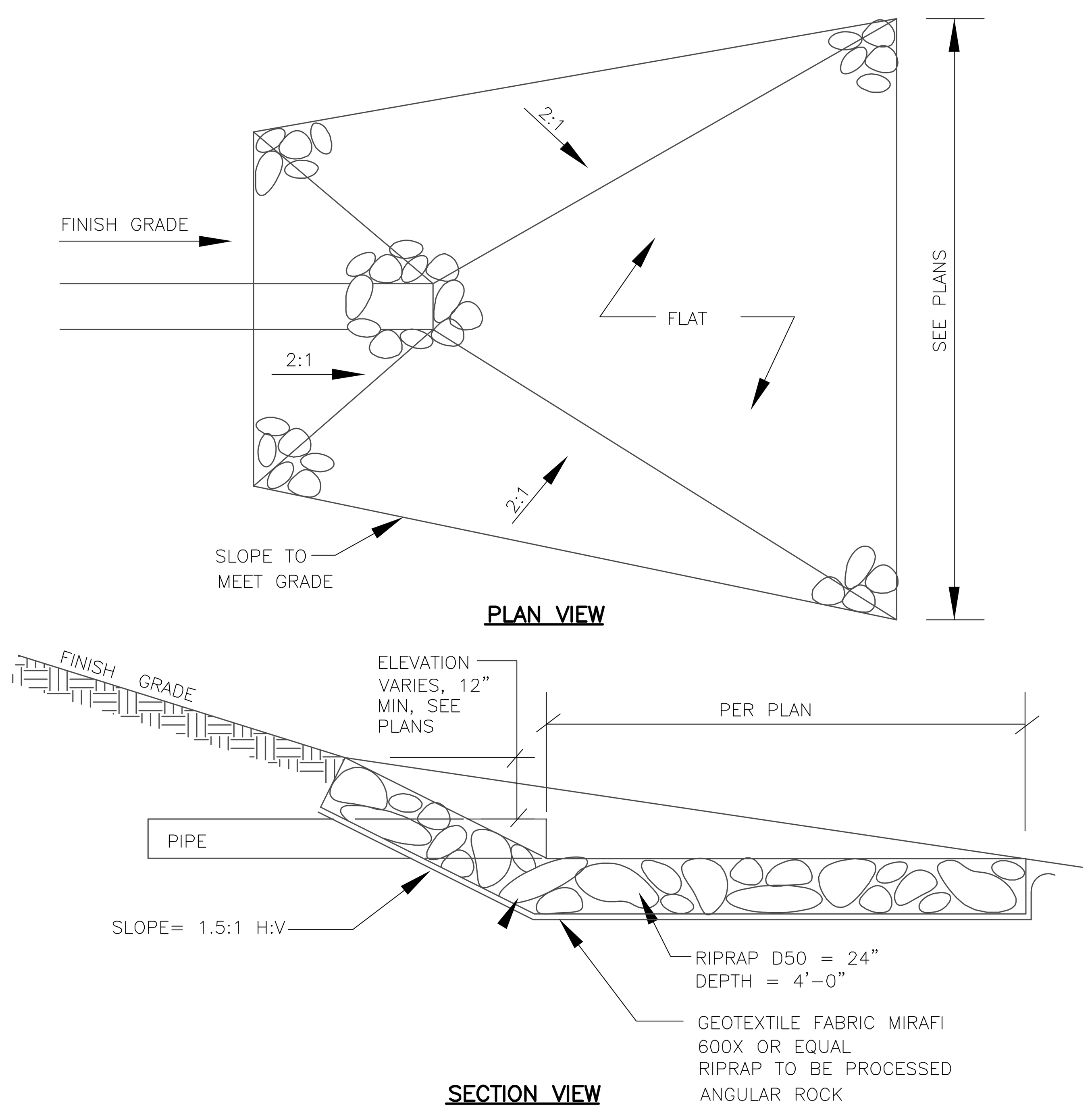
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

RESURGAM CITY OF PORTLAND, MAINE

SHEET # 41 OF 46

PLAN NUMBER



RIPRAP APRON

NOT TO SCALE

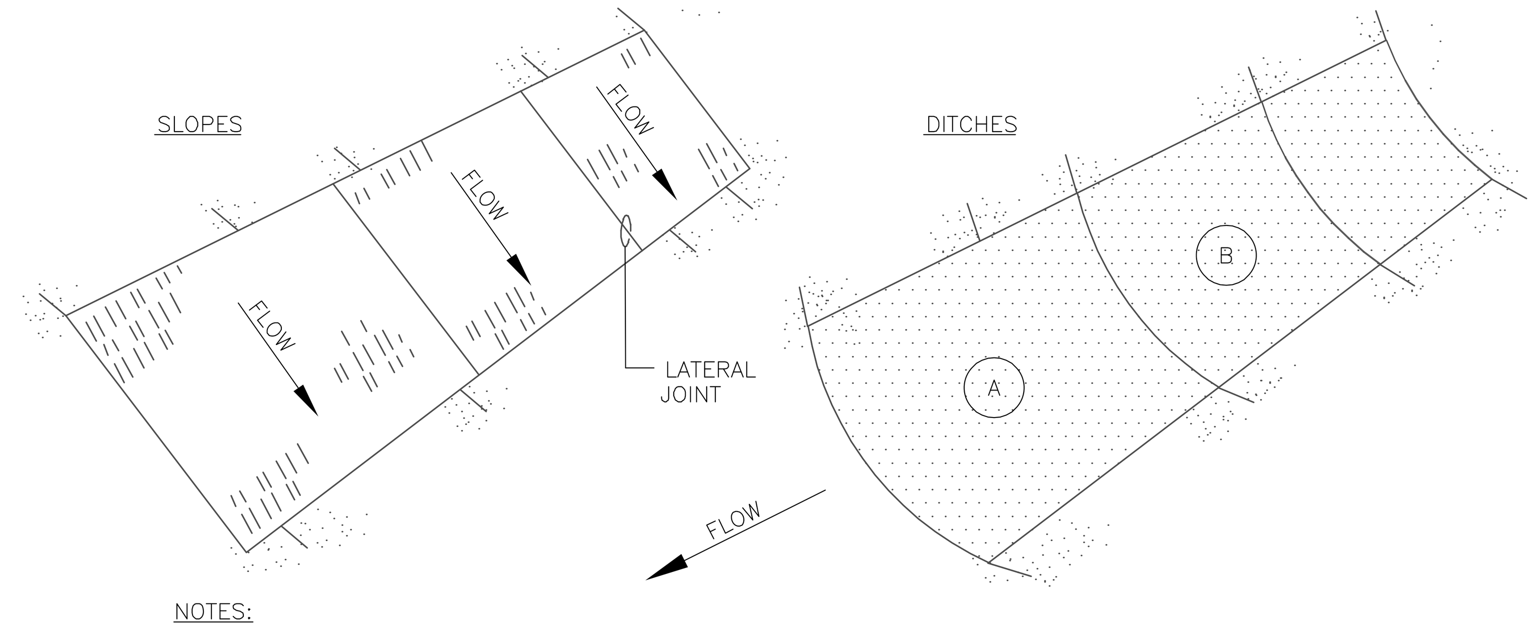
RIPRAP OUTLET CONSTRUCTION NOTES (REFER TO RIPRAP APRON DETAIL ON DETAIL SHEET)

PRE-CONSTRUCTION

1. MEET ON SITE WITH OWNER, SITE CONTRACTOR, AND THE DESIGN ENGINEER TO DISCUSS SCOPE OF WORK AND EXPECTATIONS. DETERMINE LIMITS OF TIDAL "SPARTINA" GRASS.
2. CONTRACTOR SHALL HAVE ALL MATERIALS APPROVED BY THE DESIGN ENGINEER PRIOR TO INSTALLATION.

CONSTRUCTION PHASE

1. STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL BMP MANUAL, LATEST EDITION. SEE THE EROSION & SEDIMENT CONTROL NOTES AND PLAN FOR ADDITIONAL REQUIREMENTS. PROTECT NEARBY TREES, WHICH ARE PROPOSED TO REMAIN. TO THE EXTENT PRACTICAL, PROTECT THE ROOT ZONE OF THESE TREES.
2. THE CONTRACTOR SHALL CONSIDER THE TIDE SCHEDULE CAREFULLY; AND SHALL SCHEDULE WORK TO AVOID INTERRUPTIONS OF DAYLIGHT WORKING HOURS WITH HIGH TIDES. WORKING WITHIN TIDAL WATERS IS NOT PERMITTED.
3. THE CONTRACTOR SHALL ONLY WORK IN AREAS THAT CAN BE COMPLETED DURING EACH CONSTRUCTION DAY. NO AREAS SHALL BE EXCAVATED BY THE CONTRACTOR AND LEFT EXPOSED, AS THESE AREAS WILL BE SUBJECT TO EROSION FROM TIDAL SURGES OR STORM EVENTS.
4. WITHIN VEGETATIVE AREA PROPOSED TO BE DISTURBED, CAREFULLY REMOVE THE TOP ORGANIC LAYER (12"±) BELOW ELEVATION DETERMINED AT PRECONSTRUCTION MEETING. REMOVE USING METHOD THAT WILL KEEP THE VEGETATION SYSTEM INTACT. STOCKPILE THE ORGANIC LAYER IN A MANNER SO THAT MATERIAL CAN BE REUSED. REMOVE ONLY ENOUGH VEGETATION NEEDED TO INSTALL THE TIDE GATE VAULT AND SEWER PIPE IN ACCORDANCE WITH THE CROSS-SECTION. ORGANIC LAYER REMOVAL, STORAGE AND PLACEMENT SHALL BE INCIDENTAL TO THE RELATED PIPE PAY ITEM.
5. PIPE INSTALLATION: LOW PERMEABILITY DAMS OF NATURAL CLAY, BETONITE OR FLOWABLE FILL SHALL BE INSTALLED AS SHOWN TO MINIMIZE TIDAL FLOW THROUGH THE BACKFILL. DAMS SHALL EXTEND A MINIMUM 1 FOOT BELOW THE TRENCH BOTTOM, 1 FOOT BEYOND THE SIDEWALLS AND UP TO ELEVATION 7.4 OR TOP OF FINISHED GRADE. DAMS SHALL BE A MINIMUM OF 2 FEET THICKNESS. COSTS OF LOW PERMEABILITY DAMS SHALL BE INCIDENTAL TO THE CONTRACT.
6. INSTALL RIPRAP APRON IN ACCORDANCE WITH THE DETAILS. ONCE THE RIPRAP SLOPE IS COMPLETELY INSTALLED, THE CONTRACTOR SHALL GRADE THE DISTURBED AREAS UNIFORMLY TO MATCH EXISTING TOPOGRAPHY (U.N.O.) AND THE NEW RIPRAP EDGE.
7. PLACE EXISTING ORGANIC MATERIAL IN DISTURBED VEGETATIVE AREAS BELOW ELEVATION 10, WORKING FROM THE OUTFALL TO THE VAULT. DISTURBED VEGETATIVE AREAS ABOVE ELEVATION 10 SHALL HAVE LOAM AND SEED. ORGANIC LAYER REMOVAL, STORAGE AND PLACEMENT SHALL BE INCIDENTAL TO THE RELATED PIPE PAY ITEM.
8. INSPECT THE SITE EVERY TWO WEEKS FOR SIGNS OF EROSION AND ESTABLISHMENT OF VEGETATION. REPAIR ERODED AREAS AND REPLANT VEGETATION TO ESTABLISH 75% VEGETATION CATCH, AS REQUIRED.
9. IN AREAS REQUIRING REPLANTING, INSTALL NORTH AMERICAN GREEN C125BN EROSION CONTROL FABRIC OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS (PAY ITEM 613.319).
10. USING RAZOR BLADE, CAREFULLY CUT HOLES 1 FOOT O.C. AND IN ROWS SPACED 1 FOOT APART. LOOSELY OFFSET HOLES BETWEEN ROWS FOR APPROXIMATELY 6-8 HOLES PER SQUARE YARD. PLANT CORD GRASS SPARTINA PATENS (SALT MEADOW GRASS) AND SPARTINA ALTERNIFLORA (SMOOTH CORDGRASS) PLUGS IN ALTERNATING FASHION. COSTS ASSOCIATED WITH CUTTING FABRIC AND PLANTING GRASS PLUGS WILL BE PAID THROUGH THE BID ITEM 615.072.

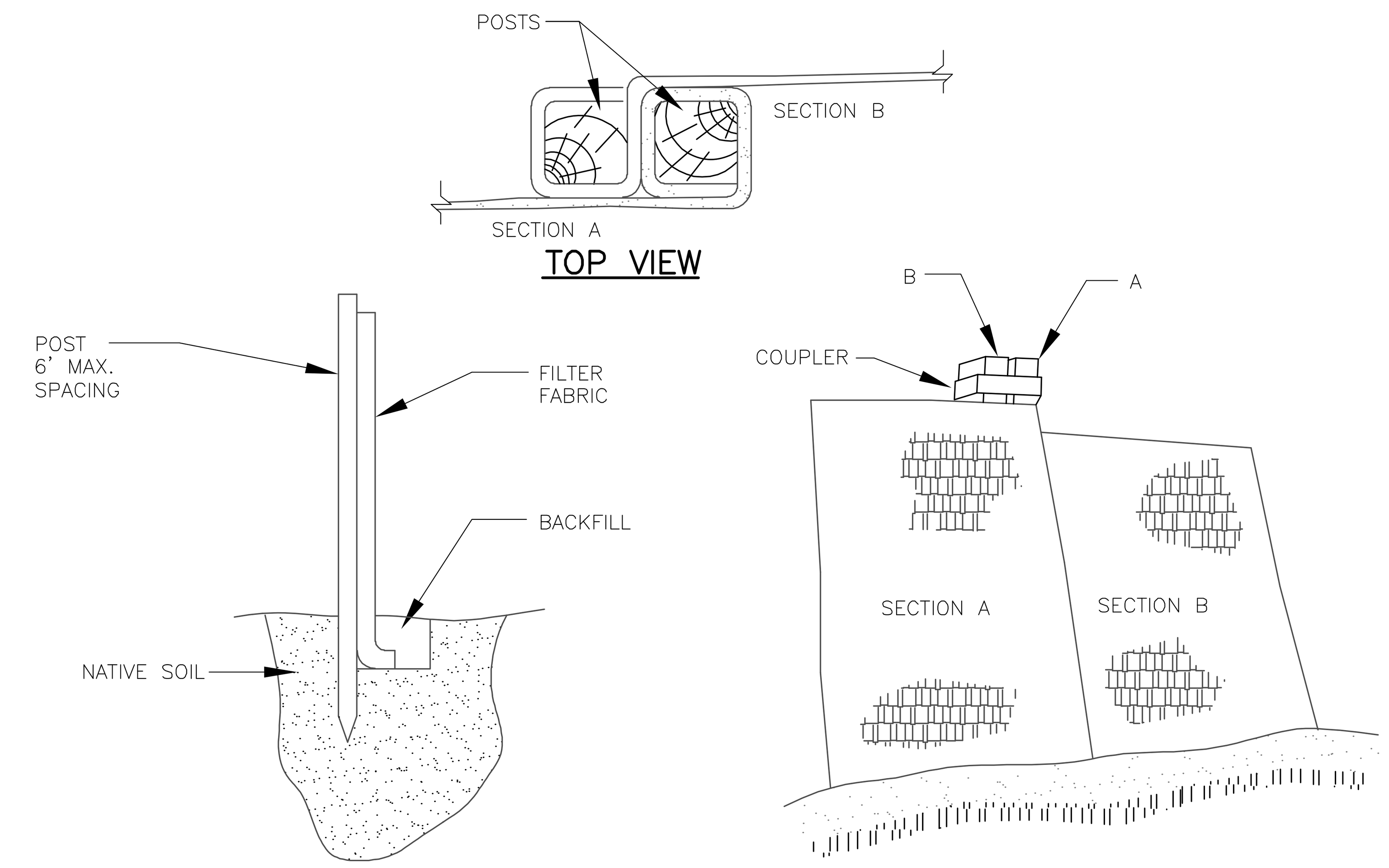


NOTES:

1. BURY THE TOP END OF THE MESH MATERIAL IN A 6" TRENCH AND BACKFILL AND TAMP TRENCHING SECURE END WITH STAPLES AT 6" SPACING, 4" DOWN FROM EXPOSED END.
2. FLOW DIRECTION JOINTS TO HAVE UPPER END OF LOWER STRIP BURIED WITH UPPER LAYERS OVERLAPPED 4" AND STAPLED. OVERLAP B OVER A.
3. LATERAL JOINTS TO HAVE 4" OVERLAP OF STRIPS. STAPLE 18" ON CENTER.
4. STAPLE OUTSIDE LATERAL EDGE 2' ON CENTER.
5. WIRE STAPLES TO BE MIN. OF # 11 WIRE 6" LONG AND 1-1/2" WIDE.
6. USE NORTH AMERICAN GREEN 125BN OR APPROVED EQUAL.
7. WHERE EROSION CONTROL BLANKET IS REQUIRED OR NEEDED, IT SHALL BE CONSIDERED INCIDENTAL TO THE RELATED PAY ITEM OR COSTS OF CONSTRUCTION.

EROSION CONTROL BLANKET DETAIL

NOT TO SCALE

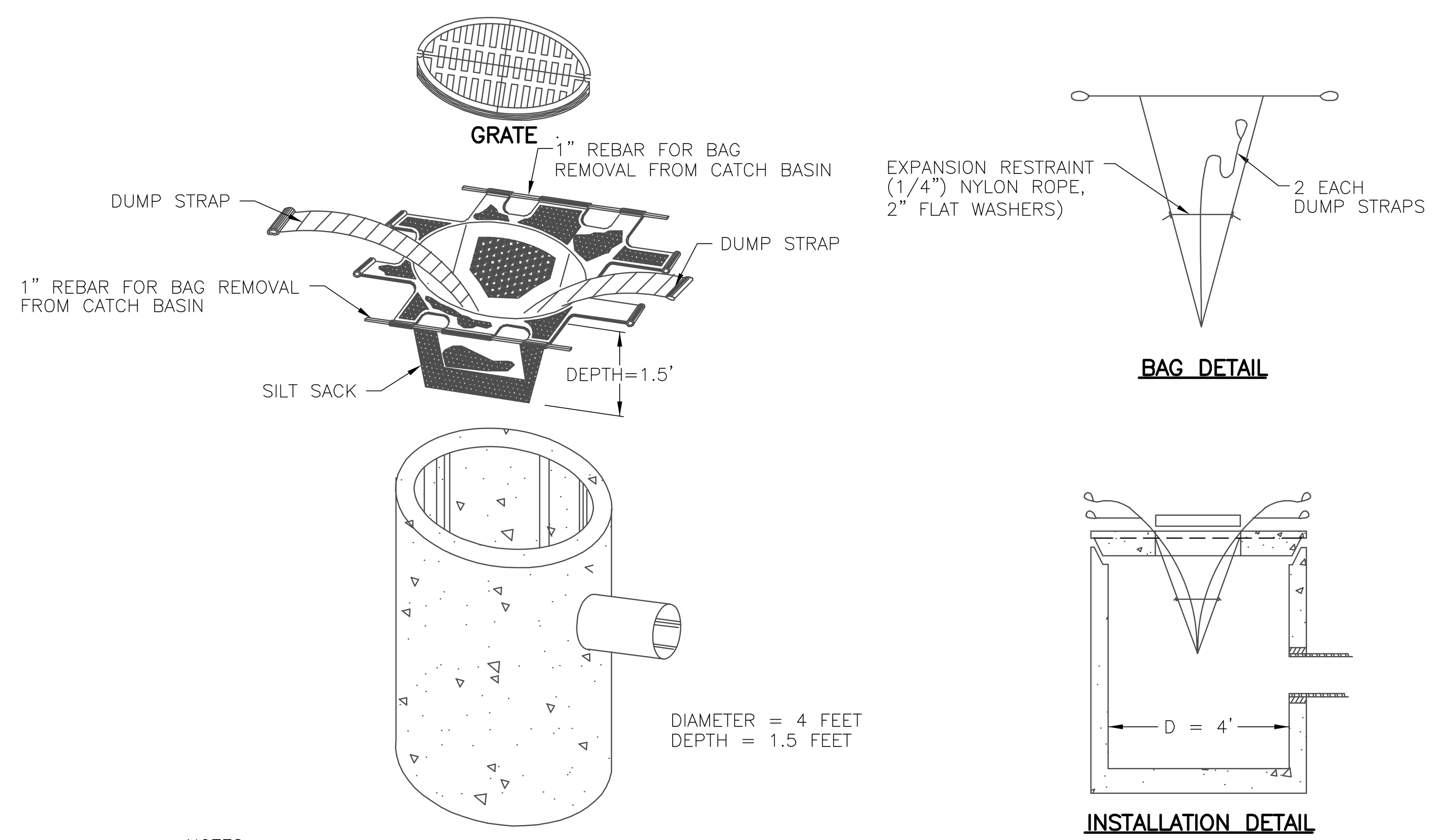


INSTALLATION NOTES:

1. EXCAVATE A 6"x 6" TRENCH ALONG THE LINE OF PLACEMENT FOR THE FILTER BARRIER.
2. UNROLL A SECTION AT A TIME AND POSITION THE POSTS AGAINST THE BACK (DOWNSTREAM) WALL OF THE TRENCH.
3. DRIVE POSTS INTO THE GROUND UNTIL APPROXIMATELY 2" OF FABRIC IS LYING ON THE TRENCH BOTTOM.
4. LAY THE TOE-IN FLAP OF FABRIC ONTO THE UNDISTURBED BOTTOM OF THE TRENCH, BACKFILL THE TRENCH AND TAMP THE SOIL. TOE-IN CAN ALSO BE ACCOMPLISHED BY LAYING THE FABRIC FLAP ON UNDISTURBED GROUND AND PILING AND TAMPING FILL AT THE BASE, BUT MUST BE ACCOMPANIED BY AN INTERCEPTION DITCH.
5. JOIN SECTION AS SHOWN ABOVE.
6. BARRIER SHALL BE MIRAFI SILT FENCE OR EQUAL.

SILT FENCE

NOT TO SCALE

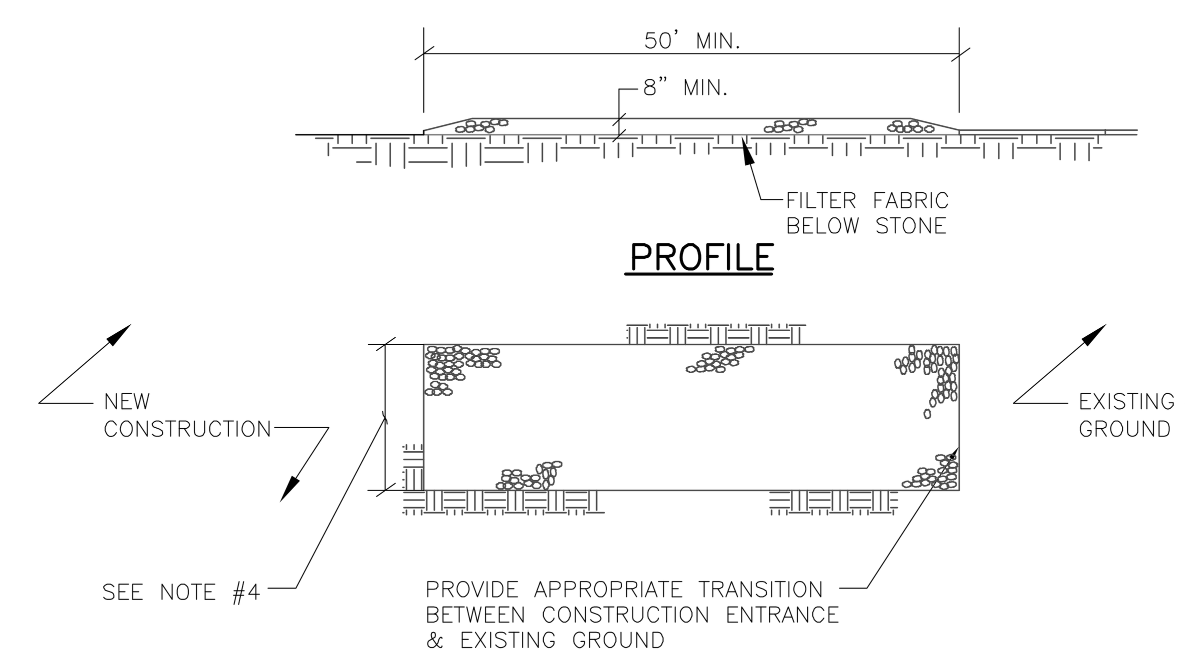


NOTES:

1. REMOVE THE CATCH BASIN GRATE AND PLACE THE SACK INTO THE OPENING. HOLD OUT APPROXIMATELY SIX (6) INCHES OF THE SACK BEYOND THE BASIN FRAME TO ALLOW ACCESS TO THE "SILT SACK" LIFTING STRAPS. REPLACING THE GRATE BACK INSIDE OF ITS FRAME WILL HOLD THE SACK IN PLACE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MONITORING AND MAINTAINING THIS SEDIMENT CONTROL DEVICE. THE SACK IS CONSIDERED FULL AND READY TO EMPTY WHEN THE THE "RESTRAINT CORD" IS NO LONGER VISIBLE.
3. THE "SILT SACK" IS REMOVED BY PLACING TWO (2) PIECES IF 1 INCH DIAMETER REBAR THROUGH THE LIFTING LOOPS LOCATED ON EACH SIDE OF THE SACK AND LIFTING WITH AN APPROPRIATE PIECE OF CONSTRUCTION EQUIPMENT. THE LIFTING STRAPS ARE CONNECTED TO THE BOTTOM OF THE SACK AND THE LIFTING ACTION WILL CAUSE THE SACK TO TURN INSIDE OUT, AND EMPTYING THE CONTENTS. THE SACK SHOULD THEN BE CLEANED, RINSED AND RETURNED TO ITS ORIGINAL SHAPE AND PLACED BACK IN THE BASIN.
4. THE "SILT SACK" IS REUSABLE, THEREFORE, ONCE THE CONSTRUCTION CYCLE IS COMPLETE, REMOVE THE SACK FROM THE BASIN, CLEAN AND STORE OUT OF DIRECT SUNLIGHT UNTIL ITS NEXT USE.
5. THE "SILT SACK" SEDIMENT CONTROL DEVICE IS MANUFACTURED BY: ACF ENVIRONMENTAL 1801-A WILLIS ROAD RICHMOND, VA. 23237 PHONE: 800-644-9223 FAX: 804-271-3074
6. WITH STRUCTURES WITH CURB INLETS, CONTRACTOR SHALL USE "SILT SACKS" CURB DEFLECTOR, ANCHORED STRAW WATTLES OR EQUIVALENT COMBINATION OF PRODUCTS

SEDIMENT CONTROL DEVICE "SILT SACK" FOR CATCH BASINS

NOT TO SCALE



NOTES:

1. STONE SIZE- AASHTO DESIGNATION M43, SIZE NO. 2 (2 1/2" TO 1 1/2"). USE CRUSHED STONE.
2. LENGTH- AS SHOWN ON PLANS, MIN. 50 FEET.
3. THICKNESS- NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH- NOT LESS THAN FULL WIDTH OF ALL POINT OF INGRESS OR EGRESS.
5. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 D.dwg, TAB:D6

CITY PROPERTY PLAN BOOK SHEETS:
I & I SHEETS: III-9, III-II

DESIGN BY: RLM
DRAWN BY: SAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02. 16.2018

STATE OF MAINE ROBERT A. McSORLEY No. 8588 LICENSED PROFESSIONAL ENGINEER
02. 16.2018

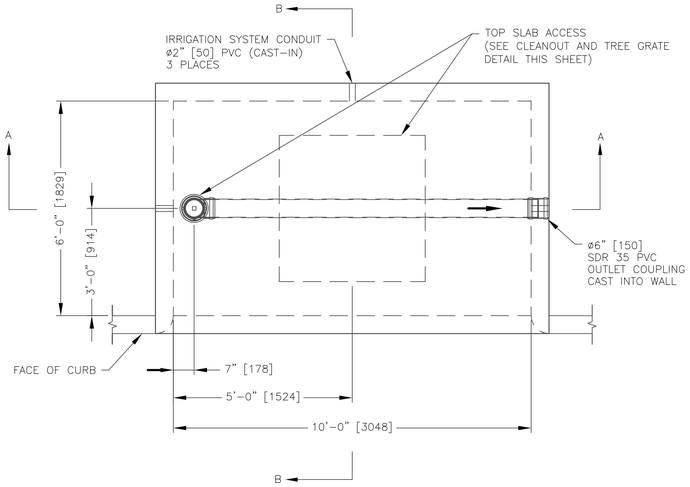
BEDFORD STREET
SEWER SEPERATION PROJECT
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

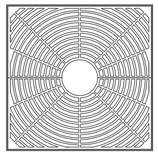
RESURGAM CITY OF PORTLAND, MAINE

SHEET #
42 OF 46

PLAN NUMBER



PLAN VIEW

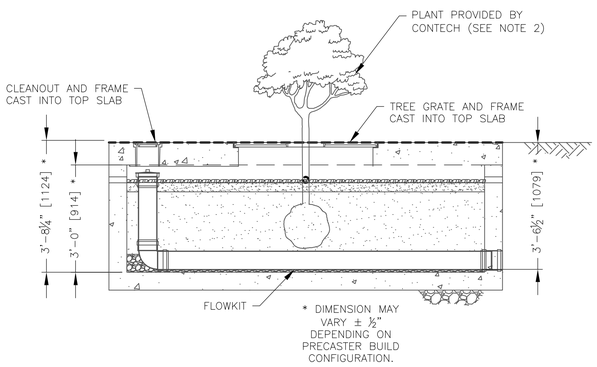


48" x 48" [1219 x 1219]

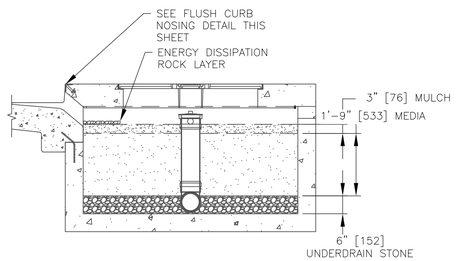
TREE GRATE

(ACTUAL PRODUCT MAY VARY)

N.T.S.



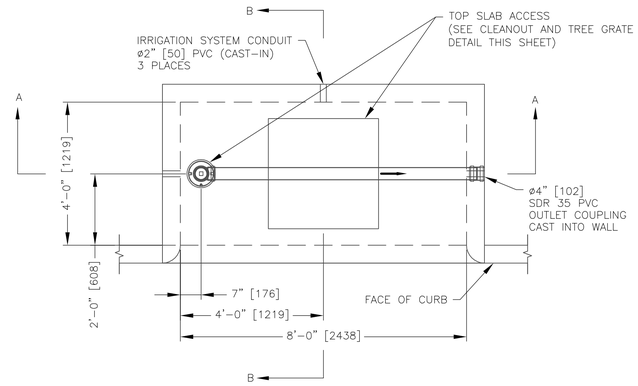
SECTION A–A



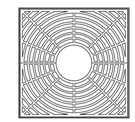
SECTION B–B

FILTERRA 10x6 OFFLINE STANDARD DETAIL MODEL: FT1006

NOT TO SCALE



PLAN VIEW

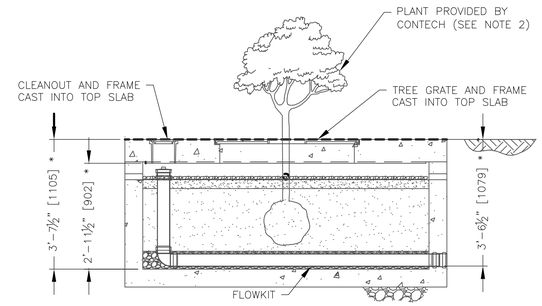


36" x 36" [914 x 914]

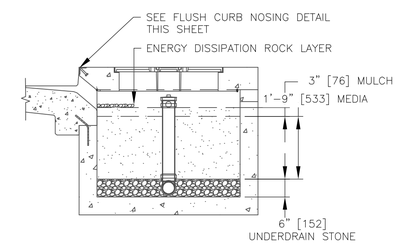
TREE GRATE

(ACTUAL PRODUCT MAY VARY)

N.T.S.



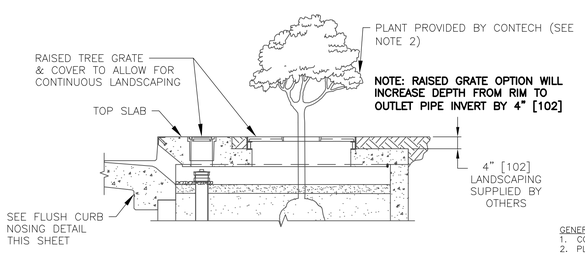
SECTION A–A



SECTION B–B

FILTERRA 8x4 OFFLINE STANDARD DETAIL MODEL: FT0804

NOT TO SCALE



OPTIONAL RECESSED TOP SLAB DETAIL

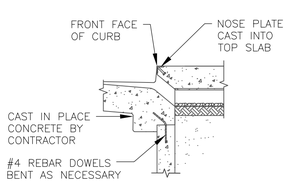
(TYPICAL TOP SLAB DETAIL SHOWN IN SECTION B–B)

ø7" x 8" [178 x 203]

CLEANOUT

(ACTUAL PRODUCT MAY VARY)

N.T.S.



FLUSH CURB NOSING DETAIL

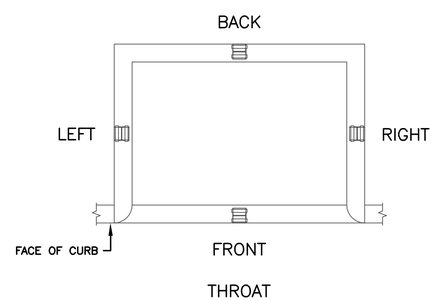
(OTHER CURB NOSING OPTIONS MAY BE AVAILABLE)

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. PLANT, MULCH, AND DISSIPATION ROCK ARE SUPPLIED BY CONTECH AND DELIVERED AT TIME OF SYSTEM ACTIVATION. PLANT SELECTION SHALL BE DONE BY THE ENGINEER OF RECORD IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
3. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
4. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
5. FILTERRA WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
6. STRUCTURE DESIGNED FOR PEDESTRIAN LIVE LOAD WITH H5 (4,000 LBS.) WHEEL LOAD MOUNTING THE CURB AND ADJACENT HS-2 LIVE LOAD SURCHARGE ON THE WALLS OF THE STRUCTURE.
7. FILTERRA STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND ACI-318 LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE FILTERRA VAULT (LIFTING CLUTCHES PROVIDED). SPREADER BAR WITH SUFFICIENT CABLE IS REQUIRED FOR SAFETY AND REDUCTION OF DAMAGE TO CONCRETE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE AND INSTALL OUTLET PIPE. PVC COUPLING CAST-IN TO WALL FOR OUTLET PIPE CONNECTION.
E. CONTRACTOR TO SUPPLY AND INSTALL INLET PROTECTION BAR IF REQUIRED BY LOCAL JURISDICTION.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT FILTERRA MEDIA BAY FROM CONSTRUCTION-RELATED EROSION RUNOFF.
G. CONTECH IS RESPONSIBLE FOR ACTIVATION OF THE SYSTEM AND PLANTING OF THE PLANT THAT IS SPECIFIED. ACTIVATION ONLY OCCURS WHEN THE SITE IS FULLY STABILIZED, FINAL PAVEMENT INSTALLED AND SWEPT CLEAN OF CONSTRUCTION SEDIMENT.
H. ALL FILTERRA UNITS MUST BE WATERED BY IRRIGATION LINES OR SPRINKLER SYSTEMS ON A REGULAR BASIS. EACH FILTERRA UNIT INCLUDES IRRIGATION HOLES FOR NEW OR EXISTING IRRIGATION LINES.



OUTLET PIPE ORIENTATION OPTIONS

ORIENTATION REFERENCE IS INLET THROAT

REFERENCES:

Civil 3D 2013 Drawing Name:
17112 D.dwg, TAB:D7

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	SAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02. 16.2018

STATE OF MAINE ROBERT A. MCSORLEY No. 6569 LICENSED PROFESSIONAL ENGINEER

BEDFORD STREET
SEWER SEPERATION PROJECT

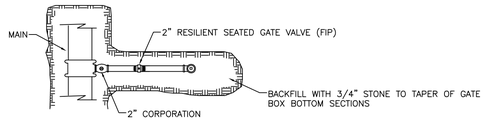
STANDARD CONSTRUCTION DETAILS

CITY OF PORTLAND, MAINE
PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

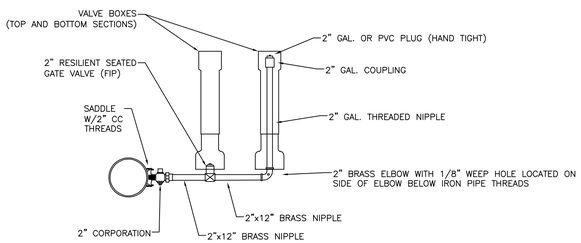
RESURGAM CITY OF PORTLAND, MAINE

SHEET #
43 OF 46

PLAN NUMBER

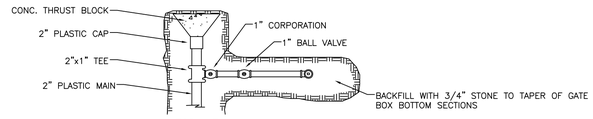


TOP VIEW

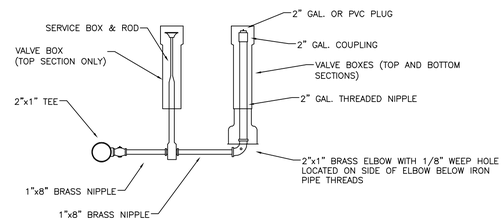


SIDE VIEW

SIDE-ARM BLOW-OFF 4" & LARGER MAINS

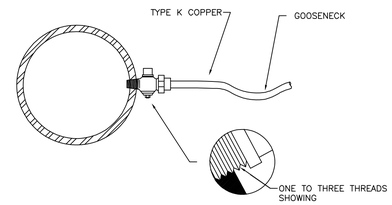


TOP VIEW

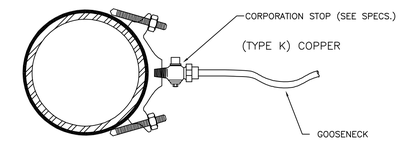


SIDE VIEW

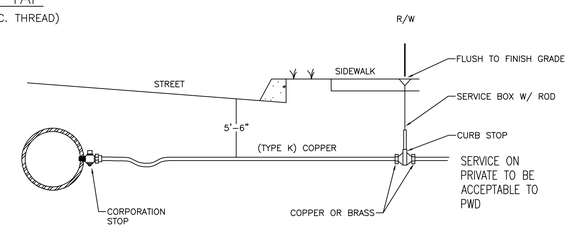
SIDE-ARM BLOW-OFF 2" MAIN



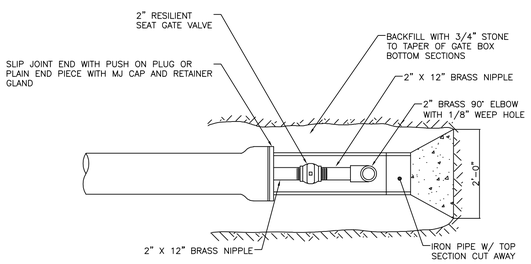
SERVICE TAP
(3/4" AND 1" C.C. THREAD)



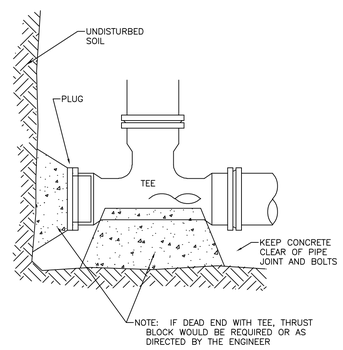
SERVICE SADDLE
(1-1/2" AND 2" C.C. THREAD)

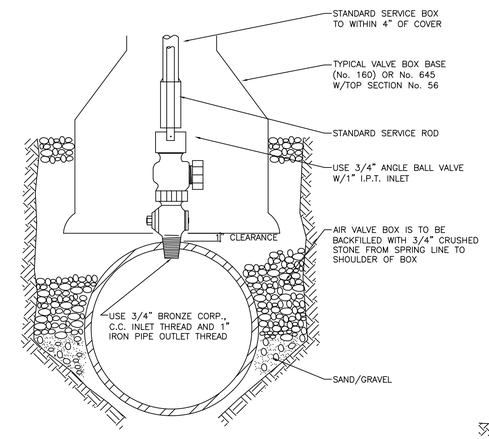


TYPICAL SERVICE CONNECTION

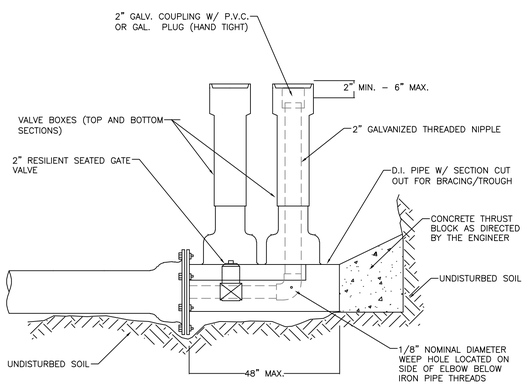


TOP VIEW

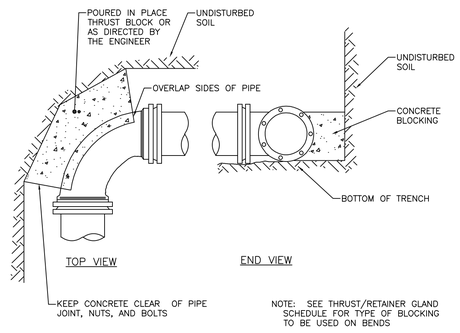




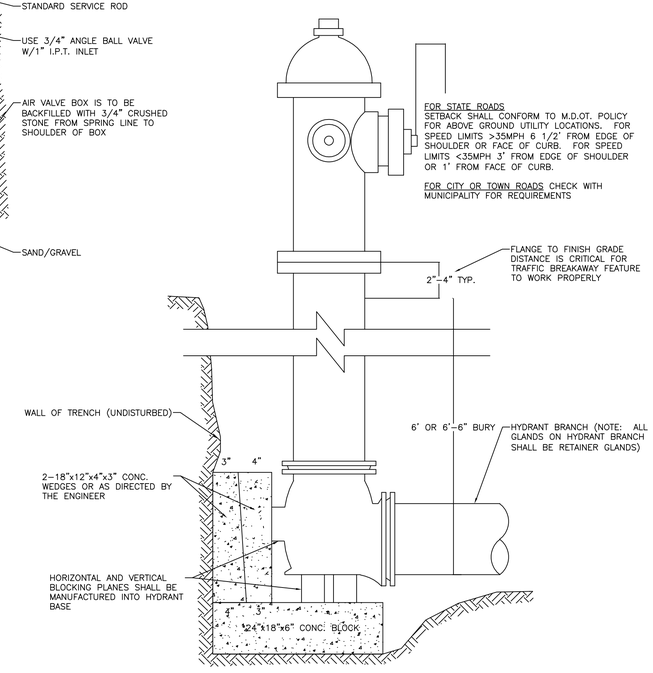
TYPICAL AIR VALVE (1")



STANDARD 2" BLOW OFF



STANDARD BEND BLOCKING



TYPICAL HYDRANT INSTALLATION DETAIL

Civil 3D 2013 Drawing Name:
17112 D.dwg, TAB:D8

REFERENCES:

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY:	RLM
DRAWN BY:	AAP
CHECKED BY:	RAM
SCALE:	1" = 20'
DATE:	02.16.2018

STATE OF MAINE ROBERT A. MOSELEY No. 8568 LICENSED PROFESSIONAL ENGINEER

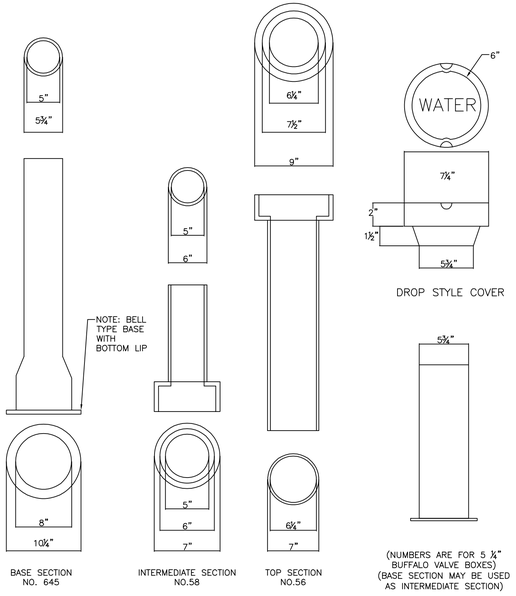
BEDFORD STREET
SEWER SEPERATION PROJECT

44 - PORTLAND WATER DISTRICT
DETAILS

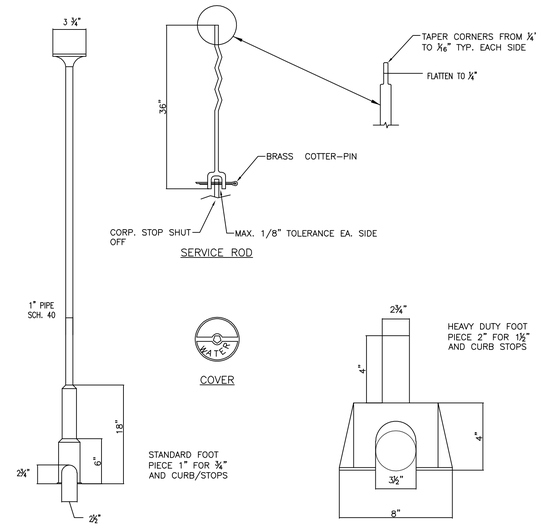
PORTLAND WATER DISTRICT
225 DOUGLAS STREET
PORTLAND, MAINE

SHEET #
44 OF 46

PLAN NUMBER



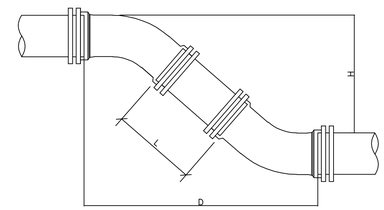
VALVE BOX & COVER

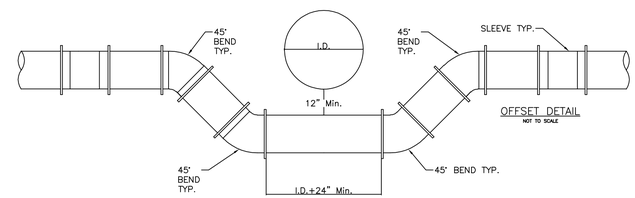


NOTE : ANY EXTENSION OF SERVICE BOX REQUIRES:
1. 1" FEMALE IRON PIPE COUPLING
2. 1" THREADED PIPE (THIS IS TO BE A NON-WELDED, TWO PIECE ARRANGEMENT. SLIP ON ADAPTERS ARE NOT PERMISSIBLE.)

SERVICE BOX

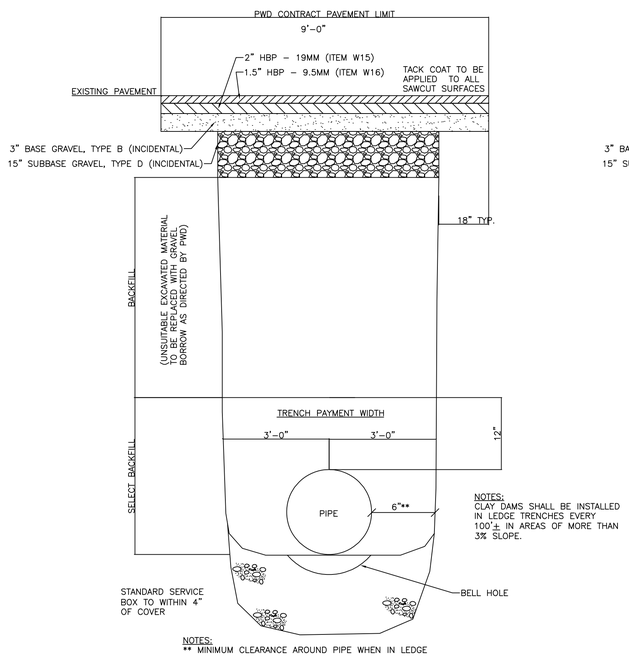
FOOT PIECE





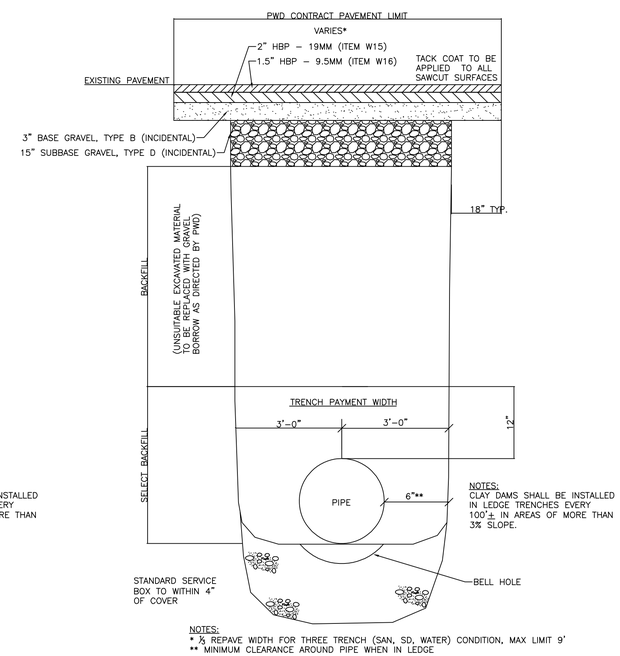
OFFSET DETAIL
NOT TO SCALE

NOTE:
DIMENSIONS APPLICABLE FOR SIGMA COMPACT BENDS. FOR TYLER COMPACT BENDS, ADD 1/2" TO "D" DIMENSION AND SUBTRACT 1/2" FROM "L" DIMENSION. FOR OTHER FITTINGS REFER TO MANUFACTURER'S RECOMMENDATIONS.



NOTES:
** MINIMUM CLEARANCE AROUND PIPE WHEN IN LEDGE

SECTION THRU EARTH TRENCH PERMANENT TRENCH REPAIR
N.T.S.



NOTES:
* ½ REPAVE WIDTH FOR THREE TRENCH (SAN, SD, WATER) CONDITION, MAX LIMIT 9'
** MINIMUM CLEARANCE AROUND PIPE WHEN IN LEDGE

SECTION THRU EARTH TRENCH ROAD REPAVE
N.T.S.

	6" PIPE		8" PIPE		12" PIPE	
H	D	L	D	L	D	L
12"	1' 6-1/2"	0' 10-1/2"	1' 7-1/2"	0' 9-1/2"	1' 11-1/2"	0' 5-1/2"
13"	1' 7-1/2"	0' 11-7/8"	1' 8-1/2"	0' 10-7/8"	2' 0-1/2"	0' 6-7/8"
14"	1' 8-1/2"	1' 1-5/16"	1' 9-1/2"	1' 0-5/16"	2' 1-1/2"	0' 8-5/16"
15"	1' 9-1/2"	1' 2-11/16"	1' 10-1/2"	1' 1-11/16"	2' 2-1/2"	0' 9-11/16"
16"	1' 10-1/2"	1' 4-1/8"	1' 11-1/2"	1' 3-1/8"	2' 3-1/2"	0' 11-1/8"
17"	1' 11-1/2"	1' 5-9/16"	2' 0-1/2"	1' 4-9/16"	2' 4-1/2"	1' 0-9/16"
18"	2' 0-1/2"	1' 6-15/16"	2' 1-1/2"	1' 5-15/16"	2' 5-1/2"	1' 1-15/16"
19"	2' 1-1/2"	1' 8-3/8"	2' 2-1/2"	1' 7-3/8"	2' 6-1/2"	1' 3-3/8"
20"	2' 2-1/2"	1' 9-13/16"	2' 3-1/2"	1' 8-13/16"	2' 7-1/2"	1' 4-13/16"
21"	2' 3-1/2"	1' 11-3/16"	2' 4-1/2"	1' 10-3/16"	2' 8-1/2"	1' 6-3/16"
22"	2' 4-1/2"	2' 0-5/8"	2' 5-1/2"	1' 11-5/8"	2' 9-1/2"	1' 7-5/8"
23"	2' 5-1/2"	2' 2"	2' 6-1/2"	2' 1"	2' 10-1/2"	1' 9"
24"	2' 6-1/2"	2' 3-7/16"	2' 7-1/2"	2' 2-7/16"	2' 11-1/2"	1' 10-7/16"
25"	2' 7-1/2"	2' 4-7/8"	2' 8-1/2"	2' 3-7/8"	3' 0-1/2"	1' 11-7/8"
26"	2' 8-1/2"	2' 6-1/4"	2' 9-1/2"	2' 5-1/4"	3' 1-1/2"	2' 1-1/4"
27"	2' 9-1/2"	2' 7-11/16"	2' 10-1/2"	2' 6-11/16"	3' 2-1/2"	2' 2-11/16"
28"	2' 10-1/2"	2' 9-1/8"	2' 11-1/2"	2' 8-1/8"	3' 3-1/2"	2' 4-1/8"
29"	2' 11-1/2"	2' 10-1/2"	3' 0-1/2"	2' 9-1/2"	3' 4-1/2"	2' 5-1/2"
30"	3' 0-1/2"	2' 11-15/16"	3' 1-1/2"	2' 10-15/16"	3' 5-1/2"	2' 6-15/16"
31"	3' 1-1/2"	3' 1-5/16"	3' 2-1/2"	3' 0-5/16"	3' 6-1/2"	2' 8-5/16"
32"	3' 2-1/2"	3' 2-3/4"	3' 3-1/2"	3' 1-3/4"	3' 7-1/2"	2' 9-3/4"
33"	3' 3-1/2"	3' 4-3/16"	3' 4-1/2"	3' 3-3/16"	3' 8-1/2"	2' 11-3/16"
34"	3' 4-1/2"	3' 5-9/16"	3' 5-1/2"	3' 4-9/16"	3' 9-1/2"	3' 0-9/16"
35"	3' 5-1/2"	3' 7"	3' 6-1/2"	3' 6"	3' 10-1/2"	3' 2"
36"	3' 6-1/2"	3' 8-7/16"	3' 7-1/2"	3' 7-7/16"	3' 11-1/2"	3' 3-7/16"
37"	3' 7-1/2"	3' 9-13/16"	3' 8-1/2"	3' 8-13/16"	4' 0-1/2"	3' 4-13/16"
38"	3' 8-1/2"	3' 11-1/4"	3' 9-1/2"	3' 10-1/4"	4' 1-1/2"	3' 6-1/4"
39"	3' 9-1/2"	4' 0-11/16"	3' 10-1/2"	3' 11-11/16"	4' 2-1/2"	3' 7-11/16"
40"	3' 10-1/2"	4' 2-1/16"	3' 11-1/2"	4' 1-1/16"	4' 3-1/2"	3' 9-1/16"
41"	3' 11-1/2"	4' 3-1/2"	4' 0-1/2"	4' 2-1/2"	4' 4-1/2"	3' 10-1/2"
42"	4' 0-1/2"	4' 4-7/8"	4' 1-1/2"	4' 3-7/8"	4' 5-1/2"	3' 11-7/8"
43"	4' 1-1/2"	4' 6-5/16"	4' 2-1/2"	4' 5-5/16"	4' 6-1/2"	4' 1-5/16"
44"	4' 2-1/2"	4' 7-3/4"	4' 3-1/2"	4' 6-3/4"	4' 7-1/2"	4' 2-3/4"
45"	4' 3-1/2"	4' 9-1/8"	4' 4-1/2"	4' 8-1/8"	4' 8-1/2"	4' 4-1/8"
46"	4' 4-1/2"	4' 10-9/16"	4' 5-1/2"	4' 9-9/16"	4' 9-1/2"	4' 5-9/16"
47"	4' 5-1/2"	4' 11-15/16"	4' 6-1/2"	4' 10-15/16"	4' 10-1/2"	4' 6-15/16"
48"	4' 6-1/2"	5' 1-3/8"	4' 7-1/2"	5' 0-3/8"	4' 11-1/2"	4' 8-3/8"
49"	4' 7-1/2"	5' 2-13/16"	4' 8-1/2"	5' 1-13/16"	5' 0-1/2"	4' 9-13/16"
50"	4' 8-1/2"	5' 4-3/16"	4' 9-1/2"	5' 3-3/16"	5' 1-1/2"	4' 11-3/16"
51"	4' 9-1/2"	5' 5-5/8"	4' 10-1/2"	5' 4-5/8"	5' 2-1/2"	5' 0-5/8"
52"	4' 10-1/2"	5' 7-1/16"	4' 11-1/2"	5' 6-1/16"	5' 3-1/2"	5' 2-1/16"
53"	4' 11-1/2"	5' 8-7/16"	5' 0-1/2"	5' 7-7/16"	5' 4-1/2"	5' 3-7/16"
54"	5' 0-1/2"	5' 9-7/8"	5' 1-1/2"	5' 8-7/8"	5' 5-1/2"	5' 4-7/8"
55"	5' 1-1/2"	5' 11-5/16"	5' 2-1/2"	5' 10-5/16"	5' 6-1/2"	5' 6-5/16"

TYPICAL MAIN OFFSET

REFERENCES:
Civil 3D 2013 Drawing Name:
17112 D.dwg, TAB:D9

CITY PROPERTY PLAN BOOK SHEETS:
I & J SHEETS: III-9, III-11

DESIGN BY: RLM
DRAWN BY: AAP
CHECKED BY: RAM
SCALE: 1" = 20'
DATE: 02.16.2018

STATE OF MAINE
ROBERT A. MOSELEY
Mo. 8658
LICENSED
PROFESSIONAL ENGINEER
02.16.2018

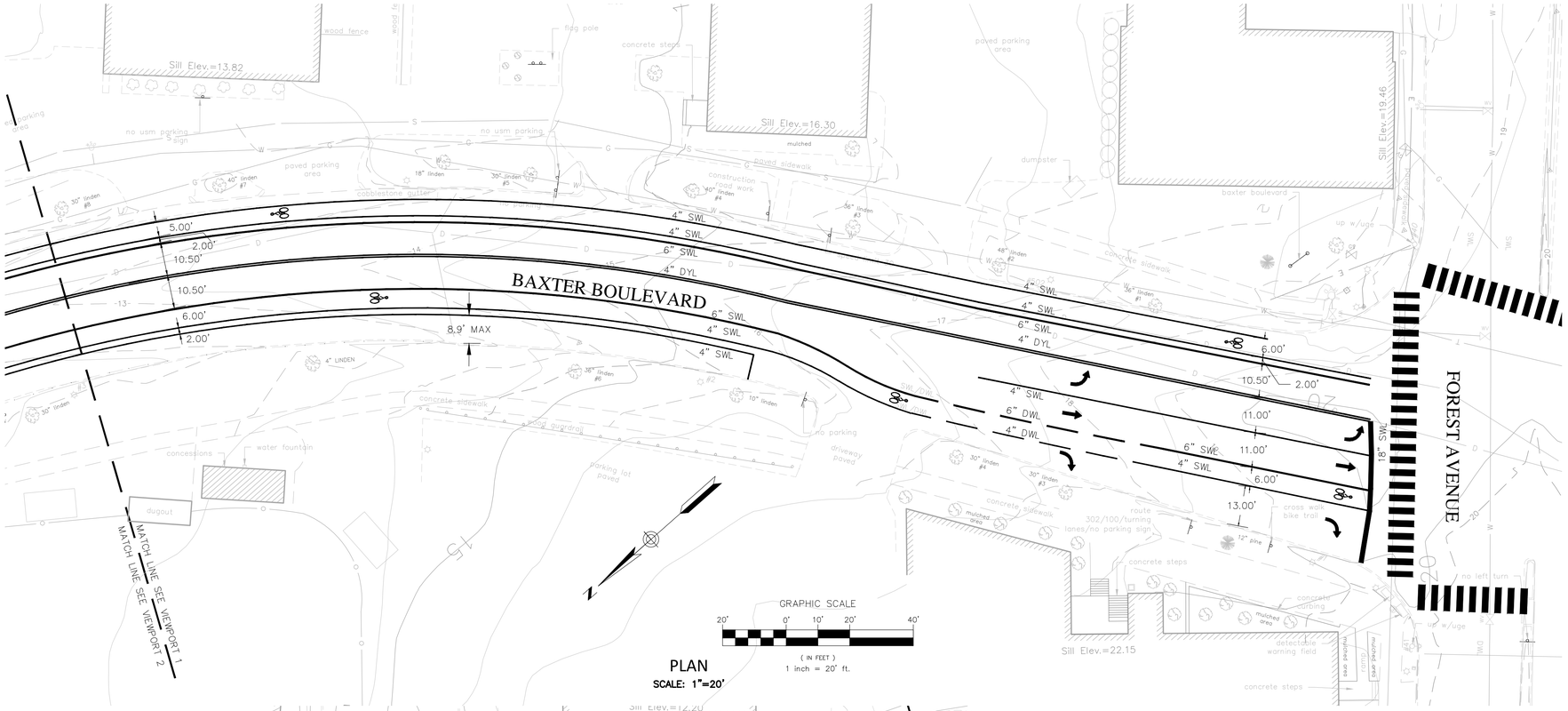
BEDFORD STREET
SEWER SEPERATION PROJECT

PORTLAND WATER DISTRICT DETAILS

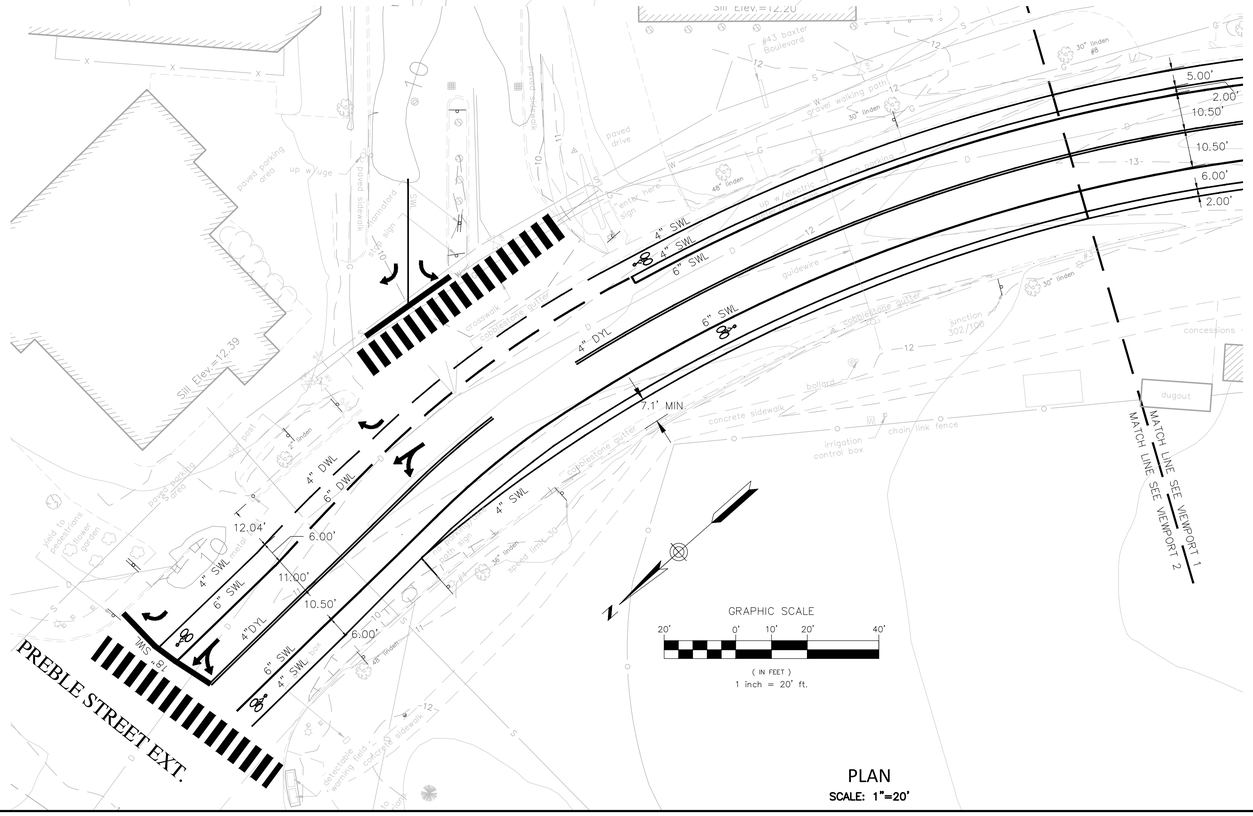
PORTLAND WATER DISTRICT
225 DOUGLAS STREET
PORTLAND, MAINE

SHEET #
45 OF 46

PLAN NUMBER



PLAN
SCALE: 1"=20'



PLAN
SCALE: 1"=20'

NOTES:

TWO BUFFERED BIKE LANES

PARKING NEUTRAL

PARKING LANE WIDTHS ALL OVER 7 FT.

DISTANCE FROM CENTER LINE TO CROWN OF ROAD RANGING FROM 0'-5'

RESTRIPING

TOTAL SYMBOLS (EA): 21
- RIGHT ARROWS: 5
- LEFT ARROWS: 2
- STRAIGHT ARROWS: 2
- COMBO ARROW: 2
- BIKE SYMBOL: 9

WHITE PAINT (SF): 880

4" WHITE/YELLOW PAINT (LF): 3,890

6" WHITE/YELLOW PAINT (LF): 1,420

Civil 3D 2018 Drawing Name:
"Baxter Blvd Restriping.dwg"
Civil 3D 2015 Survey Database:
"13058A"

REFERENCES:

SURVEY CREW:	LKS
DRAWN BY:	JML
CHECKED BY:	JWL
SCALE:	1" = 20'
DATE:	JAN. 25, 2018

BEDFORD ST.
SEWER SEPARATION PROJECT

BAXTER BOULEVARD
RESTRIPING PLANS

CITY OF PORTLAND, MAINE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION

SHEET #
R-1

PLAN NUMBER
1 OF 1

CONTRACT DOCUMENTS

FOR

2018 WATER MAIN REPLACEMENT

BAXTER BOULEVARD

between

Belmeade Road and Forest Avenue

PREBLE STREET

between

Baxter Boulevard and Forest Avenue

FOREST AVENUE

between

Bedford Street and Pitt Street

And

Deerfield Road, Belmeade Road, Grasmere Road, Durham Street, Falmouth Street, and Bedford Street

PORTLAND, MAINE

February 16, 2018

PORTLAND WATER DISTRICT
225 Douglass Street
Portland, Maine 04104

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DIVISION 0 – BIDDING & CONTRACT REQUIREMENTS

SECTION 00020 - INVITATION TO BID

Sealed bids for construction of the Bedford Street Sewer Separation (Bid #18056) will be received by the City of Portland Purchasing Office, Room 103, City Hall, 389 Congress Street, Portland, Maine 04101 until **3:00 P.M. on March 15, 2018**, local time and then at said office publicly opened and read aloud. Bids submitted after this time will not be accepted. Each bidder must submit a single sealed envelope, the outside of which must be clearly marked "Bid for Bedford Street Sewer Separation (Bid #18056)".

Location

The Bedford Street Sewer Separation Project is located along portions of Bedford Street, Durham Street, Falmouth Street, Forest Avenue, Baxter Boulevard, Preble Street Extension, Belmeade Road, Deerfield Road and Grasmere Road in Portland.

Outline of Work

The City of Portland work includes installation of sewer and storm drain pipe, catch basin and drain manhole structures, street re-construction, earthwork, dewatering, and associated work as shown on contract drawings and documents. The work will include the installation of new water mains, services and appurtenances by the Portland Water District.

The contractor will be required to enter into separate contracts with the City of Portland and the Portland Water District.

The work includes, but is not limited to:

Base Bid

1. The installation of approximately 6,200 linear feet (lf) of new gravity storm drain, installation of precast catch basins and manholes and associated construction.
2. Installation of approximately 2,400 lf of new sanitary sewer pipe, sewer manholes and associated lateral construction.
3. Street Improvements including the removal of bituminous pavement; pavement milling; removal of concrete and bituminous sidewalks; installation and/or replacement of granite curb and bituminous and concrete sidewalks; street reconstruction and paving; loam and seeding disturbed areas including locations were sidewalks and street pavement is removed and not replaced; areas of partial depth and full depth street reconstruction; the reconstruction of concrete driveway aprons; and the installation of stormwater Best Management Practices (BMP'S).
4. Replacement of approximately 6,300 lf of water main and associated construction as indicated on the plans and Specifications including maintenance of temporary water service during construction; relocation /reconnection of existing water service laterals which may conflict with work.
5. Traffic control are described in the City of Portland Specifications for the Bedford Street Sewer Separation project.
6. Other Incidental work including: support of existing underground utilities including water, natural gas, electrical and telecommunications utilities during excavations; traffic control during construction; providing construction staging areas and trailer for resident inspector.
7. The contractor will coordinate his work with the relocation of gas mains and services a by Unitil.

Basis of Award

The project plans include a bid schedule in two (2) parts. Part 1 of the Bid Form is for the City of Portland's storm drainage, sanitary sewer and street improvement work. Part 2 of the Bid Form is for the Portland Water District's work.

The basis of the award will be the lowest responsive bid for the entire project including either: the sum of Part 1 and Part 2 of the bid schedule listed as TOTAL BASE BID on the bid form. The selected contractor shall be required to enter into separate contracts with the City of Portland and The Portland Water District.

Other Information

The contractor shall make note of the schedule requirements presented in the contract documents. The City intends to begin construction of the project April 1, 2018. The contractor shall meet substantial completion by October 31, 2018 including all Portland Water District infrastructure and improvements as well a base paving.

The Contract Documents may be examined at the following locations:

1. City of Portland Engineering Office, Department of Public Works, 55 Portland Street, Portland, Maine 04101.
2. Purchasing Office, City Hall, Room 103, 389 Congress Street, Portland, Maine 04101

The Issuing Office is City of Portland Engineering Office, Department of Public Works, 55 Portland Street, Portland, Maine 04101. Copies of Contract Documents may be obtained upon payment of a fee of **$100.00** per set. Plans and specification will be available on February 15, 2018 after 1:00 P.M. Partial sets will not be distributed. All requests for mailed documents must be accompanied by an additional non-refundable fee of **$25.00** to cover postage and handling. **Checks should be made payable to CITY OF PORTLAND. Credit cards will not be accepted.** Such payment will not be refunded. Electronic copies of the plans and proposal books are available at no charge.

To be considered a responsive Bidder, the Contractor shall have obtained at least one set of paper plans and specifications from the City of Portland. The Bid will not be awarded to a Bidder unless a record for the purchase of at least one set of paper plans and specifications exists in the office of the Engineer. To meet this requirement and to establish the record of purchase, a prospective Bidder must purchase paper plans and specifications using the name that is to appear in the Bid Documents.

Northern Test Boring, Inc. has done ledge investigations at the project site. A copy of the boring logs and boring layout maps are included in the Appendices of the specifications. Documents and is not a warranty of subsurface conditions.
A Mandatory Pre-Bid Conference will be held for General Contractors at room 24 of the Portland City Hall, 389 Congress Street, Portland, Maine 04101 at 10:00 A.M. on March 1, 2018. Attendance by Subcontractors, while encouraged, is not mandatory.

All questions are to be submitted to Engineer in writing. Questions may be transmitted by e-mail to rmcsorley@sebagotechnics.com. Questions received less than 5 working days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding.

A bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 90 days after receipt of bids unless released by the Owner.

A completed Bid Form, Bid Security, Experience and Qualifications Statement with verification of bonding capacity, and other attachments identified in the instructions must be submitted with the Bid.

Within five days after the receipt of bids, the apparent low responsive bidder shall deliver to the Engineer and Owner for review and acceptance the listing of subcontractors, suppliers or entities for the work listed in Supplementary Condition SC-7.06.

The successful bidder must furnish within **10 calendar days** after the Notice of Award the required number of copies of the **signed Agreement, 100% Performance Bond, 100% Payment Bond**, **Insurance Policy** and begin execution of this contract within 10 calendar days following the Notice to Proceed. **The General Contractor shall be responsible for the full amount of the 100% Performance Bond and the 100% Payment Bonds. Combining bonds of subcontractors is not acceptable.**

Owner's Statement

The Owner reserves the right to reject any or all Bids, to waive any technical or legal deficiencies, and to accept any Bid that it may deem to be in the best interests of the Owner.

SECTION 00200 - INSTRUCTIONS TO BIDDERS

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ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Bidder* – The individual or entity who submits a Bid directly to Owner.

B. *Issuing Office*--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

C. *Successful Bidder* – The lowest responsible Bidder submitting a responsible Bid to whom Owner (on the basis of Owner's evaluation hereinafter provided) makes an award.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the sum stated in the Invitation to Bid may be obtained from the Issuing Office.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be requested.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;

E. obtain and carefully study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or

performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.07 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A mandatory pre-bid conference will be held for Bidders at 10:00 A.M. on March 1, 2018 at room 24 of the Portland City Hall, 389 Congress Street, Portland, Maine 04101. Representative of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of Record, such Addenda as Engineer considered necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Questions may be transmitted by e-mail to rmcsorley@sebagotechnics.com. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda. Questions received less than five (5) days prior to the date for opening of Bids may not be answered. Only

questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 10 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 60 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in the General Conditions and may be supplemented in the General Requirements.

11.02 Whenever a material, article, or piece of equipment is identified by reference to a manufacturer or trade name, it shall be understood that this is referenced for defining the performance of the material, article, or piece of equipment and that other products of equal capacities, quality and function shall be considered. It shall be the Contractor's responsibility to coordinate all submittals to the Engineer for approval to eliminate any conflicts which might arise due to the use of the "or equal" item. Any additional cost incident to the use of "or equal" items will be paid by the Contractor.

11.03 Wherever it may be written that an equipment manufacturer must have a specified period of experience with his product or equipment, who does not meet the specified experience period, can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.10 The address and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one copy of the Bid Form, and the Bid Bond Form. . The Bid Form is to be reproduced, completed and submitted with the Bid security.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title, the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to as indicated on the bid form.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bid must withdraw its initial Bid in the manner specified in Paragraphs 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security with be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids:

A. Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
B. For determination of the apparent low Bidder, Bids will be compared on the basis of the total of the products of the estimated quantity of each items and unit price Bid for that item, together with any lump sum items. The basis of the award will be lowest responsive bid for entire project based on
    a. The sum of Part 1 and Part 2 of the bid schedule listed as TOTAL BASE BID on the Bid Form

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project. It is intended that the Contract be awarded to the responsible bidder presenting the lowest responsible bid.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder.

ARTICLE 22 - SALES AND USE TAXES

22.01 Owner is exempt from Maine state sales and use taxes on materials and equipment to be incorporated in the Work. Exemption No. E-45784. Said taxes shall not be included in the Bid. Refer to Paragraph SC-6.10 of the Supplementary Conditions for additional information.

ARTICLE 23 – DELETION OF ITEMS

23.01 Owner reserves the right to reduce project scope by the elimination of Bid items, reduction of quantities or unit price Bid items, or deleting elements of lump sum Bid items. No adjustment to other Bid item prices will be permitted. In the case of reduction of quantities on unit price items, the unit price will not be adjusted. Such adjustments to project scope will be determined prior to award of the Contract and will be negotiated with the apparent successful Bidder only. If such negotiations are not satisfactory to Owner, Owner will reject all Bids.

ARTICLE 24 – SPECIAL LEGAL REQUIREMENTS

24.01 Safety and Health Regulations: This project is subject to all of the Safety and Health Regulations (CFR 29 Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations.

24.02 Manufacturer's Experience

Wherever it may be written that an equipment manufacturer must have a specified period of experience with his product or equipment, but does not have the requisite experience, the product or equipment can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

END OF SECTION

SECTION 00410 - BID FORM

2018 Water Main Replacement
Baxter Boulevard between Belmeade Road and Forest Avenue
And
Preble Street between Baxter Boulevard and Forest Avenue
And
Forest Avenue between Bedford Street and Pitt Street
And
Deerfield Road, Belmeade Road, Grasmere Road, Durham Street, Falmouth Street and Bedford Street

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

CITY OF PORTLAND
PURCHASING OFFICE
ROOM103, 389 CONGRESS AVENUE
PORTLAND, MAINE 04101

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. Bidder acknowledges that his Bid will be rejected unless the Issuing Office has a record that the Bidder has purchased at least one set of paper Bidding Documents from the Issuing Office.

C. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

D. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

E. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in SC-4.06.

F. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

G. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

H. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

I. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

J. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

K. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

L. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W1	LF	16-in Ductile Iron Water Main @_____ _____				
	1480.00	Per Linear Foot				
W2	LF	12-in Ductile Iron Water Main @_____ _____				
	1320.00	Per Linear Foot				
W3	LF	8-in Ductile Iron Water Main @_____ _____				
	3434.00	Per Linear Foot				
W4	LF	4-in Ductile Iron Water Main @_____ _____				
	40.00	Per Linear Foot				
W5	EA	Hydrant - Shortside @_____ _____				
	13.00	Per Each				
W6	EA	20-Inch Cut-In Gate Valve @_____ _____				
	1.00	Per Each				
W7	EA	12-Inch Cut-In Gate Valve @_____ _____				
	3.00	Per Each				
W8	EA	8-Inch Cut-In Gate Valve @_____ _____				
	3.00	Per Each				
W9	EA	6-Inch Cut-In Gate Valve @_____ _____				
	3.00	Per Each				
W10	EA	16-inch Gate Valve @_____ _____				
	3.00	Per Each				
W11	EA	12-inch Gate Valve @_____ _____				
	5.00	Per Each				
W12	EA	8-inch Gate Valve @_____ _____				
	14.00	Per Each				
W13	EA	6-inch Gate Valve @_____ _____				
	3.00	Per Each				

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	Quanity	Item with Unit Bid Price Written in Words	Dollars	Cents	Dollars	Cents
W14	EA 1.00	2-inch Blowoff @_____ _____ Per Each				
W15	EA 7.00	1-inch Air Release Valve @_____ _____ Per Each				
W16	EA 27.00	1-inch Copper Service - Shortside @_____ _____ Per Each				
W17	EA 15.00	1-inch Copper Service - Longside @_____ _____ Per Each				
W18	EA 1.00	1-inch Copper Service - Reconnect @_____ _____ Per Each				
W19	EA 4.00	2-inch Copper Service - Shortside @_____ _____ Per Each				
W20	EA 6.00	2-inch Copper Service - Reconnect @_____ _____ Per Each				
W21	EA 3.00	4-inch Fire Service - Long Side @_____ _____ Per Each				
W22	EA 1.00	4-inch Fire Service - Reconnect @_____ _____ Per Each				
W23	EA 3.00	6-inch Fire Service - Shortside @_____ _____ Per Each				
W24	EA 3.00	6-inchFire Service - Long Side @_____ _____ Per Each				
W25	EA 1.00	6-inch Fire Service - Reconnect @_____ _____ Per Each				
W26	EA 2.00	8-inch Fire Service - Reconnect @_____ _____ Per Each				

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

			Unit Price		Total Price	
Item No.	**Quanity**	**Item with Unit Bid Price Written in Words**	**Dollars**	**Cents**	**Dollars**	**Cents**
W27	EA 1.00	12-inch Fire Service - Reconnect @_____ _____ Per Each				
W28	CY 71.00	Gravel Borrow @_____ _____ Per Cubic Yard				
W29	CY 71.00	Unsuitable Material Excavated Below Grade @_____ _____ Per Cubic Yard				
W30	CY 119.00	Rock Excavation @_____ _____ Per Cubic Yard				
W31	SY 947.00	Roadway Cobblestones with Concrete Base Removal @_____ _____ Per Square Yard				
W32	SY 65.00	Remove and Reset Cobblestone Curb @_____ _____ Per Square Yard				
W33	LF 920.00	Remove Subsurface Rail Line @_____ _____ Per Linear Foot				
W34	CY 316.00	Install Concrete Base in Trenches @_____ _____ Per Cubic Yard				
W35	LS 1.00	Work Zone Traffic Control @_____ _____ Lump Sum				
W36	LS 1.00	Flaggers @_____ _____ Lump Sum				

	TOTAL COST
TOTAL AMOUNT OF PORTLAND WATER DISTRICT BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES. _____ _____ _____	

SUB-TOTAL PART 1 – Sewer Separation (City of Portland): **$_____**

SUB-TOTAL PART 2 – Water Main Replacement (Portland Water District): **$_____**

TOTAL BID PRICE (Sub-Total Part 1 + Sub-Total Part 2, Basis of Award) **$_____**

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the form of _____

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

EXHIBIT B

PROPOSAL

Bid No. 18056
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS

PROJECT: BEDFORD STREET SEWER SEPARATION

**** THIS SHEET MUST BE INCLUDED IN YOUR PROPOSAL ****

The undersigned hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, that it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same, and that no person acting for or employed by the City of Portland is directly or indirectly interested in this proposal or in any anticipated profits which may be derived there from.

The undersigned hereby declares that they have read and understand all conditions as outlined in this Request for Proposals, and that the proposal is made in accordance with the same.

The bidder acknowledges the receipt of Addenda numbered: 1, 2 & 3

COMPANY NAME: Shaw Brothers Construction, Inc.

PRINT NAME & TITLE: Jonathan E. Shaw - President

ADDRESS: PO Box 69, 341 Mosher Rd. Gorham, ME

E-MAIL ADDRESS: bbrady@shawbrothers.com

PHONE NUMBER: 207-839-2552 FAX NUMBER: 839-6239

TYPE OF ORGANIZATION - PARTNERSHIP, CORPORATION, INDIVIDUAL, OTHER: Corporation

STATE OF INCORPORATION, IF APPLICABLE: Maine

FEDERAL TAX IDENTIFICATION NUMBER (Required): 01-0350537

AUTHORIZED SIGNATURE: [signature]
Jonathan E. Shaw - President

DATE: 3/15/18

NOTE: Proposals must bear the handwritten signature of a duly authorized member or employee of the organization submitting a proposal.

Addendum #1

CITY OF PORTLAND, MAINE
Bedford Street Sewer Separation Project
Portland Water District Main Replacement;
Bid #18056

Current Date: February 26, 2018

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

****

ALL BIDDERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY ACKNOWLEDGED ON THE BID PROPOSAL FORM OR BY THE INSERTION OF THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.

****

MATTHEW F. FITZGERALD
PURCHASING MANAGER

NOTE: Questions and Answers are offered on the attached pages.

Receipt of **Addendum No. 1** to the City of Portland's **Bid #18056: Bedford Street Sewer Separation Project; Portland Water District Main Replacement** is hereby acknowledged.

COMPANY: Shaw Brothers Construction, Inc.

NAME: _____

SIGNED BY: Mitch Elliot DATE: 3/15/18

PRINT NAME & TITLE: Mitch Elliott - Estimator

ADDRESS: PO Box 69, 341 Mosher Rd.

Gorham ME 04038

Zip Code

Addendum #2

CITY OF PORTLAND, MAINE
Bedford Street Sewer Separation Project
Portland Water District Main Replacement
Bid #18056

Current Date: March 7, 2018

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

****

ALL BIDDERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY ACKNOWLEDGED ON THE BID PROPOSAL FORM OR BY THE INSERTION OF THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.

****

MATTHEW F. FITZGERALD
PURCHASING MANAGER

NOTE: Questions and Answers are offered on the attached pages.

Receipt of **Addendum No. 2** to the City of Portland's **Bid #18056: Bedford Street Sewer Separation, Portland Water District Water Main Replacement** is hereby acknowledged.

COMPANY: Shaw Brothers Construction, Inc

NAME: _____

SIGNED BY: Mitch Elliott DATE: 3/15/18

PRINT NAME & TITLE: Mitch Elliott - Estimator

ADDRESS: PO Box 69, 341 Mosher Rd.

Gorham, ME 04038

Zip Code

Addendum #3

CITY OF PORTLAND, MAINE
Bedford Street Sewer Separation Project
Portland Water District Main Replacement
Bid #18056

Current Date: March 12, 2018

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

****

ALL BIDDERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY ACKNOWLEDGED ON THE BID PROPOSAL FORM OR BY THE INSERTION OF THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.

****

MATTHEW F. FITZGERALD
PURCHASING MANAGER

NOTE: Questions and Answers are offered on the attached pages.

Receipt of **Addendum No. 3** to the City of Portland's **Bid #18056: Bedford Street Sewer Separation, Portland Water District Water Main Replacement** is hereby acknowledged.

COMPANY: Shaw Brothers Construction, Inc.

NAME: _____

SIGNED BY: Mitch Elliott DATE: 3/15/18

PRINT NAME & TITLE: Mitch Elliott - Estimator

ADDRESS: PO Box 69, 341 Mosher Rd.

Gorham, ME 04038

Zip Code

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
1	201.24	EA 4.00	Remove Street Tree and Stump @ Six hundred fifty dollars and zero cents Per Each	650.	00	2,600.	00
2	202.15	EA 6.00	Remove Exist Manhole or Catch Basin @ Four hundred fifty dollars and zero cents Per Each	450.	00	2,700.	00
3	202.20	SY 20970.00	Remove Bituminous Concrete Pavement (Plan Quantity) @ Three dollars and fifty cents Per Square Yard	3.	50	73,395.	00
4	202.60	LF 82.00	Remove Storm Drain or Sewer Pipe @ Thirty dollars and zero cents Per Linear Foot	30.	00	2,460.	00
5	202.70	SY 2740.00	Remove Subsurface Cobblestones with Concrete Base @ Thirteen dollars and zero cents Per Square Yard	13.	00	35,620.	00
6	202.90	LF 920.00	Remove Subsurface Rail Line @ Seven dollars and twenty cents Per Linear Foot	7.	20	6,624.	00
7	203.20	CY 4840.00	Common Excavation @ Nineteen dollars and fifty cents Per Cubic Yard	19.	50	94,380.	00
8	203.25	CY 340.00	Granular Borrow @ Twenty five dollars and zero cents Per Cubic Yard	25.	00	8,500.	00
9	203.28	VF 70.00	Test Pits @ Eighty Six dollars and fifty cents Per Vertical Foot	86.	50	6,055.	00
10	203.35	CY 140.00	Crushed Stone (Overdepth) @ Thirty five dollars and zero cents Per Cubic Yard	35.	00	4,900.	00
11	206.061	CY 140.00	Structural Earth Excavation (Overdepth) @ Twenty dollars and zero cents Per Cubic Yard	20.	00	2,800.	00
12	206.07	CY 1620.00	Structural Rock Excavation @ Zero dollars and one cents Per Cubic Yard	0.	01	16.	20
13	304.10	CY 6010.00	Agg Subbase Course Type D @ Twenty seven dollars and zero cents Per Cubic Yard	27.	00	162,270.	00
14	304.15	CY 1140.00	Agg Base Course Type B @ Thirty six dollars and zero cents Per Cubic Yard	36.	00	41,040.	00
15	312.10	SY 563.00	Bituminous Driveway Apron @ forty nine dollars and zero cents Per Square Yard	49.	00	27,587.	00

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written In Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
16	403.207	T 2280.00	Hot Mix Asphalt 19.0 MM @ Eighty seven dollars and zero cents Per Ton	87.	00	198,360.	00
17	403.208	T 2440.00	Hot Mix Asphalt 12.5MM @ Eighty nine dollars and zero cents Per Ton	89.	00	217,160.	00
18	603.132	LF 2140.00	8-Inch Diameter PVC Storm Drain/Sewer Pipe (ALL DEPTHS) @ ninety five dollars and ninety cents Per Linear Foot	95.	90	205,226.	00
19	603.142	LF 1150.00	10-Inch Diameter PVC Storm Drain/Sewer Pipe (ALL DEPTHS) @ ninety eight dollars and Per Linear Foot thirty cents	98.	30	113,045.	00
20	603.159	LF 1150.00	12-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ ninety five dollars and zero cents Per Linear Foot	95.	00	109,250.	00
21	603.179	LF 390.00	18-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ one hundred forty dollars and zero cents Per Linear Foot	140.	00	54,600.	00
22	603.199	LF 1870.00	24-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ One hundred fifty dollars and Per Linear Foot sixty cents	150.	60	281,622.	00
23	603.209	LF 765.00	30-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ one hundred sixty dollars and Per Linear Foot fifty cents	160.	50	122,782.	50
24	603.219	LF 300.00	36-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ one hundred sixty dollars and Per Linear Foot zero cents	160.	00	48,000.	00
25	603.229	LF 320.00	42-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ one hundred eighty dollars and zero cents Per Linear Foot	180.	00	57,600.	00
26	603.239	LF 710.00	48-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ Two hundred twenty seven dollars Per Linear Foot and fifty cents	227.	50	161,525.	00
27	603.259	LF 220.00	60-Inch Diameter Storm Drain Pipe (ALL DEPTHS) @ Two hundred eighty dollars and Per Linear Foot fifty cents	280.	50	61,710.	00
28	603.829	LF 90.00	42-Inch Diameter DIP, Class 250, Storm Drain Pipe @ four hundred fifty nine dollars and Per Linear Foot zero cents	459.	00	41,310.	00
29	603.91	EA 1.00	30-Inch Diameter Check Valve @ Twelve thousand seven hundred Per Each fifty dollars and zero cents	12,750.	00	12,750.	00
30	603.93	EA 2.00	42-Inch Diameter Check Valve @ Twenty four thousand seven Per Each hundred fifty dollars and zero cents	24,750.	00	49,500.	00

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
31	604.131	EA 44.00	4-foot Diameter Catch Basin @ Three thousand eight hundred Per Each dollars and zero cents	3,800	00	167,200.	00
32	604.15	EA 21.00	4-foot Diameter Manhole @ four thousand dollars and Per Each zero cents	4,000.	00	84,000.	00
33	604.153	EA 23.00	5-foot Diameter Manhole @ Six thousand forty five dollars Per Each and zero cents	6,045.	00	139,035.	00
34	604.154	EA 7.00	6-foot Diameter Manhole @ seven thousand eight hundred Per Each dollars and zero cents	7,800.	00	54,600.	00
35	604.156	EA 4.00	8-foot Diameter Manhole @ Fifteen thousand dollars and zero cents Per Each	15,000.	00	60,000.	00
36	604.159	EA 1.00	12-foot X 6-foot Vault Structure @ Thirty three thousand one hundred Per Each twenty five dollars and zero cents	33,125.	00	33,125.	00
37	604.161	EA 8.00	Modify Structure @ one thousand five hundred Per Each dollars and zero cents	1,500.	00	12,000.	00
38	604.18	EA 7.00	Adjusting Manhole or Structure to Grade @ seven hundred fifty dollars and Per Each zero cents	750.	00	5,250.	00
39	608.08	SY 302.00	Reinforced Concrete Sidewalk @ Eighty nine dollars and zero cents Per Square Yard	89.	00	26,878.	00
40	608.081	SY 77.00	Reinforced Concrete Driveway @ One hundred ten dollars and zero cents Per Square Yard	110.	00	8,470.	00
41	608.15	SY 20.00	Brick Sidewalk with Bituminous Base @ One hundred fifteen dollars and Per Square Yard zero cents	115.	00	2,300.	00
42	608.26	SF 12.00	Curb Ramp Detectable Warning Field @ one hundred dollars and zero cents Per Square Foot	100.	00	1,200.	00
43	609.15	LF 472.00	Sloped Curb Type 1 @ Thirty five dollars and zero cents Per Linear Foot	35.	00	16,520.	00
44	609.151	LF 58.00	Sloped Curb Type 1 - Cir. @ fifty dollars and zero cents Per Linear Foot	50.	00	2,900.	00
45	609.38	LF 770.00	Remove and Reset Granite Curb @ Twenty eight dollars and zero cents Per Linear Foot	28.	00	21,560.	00

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
46	610.08	CY 456.00	Plain Riprap @ Seventy dollars and zero cents Per Cubic Yard	70.	00	31,920.	00
47	614.14	EA 28.00	Masonry Plug @ four hundred fifty dollars and zero cents Per Each	450.	00	12,600.	00
48	614.16	CY 30.00	Flowable Concrete Fill @ One hundred seventy five dollars and zero cents Per Cubic Yard	175.	00	5,250.	00
49	615.072	SY 390.00	Loam, Seed and Mulch @ Ten dollars and zero cents Per Square Yard	10.	00	3,900.	00
50	621.712	EA 58.00	Herbaceous Perennial (No. 1 Count) Group A @ Twenty five dollars and zero cents Per Each	25.	00	1,450.	00
51	627.733	LF 9590.00	4" White or Yellow Pavement Marking Line @ zero dollars and thirty cents Per Linear Foot	0	30	2,877.	00
52	627.744	LF 3820.00	6" White or Yellow Pavement Marking Line @ zero dollars and fifty cents Per Linear Foot	0.	50	1,910.	00
53	627.75	SF 2530.00	White or Yellow Pavement & Curb Marking @ Two dollars and zero cents Per Square Foot	2.	00	5,060.	00
54	627.82	EA 44.00	Directional Arrow & Bike Symbol @ Thirty five dollars and zero cents Per Each	35.	00	1,540.	00
55	629.05	HR 40.00	Hand Labor, Straight Time @ forty five dollars and zero cents Per Hour	45.	00	1,800.	00
56	629.06	HR 40.00	Mason, Straight Time @ forty five dollars and zero cents Per Hour	45.	00	1,800.	00
57	631.105	HR 40.00	Air Tool and Compressor (inc operator) @ fifty dollars and zero cents Per Hour	50.	00	2,000.	00
58	631.12	HR 40.00	All Purpose Excavator (inc operator) @ one hundred seventy dollars and zero cents Per Hour	170.	00	6,800.	00
59	631.121	HR 40.00	Heavy Duty Excavator (inc operator) @ Two hundred ten dollars and zero cents Per Hour	210.	00	8,400.	00
60	631.13	HR 40.00	Bulldozer (inc operator) @ One hundred twenty five dollars and zero cents Per Hour	125.	00	5,000.	00

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
61	631.172	HR 40.00	Truck - Large or Small (inc operator) @ Ninety dollars and zero cents Per Hour	90.	00	3,600.	00
62	631.22	HR 40.00	Front End Loader (inc operator) @ one hundred dollars and zero cents Per Hour	100.	00	4,000.	00
63	631.36	HR 40.00	Foreman, Straight Time @ Eighty dollars and zero cents Per Hour	80.	00	3,200.	00
64	632.043	EA 6.00	10-Inch Inserta-Tee Section @ five hundred dollars and zero cents Per Each	500.	00	3,000.	00
65	632.08	EA 19.00	4"/6" X8" WYE Section @ Two hundred dollars and zero cents Per Each	200.	00	3,800.	00
66	633.05	LF 919.00	4"/6" Sewer Laterals @ Ninety dollars and zero cents Per Linear Foot	90	00	82,710.	00
67	637.071	LS 1.00	Dust Control @ Five thousand dollars and zero cents Lump Sum	5,000	00	5,000.	00
68	645.106	LS 1.00	Demount and Reinstall Sign @ Two thousand five hundred dollars Lump Sum and zero cents	2,500.	00	2,500.	00
69	645.107	LS 1.00	Furnish & Install New Reg, Warning, Conf. & Route Sign @ Two thousand five hundred Lump Sum dollars and zero cents	2,500.	00	2,500.	00
70	652.38	LS 1.00	Flagger @ one hundred thirteen thousand seven hundred fifty dollars Lump Sum and zero cents	$113,750.00	00	$113,750.00	00
71	652.39	LS 1.00	Work Zone Traffic Control @ one million seven hundred forty seven thousand dollars and zero cents Lump Sum	1,747,000.	00	1,747,000.	00
72	654.08	EA 43.00	Density Test @ Seventy five dollars and zero cents Per Each	75.	00	3,225.	00
73	656.75	LS 1.00	Temporary Soil Erosion and Water Pollution Control @ Thirteen thousand dollars and Lump Sum zero cents	13,000.	00	13,000.	00
74	-	- -	Not Utilized @ -				
75	670.06	EA 1.00	NSBB-6-12 Nutrient Baffle Box @ Seventy thousand seventy dollars Per Each and zero cents	70,070.	00	70,070.	00

BID FORM
PART 1
BEDFORD STREET SEWER SEPARATION PROJECT
PORTLAND MAINE
NON-CWSRF BASED BID

Bid Item	Spec No. Pay Item	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
76	670.10	EA 1.00 Per Each	NSBB-10-16 Nutrient Baffle Box @ one hundred twenty two thousand twenty dollars and zero cents	122,020.	00	122,020.	00
77	900.401	EA 1.00 Per Each	Water Quality Swale 1 @ five thousand three hundred dollars and zero cents	5,300.	00	5,300.	00
78	900.402	EA 1.00 Per Each	Water Quality Swale 2 @ Five thousand three hundred dollars and zero cents	5,300.	00	5,300.	00
79	900.403	EA 1.00 Per Each	Water Quality Swale 3 @ Five thousand three hundred dollars and zero cents	5,300.	00	5,300.	00
80	900.404	EA 1.00 Per Each	Water Quality Swale 4 @ Six thousand four hundred dollars and zero cents	6,400.	00	6,400.	00
81	900.405	EA 1.00 Per Each	Water Quality Swale 5 @ Eight thousand five hundred dollars and zero cents	8,500.	00	8,500.	00
82	900.406	EA 1.00 Per Each	Water Quality Swale 6 @ Six thousand four hundred dollars and zero cents	6,400	00	6,400.	00
83	901.501	EA 1.00 Per Each	Filtera 6 x 10 @ Twenty eight thousand three hundred dollars and zero cents	28,300.	00	28,300.	00
84	901.502	EA 1.00 Per Each	Filtera 4 x 8 @ Twenty one thousand four hundred dollars and zero cents	21,400.	00	21,400.	00

TOTAL AMOUNT OF BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES.	TOTAL PRICE
five million one hundred ninety nine thousand seven dollars and seventy cents	$5,199,007.70

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

Item No.	Quanity	Item with Unit Bid Price Written In Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
W1	LF 1480.00	16-in Ductile Iron Water Main @ two hundred seventy three dollars and zero cents Per Linear Foot	273.	00	404,040.	00
W2	LF 1320.00	12-in Ductile Iron Water Main @ two hundred seventy four dollars and zero cents Per Linear Foot	274.	00	361,680.	00
W3	LF 3434.00	8-in Ductile Iron Water Main @ two hundred fifty two dollars and fifty cents Per Linear Foot	252.	50	867,085.	00
W4	LF 40.00	4-in Ductile Iron Water Main @ two hundred nine dollars and zero cents Per Linear Foot	209.	00	8,360.	00
W5	EA 13.00	Hydrant - Shortside @ six thousand five hundred dollars and zero cents Per Each	6,500.	00	84,500.	00
W6	EA 1.00	20-Inch Cut-In Gate Valve @ Nineteen thousand five hundred dollars and zero cents Per Each	19,500.	00	19,500.	00
W7	EA 3.00	12-Inch Cut-In Gate Valve @ eight thousand nine hundred dollars and zero cents Per Each	8,900.	00	26,700.	00
W8	EA 3.00	8-Inch Cut-In Gate Valve @ two thousand six hundred fifty dollars and zero cents Per Each	2,650.	00	7,950.	00
W9	EA 3.00	6-Inch Cut-In Gate Valve @ two thousand five hundred dollars and zero cents Per Each	2,500.	00	7,500.	00
W10	EA 3.00	16-Inch Gate Valve @ six thousand six hundred dollars and zero cents Per Each	6,600.	00	19,800.	00
W11	EA 5.00	12-inch Gate Valve @ two thousand six hundred dollars and zero cents Per Each	2,600.	00	13,000.	00
W12	EA 14.00	8-Inch Gate Valve @ one thousand four hundred fifty dollars and zero cents Per Each	1,450.	00	20,300.	00
W13	EA 3.00	6-inch Gate Valve @ one thousand dollars and zero cents Per Each	1,000.	00	3,000.	00

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

Item No.	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
W14	EA 1.00	2-inch Blowoff @ one thousand two hundred Per Each fifty dollars and zero cents	1,250.	00	1,250	00
W15	EA 7.00	1-inch Air Release Valve @ six hundred dollars and Per Each zero cents	600.	00	4,200.	00
W16	EA 27.00	1-inch Copper Service - Shortside @ Three thousand five hundred Per Each dollars and zero cents	3,500.	00	94,500.	00
W17	EA 15.00	1-inch Copper Service - Longside @ five thousand five hundred Per Each seventy five dollars and zero cents	5,575.	00	83,625.	00
W18	EA 1.00	1-inch Copper Service - Reconnect @ one thousand four hundred Per Each fifty dollars and zero cents	1,450.	00	1,450.	00
W19	EA 4.00	2-inch Copper Service - Shortside @ four thousand one hundred Per Each dollars and zero cents	4,100.	00	16,400.	00
W20	EA 6.00	2-inch Copper Service - Reconnect @ one thousand five hundred Per Each dollars and zero cents	1,500.	00	9,000.	00
W21	EA 3.00	4-inch Fire Service - Long Side @ Eight thousand dollars and Per Each zero cents	8,000.	00	24,000.	00
W22	EA 1.00	4-inch Fire Service - Reconnect @ Three thousand dollars and Per Each zero cents	3,000.	00	3,000.	00
W23	EA 3.00	6-inch Fire Service - Shortside @ Nine thousand four hundred Per Each fifty dollars and zero cents	9,450.	00	28,350.	00
W24	EA 3.00	6-inchFire Service - Long Side @ Six thousand seven hundred Per Each dollars and zero cents	6,700.	00	20,100.	00
W25	EA 1.00	6-inch Fire Service - Reconnect @ Three thousand seven hundred Per Each dollars and zero cents	3,700.	00	3,700.	00
W26	EA 2.00	8-inch Fire Service - Reconnect @ Four thousand seven hundred Per Each fifty dollars and zero cents	4,750.	00	9,500.	00

BID SCHEDULE
PART 2- PORTLAND WATER DISTRICT
BEDFORD/FOREST/BAXTER
WATER MAIN REPLACEMENTS

Item No.	Quanity	Item with Unit Bid Price Written in Words	Unit Price Dollars	Unit Price Cents	Total Price Dollars	Total Price Cents
W27	EA 1.00	12-inch Fire Service - Reconnect @ Five thousand nine hundred Per Each dollars and zero cents	5,900.	00	5,900.	00
W28	CY 71.00	Gravel Borrow @ Twenty five dollars and zero cents Per Cubic Yard	25.	00	1,775.	00
W29	CY 71.00	Unsuitable Material Excavated Below Grade @ Twenty dollars and zero cents Per Cubic Yard	20.	00	1,420.	00
W30	CY 119.00	Rock Excavation @ zero dollars and one cent Per Cubic Yard	0.	01	1.	19
W31	SY 947.00	Roadway Cobblestones with Concrete Base Removal @ Thirteen dollars and zero cents Per Square Yard	13.	00	12,311.	00
W32	SY 65.00	Remove and Reset Cobblestone Curb @ Thirty five dollars and zero cents Per Square Yard	35.	00	2,275.	00
W33	LF 920.00	Remove Subsurface Rail Line @ seven dollars and twenty cents Per Linear Foot	7.	20	6,624.	00
W34	CY 316.00	Install Concrete Base in Trenches @ one hundred seventy five Per Cubic Yard dollars and zero cents	175.	00	55,300.	00
W35	HR 2250.00	Flaggers @ Twenty seven dollars and Per Hour fifty cents	27.	50	61,875.	00

TOTAL AMOUNT OF PORTLAND WATER DISTRICT BASE BID, WRITTEN AND IN FIGURES BASED ON ESTIMATE OF QUANTITIES.	TOTAL COST
two million two hundred eighty nine thousand nine hundred seventy one dollars and nineteen cents	$2,289,971.19

BASE BID TOTAL

CWSRF Sewer Separation Bid = $ 5,199,007.70

Water Main Replacement Bid = $ 2,289,971.19

Total Base Bid = $ 7,488,978.89

(Basis of Award)

Note: The City is also requiring that the contractor fill out a separate bid form (located in Appendix D), which is to be bid as a City CIP funded project without CWSRF funding requirements which shall be delivered in a separate sealed envelope and will not opened publically. The City may choose to use CIP funding on this project; however, the basis of award shall be a summation of the CWSRF Sewer Separation Bid and the Water Main Replacement Bid.

The undersigned also agrees as follows:

FIRST: To do any extra work, not covered by the above schedule of items, which may be ordered, and to accept as full compensation therefore such prices as may be agreed upon in writing by the Engineer and the Contractor; or in case no agreement is made, to accept as full compensation the amount determined upon a "force account" basis as provided in the M.D.O.T. Standard Specifications, Revision of November 2014.

SECOND: To begin work on the date specified in the Engineer's "Notice to Commence Work" and to prosecute said work in such a manner as to complete it within the time limits given in the Special Provisions. Further, that monies will be deducted as liquidated damages at the rate specified in Subsection 107.7.2 "Schedule of Liquidated Damages" for each day that the work shall remain uncompleted after the time herein specified for completion of the work.

THIRD: That this offer is to continue open to acceptance until the formal contract is executed by the successful bidder of this work, and the City may at any time without notice accept this proposal whether any other proposal has previously been accepted or not. Provided, however, that the City will accept, in writing, one of the proposals made, or reject all proposals made, within sixty (60) calendar days after the date of opening of the proposals.

The undersigned as Bidder, declares that the only persons or parties interested in this Proposal are those named herein; that the bidder is not financially interested in, or otherwise affiliated in a business way with any other bidder on this contract; and that this Proposal is made without collusion with any other person, firm or corporation.

"The undersigned declares that any person(s) employed by the City of Portland, Maine, who has direct or indirect personal or financial interest in this proposal or in any portion of the

profits which may be derived therefrom, has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of. An example of a direct interest would be a City employee who would be paid to perform services under this proposal. An example of an indirect interest would be a City employee who is related to any officers, employees, principal or shareholders of your firm or you.) If in doubt as to status or interest, please disclose to the extent known."

Respectfully submitted this 15th day of March, 2018

IF AN INDIVIDUAL, SIGN HERE

Signature of Bidder_____

Address_____

_____

IF A FIRM OR PARTNERSHIP, SIGN HERE

Signature of Bidder_____

Name of Firm or Partnership _____

Business Address_____

Telephone Number_____ Fax Number_____

Soc. Sec. No. or Tax I.D. Number_____

Names and Addresses of Members of Firm or Partnership:

_____

_____

_____

(Signatures for a Corporation on next page.)

PROPOSAL (continued)

IF A CORPORATION, SIGN HERE

Name of Bidder Shaw Brothers Construction, Inc.

Authorized Signature _____ - President
(name) Jonathan E. Shaw (title)

Business Address PO Box 69, 341 Mosher Rd. Gorham, ME 04038

Telephone Number 207-839-2552 Fax Number 207-839-6239

Soc. Sec. No. or Tax I.D. Number 01-0350537

Incorporated under the Laws of the State of Maine

Names and Addresses of Officers of the Corporation:

President Jonathan E. Shaw PO Box 303 Gorham, ME 04038

~~Secretary~~ VP Thomas B. Biegel 47 Black Brook Rd. Gorham, ME 04038

Treasurer Daniel H. Shaw 6 Bobs Way. Windham, ME 04062 ss

Before me, personally appeared Jonathan E. Shaw and acknowledged that the signature to the preceding bid is his/her signature in his/her official capacity.

Date: 15th March 2018

_____
Notary Public - Signature and Seal

CHRISTOPHER J. CLOUTIER
Notary Public, Maine
My Commission Expires August 1, 2020

ALL CORPORATIONS MUST SIGN THIS FORM
AND SUBMIT WITH THE BID PROPOSAL

(Insert copy of that part of the records of the corporation wherein authority is given to the officer of that corporation to sign this bid on behalf of the corporation.)

SEE ATTACHED

_____

_____

_____

_____

(date)

The above is a true copy of the records of the_____

Corporation, which records are in my legal custody.

_____
Officer having custody of the records

_____ss

Before me appeared, _____

_____ of the _____ Corporation, and

made oath that the above statement is true.

_____
Notary Public - Signature and Seal

SHAW BROTHERS CONSTRUCTION, INC.

I, Peter S. Plumb, Clerk of SHAW BROTHERS CONSTRUCTION, INC. certify that the following named individuals hold the offices set forth opposite their respective names as of the date below:

President:	Jonathan E. Shaw
Treasurer:	Daniel H. Shaw
Vice-President:	Thomas B. Biegel
Clerk:	Peter S. Plumb

I further certify that the following are true and exact copies of resolutions of the Corporation's Board of Directors and that said resolutions have not been altered or amended to the date of this certificate:

VOTED: To authorize the President, Vice-President and Treasurer of SHAW BROTHERS CONSTRUCTION, INC., or any one of them, to make verbal and written bids on behalf of the Corporation for construction work of any type and nature, including but not limited to earth work, road work, sidewalk work, foundation work and all other manner of work which can be reasonably described as construction work to any organization, whether public or private, anywhere within the State of Maine, at any time, and to fill out, execute and sign on behalf of the Corporation any and all documents which may be required from time to time by the person or organization or governmental entity seeking the bid.

Dated: June 30, 2017

Peter S. Plumb, Clerk

State of Maine
Cumberland, ss.

June 30, 2017

Personally appeared before me the above-named Peter S. Plumb in his capacity as Clerk and made oath that the foregoing statements are made on personal knowledge and are true.

Notary Public

SHARON C. GIGGEY
A NOTARY PUBLIC OF MAINE
MY COMMISSION EXPIRES JULY 24, 2018

NOTICE

(This Must Be Filled Out)

The full names and residences of all persons interested in this bid as principals are as follows: (In case of Corporation, include and identify President, Treasurer, Manager)

Jonathan E. Shaw-President	PO Box 303 Gorham, ME 04038
Thomas B. Bragel - Vice President	47 Black Brook Rd. Gorham, ME 04038
Daniel H. Shaw - Treasurer	6 Bob's Way Windham, ME 04062

ALL CONTRACTORS SHALL FILL IN THE FOLLOWING INFORMATION
BEFORE SUBMITTING BID

	Name and Address of Contractor	Products to be Supplied
1	Suntree Technologies American Concrete, Precast of ME	Concrete Products
2	Core & Main, EJ Prescott, Ferguson	Pipe
3		
4		
5		
6		
7		

	Name and Address of Contractor	Service or Trades to be Supplied	Anticipated $ Amount
1	Fineline Pavement Striping	Pavement Markings	
2	Project Flagging	Flaggers	
3			
4			
5			
6			
7			

Portland Public Works
55 Portland Street
Portland, ME 04101
Attn: Brad Roland / Nathaniel Smith

September 4, 2018

Re: Continuation of the operation, maintenance and
data reporting for the sewer system flow monitoring.

Dear Mr. Roland,

Please find below our scope and fee schedule for the above referenced project. As you will see, I've maintained pricing from the previous contract.

SCOPE OF SERVICES

Flow data review and compilation (as done during the previous project) will continue as directed by the City of Portland engineering staff. Monthly reports will be prepared as described below.

Flow data summarization and reduction will be performed on all collected data. The monthly reports will include depth of flow, flow rate, cumulative flow rate and a total daily flow volume.

A daily flow summary for each day will also be included in the report. The daily summary includes the minimum flow rate, peak flow rate, and the total daily flow.

DATA QUALITY REVIEW

Staff operating at our headquarters will review the flow data as it is received for completeness (missing data). A more detailed review will take place at a later date when the actual field logs arrive. Flow data files will then be combined with rainfall data and graphs will be prepared to begin a more detailed review of all depth, velocity and flow data. Abnormalities such as unexplainable depth spikes or drop outs as well as inconsistent velocity trends will be noted. Additional comparison graphs will be prepared that will use both actual depth and velocity data as well as predicted data. Scatter plots will also be produced to better understand specific characteristics of the site as well as help identify isolated incorrect measurements. Adjustments or corrections, if any, will be performed and documented.

CLIENT RESPONSIBILITIES

While developing this proposal, I have assumed that the City would provide the following at no additional cost to Flow Assessment Services:

A. Furnish copies of the necessary plot maps of all sewers to be studied. The sewer lines and manholes should be clearly marked and labeled with a numbered reference system.

B. Make arrangements to provide access to and expose for entry those manhole within the study area which are buried, covered or otherwise not readily accessible.

C. Provide free and legal access to all sites of work.

D. Assure the prompt clearance of major blockages or obstructions in the sewer system, if any, should such clearance be required for performance of the work.

E. Make arrangements to provide traffic control as required by public safety authorities.

FEE SCHEDULE

Item #	Description of Tasks	Estimated Quantity	Unit Cost	Total Cost
1	Monthly Cellular Telecommunication Fees and Data Web Hosting	12 Months (24 Sites x 12 Months = 288)	$75.00	$21,600.00
2	Monthly Maintenance and Calibration Visits	12 Visits	$3,200.00	$38,400.00
4	Flow Data Reduction & Presentation (Monthly Reports)	12 Months	$4,500.00	$54,000.00
3	Emergency Maintenance Visits (If Necessary)	2 Visits	$1,600.00	$3,200.00
			TOTAL	**$117,200.00**

After completing your review of this information, please feel free to contact me with any questions or comments. We thank you for your continued interest in Flow Assessment Services and look forward to another busy year.

Regards,
Flow Assessment Services, LLC

Dennis Vigliotte
Managing Partner

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
2/6/18	4171

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
8	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period December 2017	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period December 2017	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period December 2017	1	4,500.00	4,500.00

Approved: Nathaniel Smith
Date: 3/30/18
Account: 375-3100-500.35-20
Proj: MM1205 **PO:** 044109

Total	$9,725.00

84 Daniel Plummer Road, Goffstown, NH 03045
PHONE: 603-656-9799, FAX: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
2/20/18	4195

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name	Terms	Job Number
9	Portland, ME	As per contract	16124

Contract Item #	Description of Task	Qty	Price Each	Amount
	PO# 044109			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period January 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period January 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period January 2018	1	4,500.00	4,500.00

Approved: Nathaniel Smith
Date: 3/30/18

Account: 375-3100-500.35-20

Proj: MM1205 **PO:** 044109

Total	$9,725.00

84 Daniel Plummer Road, Goffstown, NH 03045
PHONE: 603-656-9799, FAX: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
3/27/18	4227

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
10	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
1	PO# 044109 Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period February 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period February 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period February 2018	1	4,500.00	4,500.00
	Total			$9,725.00

Approved: Nathaniel Smith
Date: 4/13/2018
Account: 375-3100-500.35-20
Proj: MM1205 **PO:** 044109

84 Daniel Plummer Road, Goffstown, NH 03045
PHONE: 603-656-9799, FAX: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
5/3/18	4280

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Approved: Nathaniel Smith

Date: 5/22/2018

Account: 375-3100-500.35-20

Proj: MM1205 **PO:** 044109

Progress Inv. #	Project Name		Terms	Job Number
11	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO# 044109			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period March 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period March 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period March 2018	1	4,500.00	4,500.00
			Total	$9,725.00

84 Daniel Plummer Road, Goffstown, NH 03045
PHONE: 603-656-9799, FAX: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
6/6/18	4318

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Approved: Nathaniel Smith
Date: 6/15/2018

Account: 375-3100-500.35-20

Proj: MM1205 **PO:** 044109

Progress Inv. #	Project Name		Terms	Job Number
12	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO# 044109			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period April 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period April 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period April 2018	1	4,500.00	4,500.00
			Total	$9,725.00

84 Daniel Plummer Road, Goffstown, NH 03045
PHONE: 603-656-9799, FAX: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
7/23/18	4391

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Account #: 31375M1205-DPW Design-ArchEngin -MM1205

Date: 10/22/18 **PO #:** 44109

Nathaniel Smith

Progress Inv. #	Project Name		Terms	Job Number
13	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
1	PO# 044109 Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period May 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period May 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period May 2018	1	4,500.00	4,500.00
			Total	$9,725.00

72 Priscilla Lane, Goffstown, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
8/17/18	4423

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Account #: 31375M1205-DPW Design-ArchEngin -MM1205

Date: 10/22/18 **PO #:** 44109

Nathaniel Smith

Progress Inv. #	Project Name		Terms	Job Number
14	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
1	PO# 044109 Monthly Cellular Telecommunication Fees & Data Web Hosting (27 Sites x 1 Month = 27) Period June 2018	27	75.00	2,025.00
2	Monthly Maintenance & Calibration Visits Period June 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period June 2018	1	4,500.00	4,500.00
			Total	$9,725.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
10/10/18	4481

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
15	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO# 51017			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (24 Sites x 1 Month = 24) Period July 2018	24	75.00	1,800.00
2	Monthly Maintenance & Calibration Visits Period July 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period July 2018	1	4,500.00	4,500.00
	Account #: 0570-50-31-3130-31303-0000-403500			
	Date: 11/19/2018 **PO #:**	51017		
	Nathaniel Smith			
			Total	$9,500.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
10/10/18	4495

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
16	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO# 044109			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (13 Sites x 2 Months = 26) Period August - September 2018	26	75.00	1,950.00
2	Monthly Maintenance & Calibration Visits Period August - September 2018	2	1,733.00	3,466.00
3	Flow Data Reduction & Presentation Period August - September 2018	2	2,438.00	4,876.00
	Account #: 0570-50-31-3130-31303-0000-403500			
	Date: 11/19/2018 **PO #:**	51017		
	Nathaniel Smith			
			Total	$10,292.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
11/16/18	4543

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
17	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO# 51017			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (24 Sites x 1 Month = 24) Period October 2018	24	75.00	1,800.00
2	Monthly Maintenance & Calibration Visits Period October 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period October 2018	1	4,500.00	4,500.00
	Account #: 0570-50-31-3130-31303-0000-403500			
	Date: 11/19/2018 **PO #:**	51017		
	Nathaniel Smith			
		Total		$9,500.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
11/20/18	4552

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
18	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
1	Remove Flow Meters & Telemetry from 11 existing PPW Sites - 7/31/18	11	0.00	0.00
2	Install Flow Meters & Telemetry at 11 new PPW Sites - October 2018	11	1,400.00	15,400.00
			Total	$15,400.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

Flow Assessment Services LLC
72 Priscilla Lane
Auburn, NH 03032

Invoice

Date	Invoice #
12/20/18	4581

Bill To
City of Portland Portland Public Works 55 Portland Street Portland, ME 04101 Attn: Brad Roland

Progress Inv. #	Project Name		Terms	Job Number
19	Portland, ME		As per contract	16124
Contract Item #	**Description of Task**	**Qty**	**Price Each**	**Amount**
	PO 51017			
1	Monthly Cellular Telecommunication Fees & Data Web Hosting (24 Sites x 1 Month = 24) Period November 2018	24	75.00	1,800.00
2	Monthly Maintenance & Calibration Visits Period November 2018	1	3,200.00	3,200.00
3	Flow Data Reduction & Presentation Period November 2018	1	4,500.00	4,500.00
	Account #: 57031303-403500			
	Date: 1/16/19 **PO #:**	51017		
	Nathaniel Smith			
			Total	$9,500.00

72 Priscilla Lane, Auburn, NH 03032
Phone: 603-656-9799, Fax: 603-656-0330

PURCHASE ORDER

CITY OF PORTLAND, MAINE
City Hall, 389 Congress Street
Portland, Maine 04101
(207) 874-8654

P.O. # 041837
Date: 10/06/15

FLOW ASSESSMENT SERVICES, LLC
84 DANIEL PLUMMER ROAD
GOFFSTOWN, NH 03045

City of Portland
PUBLIC WORKS ADMIN.
55 PORTLAND STREET
PORTLAND, ME 04101

VENDOR #
11979

DELIVER BY	SHIP VIA	TERMS
08/09/16		NET

CONFIRM BY	CONFIRM TO	REQUISITIONED BY
PAUL CASEY	KAREN MARSTON	PMH (NS)

FREIGHT	CONTRACT NO.	ACCOUNT NO.	PROJECT	REQ. NO.	REQ. DATE
		37531005003520	MM1108	3706	04/15

LINE #	QUANTITY	UOM	ITEM NO. AND DESCRIPTION	UNIT COST	EXTENDED COST
1	146200.00	EA	SEWER SYSTEM FLOW MONITORING CONTINUATION OF INSTALLATION	1.0000	146200.00
				SUB-TOTAL	146200.00
				TOTAL	146200.00

REMARKS:
Per your written proposal dated 02-10-15 and contract dated 08-09-15. Please coordinate work with Nathaniel Smith, 207-874-8818.

TERMS & CONDITIONS, AS DEPICTED ON THE REVERSE SIDE OF THIS ORDER, ARE A FORMAL PART OF THIS ORDER

FOR THE CITY OF PORTLAND, MAINE

AUTHORIZED SIGNATURE

AGREEMENT BETWEEN THE
CITY OF PORTLAND
AND
FLOW ASSESSMENT SERVICES, LLC

THIS AGREEMENT is entered into this 9th day of August, 2015, by and between the **CITY OF PORTLAND**, a body politic and corporate (hereinafter the "**CITY**"), and **FLOW ASSESSMENT SERVICES, LLC,** a New Hampshire limited liability company with a mailing address of 84 Daniel Plummer Road, Goffstown, NH 03045 (hereinafter the "**CONTRACTOR**").

W I T N E S S E T H:

WHEREAS, the **CITY** is in need of continuous wastewater flow monitoring services, at its West Storage Conduit in its sewer system; and

WHEREAS, the **CITY** has made a purchase of the needed equipment for such monitoring, having previously solicited bids or quotes from more than one vendor for the same, when it required such measurements in 2012 during the Combined Sewer Overflow Tier 3 Program at its Back Cove South Storage Conduit from the **CONTRACTOR**; and

WHEREAS, the **CONTRACTOR** has the requisite knowledge and technical ability to provide the required goods and perform these services using the equipment the **CITY** now owns for the provision of such goods and services; and

WHEREAS, pursuant to section 2-303 of the City's Code of Ordinances, the City Manager has made a written finding that the **CONTRACTOR** is the sole source of the expertise and software required for the monitoring of levels of flow in its West Storage Conduit; and

WHEREAS, after due consideration, the **CITY** did award the work to the **CONTRACTOR;**

NOW, THEREFORE, in consideration of the mutual promises made by each party to the other, the parties covenant and agree as follows:

1. The **CONTRACTOR** will furnish the materials, supplies, equipment and labor (hereinafter the "Work") in accordance with the specifications contained in the **CONTRACTOR's** Proposal dated February 10, 2015.

   A copy of said **CONTRACTOR's** Proposal is attached hereto as Exhibit A, and is hereby made a part hereof. The restatement in this document of any term of the Proposal shall not be deemed to waive any term not so restated. If any disagreement is found between this document and the Proposal, then this document shall govern; provided, however, that this document and its attachment shall be construed to be supplemental to one another to the extent possible.

2. The **CONTRACTOR** covenants and agrees that all Work performed and furnished hereunder shall be free from all defects, and that all Work shall be performed in a good workmanlike manner. Unless a longer warranty period is specified in the Exhibits hereto, all Work provided shall be warranted by the **CONTRACTOR** for one (1) full year from the date of completion of all Work hereunder and acceptance thereof by the **CITY**. Notwithstanding the foregoing, any longer period specified in the attachments shall stay in effect.

3. Prior to the execution of this Agreement, the **CONTRACTOR** will procure and maintain Automobile Insurance and General Public Liability Insurance coverage in amounts of not less than One Million Dollars ($1,000,000.00) per occurrence for bodily injury, death and property damage, naming the **CITY** as an additional insured thereon, and also Workers' Compensation Insurance coverage to the extent required by law. With respect to the Liability Insurance, the **CONTRACTOR** will provide the **CITY** a certificate of insurance evidencing such coverage, in this way: certificate must say either: A) "the policy has been endorsed to name the City of Portland as an Additional Insured" and a copy of the endorsement must come to the City of Portland with the certificate, or B) "the policy already includes an endorsement, such as the General Liability Extension Endorsement, by which the City of Portland is automatically made an additional insured." A Certificate which merely has a box checked under "Addl Insr," or the like, or which merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. The **CONTRACTOR** shall furnish the **CITY** and thereafter maintain certificates evidencing all such coverages, which certificates shall guarantee thirty (30) days' notice to the **CITY** of termination of insurance from insurance provider or agent.

4. The **CONTRACTOR** shall furnish to the **CITY**, upon execution of the Contract, a Contract Performance Bond and a Contract Labor and Materials Payment Bond each for the full amount of the Contract and issued by a surety company or surety companies authorized to do business in the State of Maine and approved by the **CITY**. The Bonds shall remain in effect for one year after final acceptance of the Work, and protect the **CITY** for at least one year of warranty of the Work hereunder, and also shall insure settlement of claims for the payment of all bills for labor, materials and equipment.

5. To the fullest extent permitted by law, the **CONTRACTOR** shall defend, indemnify and hold harmless the **CITY**, its officers and employees, from and against all claims, damages, losses, and expenses, just or unjust, including, but not limited to, the costs of defense and attorney's fees arising out of or resulting from the performance of this Agreement, provided that any such claims, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use therefrom, and (2) is caused in whole or in part by any negligent act or omission of the **CONTRACTOR**, anyone directly or indirectly employed by it, or anyone for whose act it may be liable.

6. Prior to any payment, the **CITY** reserves the right to require Waivers of Lien for materials and labor from the **CONTRACTOR** and its subcontractors and suppliers guaranteeing One Hundred Percent (100%) performance, free and clear from all liens and encumbrances. Any mechanic's lien or any other lien which may be filed against the premises which are the subject of this Agreement by reason of the Work described herein shall be defended (by counsel reasonably acceptable to the **CITY**) and promptly discharged by the **CONTRACTOR** at its own expense. The **CITY** may require the **CONTRACTOR** to provide a bond satisfactory to the **CITY** to indemnify it against any lien and as a substitution in place of a lien. If the **CONTRACTOR** should fail either to defend the **CITY** against the lien or to discharge it, then the **CITY** may do so at the **CONTRACTOR's** expense. In the event of such an undertaking by the **CITY**, the **CONTRACTOR** will promptly reimburse the **CITY** for all its costs and expenses in so doing, including, but not limited to, reimbursement of the **CITY's** reasonable counsel fees, as well as costs which may be incurred by it in substituting a bond in place of a lien.

7. The **CONTRACTOR** shall perform the work to the satisfaction of the responsible **CITY** official who will have the right of inspection at all times, and whose approval and acceptance of the work will be a condition precedent to payments by the **CITY** under this Contract. **CITY** inspectors will have the authority to stop work in progress if such work is being done contrary to the plans, specifications or engineering practice.

8. Time is of the essence in the performance of this Agreement. Upon receipt of executed contracts and insurance as required, the **CITY** will promptly send an executed **CITY** contract to the **CONTRACTOR**, which will commence the Work expeditiously thereafter, and, following installation of the flow meters, monitor equipment and its wastewater measurements in the sewer system for a total of twelve (12) months. The **CITY** shall have the option to renew this contract, on updated costs provided by the **CONTRACTOR**, for four additional one (1) year terms.

9. In the event of any dispute as to the amount, nature or scope of the work required under this Contract, the design and judgment of the Director of Public Services or designee will be final and binding.

10. For performance of all the terms and conditions of this Agreement, the **CITY** will pay the **CONTRACTOR** an amount not to exceed One Hundred Forty-Six Thousand Two Hundred Dollars ($146,200.00), based on the fee schedule in the Proposal.

11. The **CITY** shall retain the right to withhold ten percent (10%) of each invoice amount as retainage until the Work is completed and accepted by the **CITY**.

12. The **CONTRACTOR** shall keep accurate records of all services performed under this Agreement and shall submit such information to the **CITY** on a monthly basis. Payment for such Work shall be made to the **CONTRACTOR** not more than thirty (30) days after receipt of an invoice and acceptance of the Work by the Director of Public Services or designee.

13. The **CITY** may terminate this Agreement for cause by written Notice to the **CONTRACTOR**. In the event of such termination, the **CONTRACTOR** shall not be entitled to any further payment under this Agreement from the date of receipt of said Notice.

14. The **CITY** shall have the right to terminate this Agreement at any time for its convenience on thirty (30) days' prior written Notice to the **CONTRACTOR**. If the Agreement is terminated by the **CITY** for convenience, the **CITY** shall pay the **CONTRACTOR** for all Work performed and all materials purchased pursuant to this Agreement prior to receipt of such Notice.

15. Out of concern for the public, **CITY** employees and the **CONTRACTOR's** employees, all work performed by the **CONTRACTOR** shall be in conformance with pertinent OSHA, local, state and federal government regulations.

16. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the Obligations, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court.

17. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement. A signature in a pdf or electronic document shall be considered the equivalent of an original signature.

18. **CITY** and **CONTRACTOR** each warrant and represent to the other that they have the full right and authority to enter into this Agreement, that there is no impediment that would inhibit their ability to perform their respective obligations under this Agreement, and that the person signing this Agreement on behalf of each party has the authority to do so.

IN WITNESS WHEREOF, the said **CITY OF PORTLAND** has caused this Agreement to be signed and sealed by Jon P. Jennings, its City Manager, thereunto duly authorized, and **FLOW ASSESSMENT SERVICES, LLC,** has caused this Agreement to be signed and sealed by Paul R. Casey, its Managing Partner, thereunto duly authorized, the day and date first above written.

WITNESS:

Judith Rosen

CITY OF PORTLAND

By: _____

JPJ John P. Jennings
Its City Manager

WITNESS:

Judith T. Lapointe

FLOW ASSESSMENT SERVICES, LLC,

By: _____

Paul R. Casey
Its Managing Partner

Approved as to form:

_____
Corporation Counsel's Office

Approved as to funds:

_____
Budget Office

EXHIBIT A

FLOW
ASSESSMENT SERVICES

Portland Public Service
55 Portland Street
Portland, ME 04101
Attn: Bradley A. Roland, P.E., Senior Project Engineer

February 10, 2015

Re: Continuation of the installation, operation maintenance and data reporting for the sewer system flow monitoring.

Dear Mr. Roland,

Please find below our scope and fee schedule for the above referenced project. As you will see, we included cost for the re-location of the equipment as well as the continued operation and maintenance.

SCOPE OF SERVICES

Flow Assessment Services will remove all the existing flow monitoring equipment currently installed. The equipment will then be serviced for a quick turn around and re-deployment at sites selected by the city. Once the metering equipment is operational, the data web site will be updated with the new site specific information. Flow data review and compilation (as done during the previous project) will continue as directed by the City of Portland engineering staff. Monthly reports will be prepared as described below.

Flow data summarization and reduction will be performed on all collected data. The monthly reports will include depth of flow, flow rate, cumulative flow rate and a total daily flow volume.

A daily flow summary for each day will also be included in the report. The daily summary includes the minimum flow rate, peak flow rate, and the total daily flow.

DATA QUALITY REVIEW

Staff operating at our headquarters will review the flow data as it is received for completeness (missing data). A more detailed review will take place at a later date when the actual field logs arrive. Flow data files will then be combined with rainfall data and graphs will be prepared to begin a more detailed review of all depth, velocity and flow data. Abnormalities such as unexplainable depth spikes or drop outs as well as inconsistent velocity trends will be noted. Additional comparison graphs will be prepared that will use both actual depth and velocity data

as well as predicted data. Scatter plots will also be produced to better understand specific characteristics of the site as well as help identify isolated incorrect measurements. Adjustments or corrections, if any, will be performed and documented.

CLIENT RESPONSIBILITIES

While developing this proposal, I have assumed that the City would provide the following at no additional cost to Flow Assessment Services:

A. Furnish copies of the necessary plot maps of all sewers to be studied. The sewer lines and manholes should be clearly marked and labeled with a numbered reference system.

B. Make arrangements to provide access to and expose for entry those manhole within the study area which are buried, covered or otherwise not readily accessible.

C. Provide free and legal access to all sites of work.

D. Assure the prompt clearance of major blockages or obstructions in the sewer system, if any, should such clearance be required for performance of the work.

E. Make arrangements to provide traffic control as required by public safety authorities.

FEE SCHEDULE

Item #	Description of Tasks	Estimated Quantity	Unit Cost	Total Cost
1	Installation of Wireless System (Includes Isco 2150 Area Velocity Meter with all interface cables in conjunction with the Telog Remote Wireless Unit with 1 XRTT Modem. Includes a Burial or Extended Antenna Unit)	22 Sites	$1,400.00	$30,800.00
2	Monthly Cellular Telecommunication Fees and Data Web Hosting	12 Months (22 Sites x 12 Months = 264)	$75.00	$19,800.00
3	Monthly Maintenance and Calibration Visits	12 Visits	$3,200.00	$38,400.00
4	Emergency Maintenance Visits (If Necessary)	2 Visits	$1,600.00	$3,200.00
5	Flow Data Reduction & Presentation (Monthly Reports)	12 Months	$4,500.00	$54,000.00
			TOTAL	**$146,200.00**

After completing your review of this information, please feel free to contact me with any questions or comments.

We thank you for your continued interest in Flow Assessment Services and look forward to another busy year.

Very Truly Yours,
Flow Assessment Services, LLC

Paul R Casey

Paul R. Casey
Managing Partner

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 8/18/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Infantine Insurance
P. O. Box 5125
Manchester NH 03108

CONTACT NAME: Julie Levesque
PHONE (A/C, No, Ext): (603) 669-0704 FAX (A/C, No): (603) 669-6831
E-MAIL ADDRESS: jlevesque@infantine.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Essex Insurance	
INSURER B: Hanover Insurance Group	
INSURER C: Twin City Fire Ins. Co.	29459
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Flow Assessment Services, LLC
84 Daniel Plummer Road
Goffstown NH 03045

COVERAGES CERTIFICATE NUMBER: 2014-2015 MASTER REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY X CLAIMS-MADE OCCUR X Pollution Liability X Professional Liability GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC	X		14PKGNE60176	9/9/2014	9/9/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Professional Aggregate	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 1,000,000 $ 2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS X Add'l Insureds	X		AHV095534413	10/1/2014	10/1/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $ $
A	UMBRELLA LIAB OCCUR X EXCESS LIAB X CLAIMS-MADE DED X RETENTION $ 0			14EFXNE60081	9/9/2014	9/9/2015	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000 $
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		04WECTK8021 States: CT,ME,MD,MA,NH, NJ,NY,PA,RI	10/1/2014	10/1/2015	X WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
B	Inland Marine			IHV969082002	9/24/2014	9/24/2015	Valuable Papers/Records Limit	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
RE: Flow Monitoring in the City of Portland, ME. It is agreed and understood that the City of Portland is included as additional insured on General Liability and Automobile when required by written contract.

CERTIFICATE HOLDER
Portland Public Service
55 Portland St.
Portland, ME 04101

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Charles Hamlin/GS5 Charles H. Hamlin

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MARKEL

ESSEX INSURANCE COMPANY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS (BLANKET)

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

SCHEDULE

Name of Person or Organization:
Any person(s) or organization(s) to whom the insured agrees to provide Additional Insured status in a written contract signed by both parties and executed prior to the commencement of operations.

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule above, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused in whole or in part by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) scheduled above.

B. With respect to coverage provided to these additional insureds by this endorsement, the following additional exclusions apply:

This insurance does not apply to "bodily injury", "property damage", or "personal and advertising injury" occurring after:

1. All work on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations, including materials, parts or equipment furnished in connection with such work, has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

All other terms and conditions remain unchanged.

Includes copyrighted material of Insurance Services Office, Inc. with its permission.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/3/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Infantine Insurance
P. O. Box 5125
Manchester NH 03108

CONTACT NAME: Julie Levesque, CPCU, CIC
PHONE (A/C, No, Ext): (800)937-0704 FAX (A/C, No): (603)669-6831
E-MAIL ADDRESS: jlevesque@infantine.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Essex Insurance Co	
INSURER B: Massachusetts Bay Ins Co	22306
INSURER C: Twin City Fire Ins Co	29459
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Flow Assessment Services, LLC
84 Daniel Plummer Road
Goffstown NH 03045

COVERAGES **CERTIFICATE NUMBER:** 15/16 GL/X 14/15 WC/AUTO **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY X CLAIMS-MADE ☐ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY ☐ PRO-JECT ☐ LOC OTHER:	X		15PKGNE60176	9/9/2015	9/9/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Pollution Liability	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 1,000,000 $ 1,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS ☐ SCHEDULED AUTOS HIRED AUTOS ☐ NON-OWNED AUTOS	X		AHV095534413	10/1/2014	10/1/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $ $
A	UMBRELLA LIAB X OCCUR X EXCESS LIAB ☐ CLAIMS-MADE DED X RETENTION $ 0	X		15EFXNE60081	9/9/2015	9/9/2016	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000 $
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		04WECIK8021 3A States: CT; MA; MD; ME NH; NJ; NY; PA; RI	10/1/2014	10/1/2015	X PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

It is agreed and understood the City of Portland is included as additional insured on General Liability, Business Automobile and Umbrella when required by written contract.

CERTIFICATE HOLDER

City of Portland Maine
Attn: Lawrence C. Walden
389 Congress Street
Portland, ME 04101-3509

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Charles Hamlin/JL6 Charles Hamlin

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THE AMERICAN INSTITUTE OF ARCHITECTS

Premium Amount Based
on Final Contract Amount

Bond No. MEC42518

AIA Document A312
Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):
FLOW ASSESSMENT SERVICES, LLC
84 DANIEL PLUMMER ROAD
GOFFSTOWN, NH 03045

SURETY (Name and Principle Place of Business):
MERCHANTS BONDING COMPANY
P.O. BOX 14498
DES MOINES, IA 50306-3498

OWNER (Name and Address):
CITY OF PORTLAND
55 PORTLAND, STREET
PORTLAND, ME 04101

CONSTRUCTION CONTRACT
Date: **AUGUST 9, 2015**
Amount: **ONE HUNDRED FORTY SIX THOUSAND TWO HUNDRED AND 00/100 DOLLARS ($146,200.00)**
Description (Name and Location):
CONTINUATION OF INSTALLATION, OPERATION MAINTENANCE AND DATA REPORTING FOR THE SEWER SYSTEM FLOW MONITORING.

BOND
Date (No earlier than Construction Contract Date): **AUGUST 9, 2015**
Amount: **ONE HUNDRED FORTY SIX THOUSAND TWO HUNDRED AND 00/100 DOLLARS ($146,200.00)**

Modifications to this Bond: [X] None [ ] See Page 3

CONTRACTOR AS PRINCIPAL
COMPANY: (Corporate Seal)

FLOW ASSESSMENT SERVICES, LLC

Signature:
Name and Title: Manager

SURETY
COMPANY: (Corporate Seal)

MERCHANTS BONDING COMPANY

Signature: E A Morrissette
Name and Title: **E. A. MORRISSETTE, ATTORNEY-IN-FACT**

(Any additional signatures appear on page 3)

FOR INFORMATION ONLY-Name, Address, and Telephone
AGENT OR BROKER:
IIA, INC. DBA INFANTINE INSURANCE
203 MEETINGHOUSE ROAD
BEDFORD, NH 03110

OWNER'S REPRESENTATIVE (Architect, or Engineer or other party):

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

4.4 Waive its rights to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefore to the Owner; or

.2 Deny liability in whole or in part and notify the Owner citing reasons therefore.

5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and

6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation avail-

able to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12 DEFINITIONS

12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corporate Seal)	Company:	(Corporate Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	
Address:		Address:	

THE AMERICAN INSTITUTE OF ARCHITECTS

Premium Amount Based
on Final Contract Amount

Bond No. MEC42518

AIA Document A312
Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):
FLOW ASSESSMENT SERVICES, LLC
84 DANIEL PLUMMER ROAD
GOFFSTOWN, NH 03045

SURETY (Name and Principle Place of Business):
MERCHANTS BONDING COMPANY
P.O. BOX 14498
DES MOINES, IA 50306-3498

OWNER (Name and Address):
CITY OF PORTLAND
55 PORTLAND, STREET
PORTLAND, ME 04101

CONSTRUCTION CONTRACT
Date: **AUGUST 9, 2015**
Amount: **ONE HUNDRED FORTY SIX THOUSAND TWO HUNDRED AND 00/100 DOLLARS ($146,200.00)**
Description (Name and Location):
CONTINUATION OF INSTALLATION, OPERATION MAINTENANCE AND DATA REPORTING FOR THE SEWER SYSTEM FLOW MONITORING.

BOND
Date (No earlier than Construction Contract Date): **AUGUST 29, 2015**
Amount: **ONE HUNDRED FORTY SIX THOUSAND TWO HUNDRED AND 00/100 DOLLARS ($146,200.00)**

Modifications to this Bond: [X] None [ ] See Page 3

CONTRACTOR AS PRINCIPAL
COMPANY: (Corporate Seal)

FLOW ASSESSMENT SERVICES, LLC

Signature:
Name and Title:

SURETY
COMPANY: (Corporate Seal)

MERCHANTS BONDING COMPANY

Signature:
Name and Title: **E. A. MORRISSETTE, ATTORNEY-IN-FACT**

(Any additional signatures appear on page 6)

FOR INFORMATION ONLY-Name, Address and Telephone
AGENT OR BROKER:
IIA, INC. DBA INFANTINE INSURANCE
203 MEETINGHOUSE ROAD
BEDFORD, NH 03110

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
   2.1 Promptly makes payment, directly, or indirectly, for all sums due Claimants, and

   2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:
   4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
   4.2 Claimants who do not have a direct contract with the Contractor:
      .1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
      .2 Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
      .3 Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety that is sufficient compliance.

6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
   6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim,

   stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
   6.2 Pay or arrange for payment of any undisputed amounts.
7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by

Subparagraph 4.1 or Clause 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this

MERCHANTS
BONDING COMPANY™

POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

C H Hamlin; E A Morrissette; J J Schroeder; P L Sullivan

their true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver on behalf of the Companies, as Surety, bonds, undertakings and other written obligations in the nature thereof, subject to the limitation that any such instrument shall not exceed the amount of:

EIGHT MILLION ($8,000,000.00) DOLLARS

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 24, 2011.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 15th day of August, 2015.

MERCHANTS NATIONAL BONDING, INC. INCORPORATED -o- 2003

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.

By Larry Taylor
President

STATE OF IOWA
COUNTY OF Dallas ss.

On this 15th day of August, 2015, before me appeared Larry Taylor, to me personally known, who being by me sworn did say that he is President of the MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

NOTARIAL SEAL IOWA
WENDY WOODY
Commission Number 784654
My Commission Expires
June 20, 2017

Wendy Woody
Notary Public, Polk County, Iowa

(Expiration of notary's commission does not invalidate this instrument)

I, William Warner, Jr., Secretary of the MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 9th day of August, 2015.

MERCHANTS NATIONAL BONDING, INC. INCORPORATED -o- 2003

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

William Warner Jr.
Secretary

POA 0014 (6/15)

Invoice #: 8W0218

McIntosh Controls Corporation

218 Little Falls Road, Unit 1
Cedar Grove, NJ 07009
(973) 433-4700

DATE 4/10/2018

Bill To:

APR 13 2018

City of Portland
389 Congress Street
Portland, ME 04101

Ship To:

City of Portland
Public Works Admin. / Attn: John Emerson PO #J40978
55 Portland Street
Portland, ME 04101

PG.	SALESPERSON	SHIP VIA	SHIP DATE	TERMS	YOUR NO.
1	9750/0	UPS GRD PP&AD	4/9/2018	Net 30	J40978

QTY.	ITEM NO.	DESCRIPTION	PRICE	EXTENDED
1	SC-D-S-15	Smart Cover S w/E-Dot	$3,453.00	$3,453.00
1	SC-ASM-SC1	Active Site Monitoring	$364.00	$364.00

JWE 4/18/18

570 3112 500 40 20

RM/UE

SALE AMOUNT	$3,817.00
SHIPPING & HANDLING	$100.00
SALES TAX	$0.00
TOTAL AMOUNT	$3,917.00
AMOUNT PAID	$0.00
BALANCE DUE	$3,917.00

Invoice #: 8W0462

McIntosh Controls Corporation

218 Little Falls Road, Unit 1
Cedar Grove, NJ 07009
(973) 433-4700

DATE 7/2/2018

JUL 07 2018

Bill To:

City of Portland
389 Congress Street
Portland, ME 04101

Ship To:

City of Portland Public Works Admin.
Attn: John Emerson PO #JE0022
55 Portland Street
Portland, ME 04101

PG.	SALESPERSON	SHIP VIA	SHIP DATE	TERMS	YOUR NO.
1	9750/0	UPS GRD PP&AD	6/29/2018	Net 30	JE0022

QTY.	ITEM NO.	DESCRIPTION	PRICE	EXTENDED
1	SC-DSM-SR-15	StdRangeLevelSensor	$998.00	$998.00

57031202 404020

JAE 7/10/18

RM-UE

SALE AMOUNT	$998.00
SHIPPING & HANDLING	$18.00
SALES TAX	$0.00
TOTAL AMOUNT	$1,016.00
AMOUNT PAID	$0.00
BALANCE DUE	$1,016.00

INVOICE

ARCADIS Design & Consultancy for natural and built assets

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
ACH: 071 000 039 | Wire: 026009 593 | SWIFT: BOFAUS3N
Remittance Info: remit-mailbox@arcadis-us.com
62638 Collections Center Drive | Chicago, IL 60693-0626

BENJAMIN PEARSON, PE, COMPLIANCE COORDINATOR
PORTLAND DEPARTMENT OF PUBLIC WORKS
55 PORTLAND STREET
PORTLAND, ME 04101

Invoice Date:	January 10, 2018
Project No:	26980001.0000
Invoice No:	0886281
Payment Terms:	30 Days
Invoice Due Date:	February 9, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- SUBMITTAL OF DRAFT GIS AND HYDRAULIC MODEL GAP ANALYSES REPORTS
- FURTHER CONFIRMATION OF SEWER SYSTEM CONFIGURATION/CONNECTIVITY
- COORDINATION AND MEETINGS WITH DPW
- PRELIMINARY DELINEATION OF SEWERSHEDS/METER LOCATIONS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- FIELD RECONNASAINCE
- DEVELOPMENT OF FIELD INVESTIGATIONS WORKPLAN
- COORDINATION AND MEETING WITH DPW SUBCONTRACTOR
- PRELIMINARY DELINEATION OF SEWERSHEDS/METER LOCATIONS

Professional Services from November 27, 2017 to December 24, 2017

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.30	85.00	25.50	
PROJECT MANAGER				
HAYNES, SCOTT	6.00	195.00	1,170.00	
Totals	6.30		1,195.50	
Total Labor				**1,195.50**
			Total this Task	**$1,195.50**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount
PROJECT ENGINEER/SCIENTIST/ARCHITECT			
ANDERSON, SETH	31.00	155.00	4,805.00
PROJECT MANAGER			
HAYNES, SCOTT	9.00	195.00	1,755.00

PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	2.00	205.00	410.00	
Totals	42.00		6,970.00	
Total Labor				**6,970.00**
			Total this Task	**$6,970.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	28.00	106.00	2,968.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	39.00	175.00	6,825.00	
GOULDING, GUNILLA	44.70	175.00	7,822.50	
PROJECT MANAGER				
HAYNES, SCOTT	11.00	195.00	2,145.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	3.00	205.00	615.00	
Totals	125.70		20,375.50	
Total Labor				**20,375.50**
			Total this Task	**$20,375.50**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	29.50	106.00	3,127.00	
PROJECT MANAGER				
HAYNES, SCOTT	12.00	195.00	2,340.00	
Totals	41.50		5,467.00	
Total Labor				**5,467.00**

Reimbursable Expenses

POSTAGE,SHIP,& MESSENGER				
12/20/2017	FEDEX ERS	|A|143043258|E|18702|T| 770944335127	13.32	
OUTSIDE REPRODUCTIONS				
12/6/2017	JENKINS, CAMERON	Portland Map 36x48	12.63	
	Total Reimbursables		**25.95**	**25.95**
			Total this Task	**$5,492.95**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount
ENGINEER/SCIENTIST/ARCHITECT I			
MACDONALD, SETH	34.50	96.00	3,312.00

PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
PELLETIER, MICHAEL	15.00	185.00	2,775.00	
PROJECT MANAGER				
HAYNES, SCOTT	4.00	195.00	780.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	54.50		7,072.00	
Total Labor				**7,072.00**
			Total this Task	**$7,072.00**
			Total this Invoice	**$41,105.95**

INVOICE

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
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62638 Collections Center Drive | Chicago, IL 60693-0626

BENJAMIN PEARSON, PE, COMPLIANCE COORDINATOR
PORTLAND DEPARTMENT OF PUBLIC WORKS
55 PORTLAND STREET
PORTLAND, ME 04101

Invoice Date:	January 29, 2018
Project No:	26980001.0000
Invoice No:	0889378
Payment Terms:	30 Days
Invoice Due Date:	February 28, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- QA/QC OF MODEL AND GIS GAP ANALYSIS
- CONTINUED CONFIRMAION OF SEWER SYSTEM CONFIGURATION/CONNECTIVITY
- COORDINATION WITH DPW
- PRELIMINARY DELINEATION OF SEWERSHEDS/METER LOCATIONS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- REVIEW OF EXISTING RECORD DRAWINGS, METER DATA AND OTHER INFORMATION
- DEVELOPMENT OF FIELD INVESTIGATIONS WORKPLAN
- COORDINATION WITH DPW AND SUBCONTRACTOR

Professional Services from December 25, 2017 to January 21, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.40	85.00	34.00	
PROJECT MANAGER				
HAYNES, SCOTT	4.00	195.00	780.00	
Totals	4.40		814.00	
Total Labor				**814.00**
			Total this Task	**$814.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount
PROJECT MANAGER			
HAYNES, SCOTT	5.00	195.00	975.00

PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	6.00		1,180.00	
Total Labor				**1,180.00**
			Total this Task	**$1,180.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	2.00	195.00	390.00	
Totals	2.00		390.00	
Total Labor				**390.00**
			Total this Task	**$390.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	25.00	106.00	2,650.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	4.00	175.00	700.00	
PROJECT MANAGER				
HAYNES, SCOTT	4.00	195.00	780.00	
Totals	33.00		4,130.00	
Total Labor				**4,130.00**

Reimbursable Expenses

REIMB EMPLOYEE MILEAGE				
12/20/2017 HAYNES, SCOTT	mileage		113.42	
Total Reimbursables			**113.42**	**113.42**
			Total this Task	**$4,243.42**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	49.00	96.00	4,704.00	
PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
PELLETIER, MICHAEL	13.00	185.00	2,405.00	
PROJECT MANAGER				
HAYNES, SCOTT	1.00	195.00	195.00	
Totals	63.00		7,304.00	
Total Labor				**7,304.00**
			Total this Task	**$7,304.00**
			Total this Invoice	**$13,931.42**

INVOICE

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62638 Collections Center Drive | Chicago, IL 60693-0626

BENJAMIN PEARSON, PE, COMPLIANCE COORDINATOR
PORTLAND DEPARTMENT OF PUBLIC WORKS
55 PORTLAND STREET
PORTLAND, ME 04101

Invoice Date:	March 7, 2018
Project No:	26980001.0000
Invoice No:	0895770
Payment Terms:	30 Days
Invoice Due Date:	April 6, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- QA/QC OF MODEL AND GIS GAP ANALYSIS
- CONTINUED CONFIRMAION OF SEWER SYSTEM CONFIGURATION/CONNECTIVITY
- COORDINATION WITH DPW
- PRELIMINARY DELINEATION OF SEWERSHEDS/METER LOCATIONS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- REVIEW OF EXISTING RECORD DRAWINGS, METER DATA AND OTHER INFORMATION
- DEVELOPMENT OF FIELD INVESTIGATIONS WORKPLAN
- COORDINATION WITH DPW AND SUBCONTRACTOR

Professional Services from January 22, 2018 to February 18, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.40	85.00	34.00	
PROJECT MANAGER				
HAYNES, SCOTT	1.00	195.00	195.00	
Totals	1.40		229.00	
Total Labor				**229.00**
			Total this Task	**$229.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	8.00	195.00	1,560.00	
Totals	8.00		1,560.00	
Total Labor				**1,560.00**

Total this Task **$1,560.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	5.00	195.00	975.00	
Totals	5.00		975.00	
Total Labor				**975.00**

Total this Task **$975.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
ANTONUCCI, ROBERT	6.00	85.00	510.00	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	3.00	96.00	288.00	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	15.50	106.00	1,643.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	12.00	175.00	2,100.00	
PROJECT MANAGER				
HAYNES, SCOTT	6.00	195.00	1,170.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	2.00	205.00	410.00	
Totals	44.50		6,121.00	
Total Labor				**6,121.00**

Total this Task **$6,121.00**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
ANTONUCCI, ROBERT	4.00	85.00	340.00	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	2.00	96.00	192.00	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	5.00	106.00	530.00	
PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
PELLETIER, MICHAEL	1.00	185.00	185.00	
Totals	12.00		1,247.00	
Total Labor				**1,247.00**

Total this Task **$1,247.00**

Total this Invoice **$10,132.00**

INVOICE

ARCADIS Design & Consultancy for natural and built assets

Remit Payments To:
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Bank of America | Acct. No. 8188093937
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62638 Collections Center Drive | Chicago, IL 60693-0626

BENJAMIN PEARSON, PE, COMPLIANCE COORDINATOR
PORTLAND DEPARTMENT OF PUBLIC WORKS
55 PORTLAND STREET
PORTLAND, ME 04101

Invoice Date:	April 5, 2018
Project No:	26980001.0000
Invoice No:	0900596
Payment Terms:	30 Days
Invoice Due Date:	May 5, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATE AND MEET WITH DPW
- REVISION TO DRAFT HYDRAULIC MODEL GAP ANALYSIS
- FINALIZED YEAR 1 METER LOCATIONS, INSTALLED FLOW METERS
- DRILLED GROUNDWATER WELL FOR GW GAUGE

Professional Services from February 19, 2018 to March 25, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.20	85.00	17.00	
PROJECT ENGINEER/SCIENTIST/ARCHITECT				
MARTZ, IAN	.50	155.00	77.50	
PROJECT MANAGER				
HAYNES, SCOTT	5.00	195.00	975.00	
Totals	5.70		1,069.50	
Total Labor				**1,069.50**
		Total this Task		**$1,069.50**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	5.00	195.00	975.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	8.00	205.00	1,640.00	
Totals	13.00		2,615.00	
Total Labor				**2,615.00**

Reimbursable Expenses

REIMB EMPLOYEE MILEAGE

3/1/2018	HAYNES, SCOTT	mileage	106.82	
	Total Reimbursables		**106.82**	**106.82**

Total this Task **$2,721.82**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	11.00	106.00	1,166.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
GOULDING, GUNILLA	70.90	175.00	12,407.50	
MCGINNIS, LAURA	3.30	175.00	577.50	
PROJECT MANAGER				
HAYNES, SCOTT	7.00	195.00	1,365.00	
Totals	92.20		15,516.00	
Total Labor				**15,516.00**

Total this Task **$15,516.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
TRAVIS, JOHN	1.00	85.00	85.00	
ENGINEER/SCIENTIST/ARCHITECT II				
CATHCART, ERIC	2.50	106.00	265.00	
JENKINS, CAMERON	124.50	106.00	13,197.00	
PROJECT ENGINEER/SCIENTIST/ARCHITECT				
MARTZ, IAN	1.00	155.00	155.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	31.00	175.00	5,425.00	
PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
BATMAN, PAUL	3.50	185.00	647.50	
PROJECT MANAGER				
HAYNES, SCOTT	17.00	195.00	3,315.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	3.00	205.00	615.00	
Totals	183.50		23,704.50	
Total Labor				**23,704.50**

Consultants

SUBCONTRACTOR COSTS

3/25/2018	Flow Assessment Services, LLC	11,000.00	
3/25/2018	GEOSEARCH, INC. (FITCHBURG, MA)	2,892.13	
	Total Consultants	**13,892.13**	**13,892.13**

Project	26980001.0000	Citywide I/I Program		Invoice	0900596
Reimbursable Expenses					
FIELD EXPENSES					
3/6/2018	CATHCART, ERIC		Spray paint for dig safe markout	8.42	
REIMB EMPLOYEE MILEAGE					
3/23/2018	CATHCART, ERIC			10.90	
	Total Reimbursables			**19.32**	**19.32**
			Total this Task		**$37,615.95**
			Total this Invoice		**$56,923.27**

INVOICE

ARCADIS Design & Consultancy for natural and built assets

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62638 Collections Center Drive | Chicago, IL 60693-0626

BENJAMIN PEARSON, PE, COMPLIANCE COORDINATOR
PORTLAND DEPARTMENT OF PUBLIC WORKS
55 PORTLAND STREET
PORTLAND, ME 04101

Invoice Date:	May 3, 2018
Project No:	26980001.0000
Invoice No:	0905271
Payment Terms:	30 Days
Invoice Due Date:	June 2, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PM AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- REVISION TO DRAFT HYDRAULIC MODEL GAP ANALYSIS
- CONTINUOUS FLOW MONITORING, GROUNDWATER AND RAIN GAUGING

Professional Services from March 26, 2018 to April 22, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.40	85.00	34.00	
PROJECT MANAGER				
HAYNES, SCOTT	3.00	195.00	585.00	
Totals	3.40		619.00	
Total Labor				**619.00**
			Total this Task	**$619.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	8.00	195.00	1,560.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	3.00	205.00	615.00	
Totals	11.00		2,175.00	
Total Labor				**2,175.00**
			Total this Task	**$2,175.00**

Task 00300 Data Gap Analysis

Project	26980001.0000	Citywide I/I Program	Invoice	0905271

Professional Personnel

	Hours	Rate	Amount	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
GOULDING, GUNILLA	2.80	175.00	490.00	
MCGINNIS, LAURA	1.40	175.00	245.00	
PROJECT MANAGER				
HAYNES, SCOTT	8.00	195.00	1,560.00	
Totals	12.20		2,295.00	
Total Labor				**2,295.00**
			Total this Task	**$2,295.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
ANTONUCCI, ROBERT	2.50	85.00	212.50	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	4.00	96.00	384.00	
ENGINEER/SCIENTIST/ARCHITECT II				
CATHCART, ERIC	14.30	106.00	1,515.80	
JENKINS, CAMERON	31.00	106.00	3,286.00	
PROJECT ENGINEER/SCIENTIST/ARCHITECT				
MARTZ, IAN	5.50	155.00	852.50	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	3.00	175.00	525.00	
PROJECT MANAGER				
HAYNES, SCOTT	7.00	195.00	1,365.00	
Totals	67.30		8,140.80	
Total Labor				**8,140.80**

Reimbursable Expenses

TOLLS,PARKING,TRANSPORT,GAS				
3/30/2018	CATHCART, ERIC	tolls	2.00	
REIMB EMPLOYEE MILEAGE				
3/30/2018	CATHCART, ERIC		69.76	
	Total Reimbursables		**71.76**	**71.76**
			Total this Task	**$8,212.56**
			Total this Invoice	**$13,301.56**

INVOICE

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62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	June 11, 2018
Project No:	26980001.0000
Invoice No:	0912295
Payment Terms:	30 Days
Invoice Due Date:	July 11, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PM AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- REVISION TO DRAFT HYDRAULIC MODEL GAP ANALYSIS
- CONTINUOUS FLOW MONITORING, GROUNDWATER AND RAIN GAUGING

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- COORDINATION WITH DPW AND SUBCONTRACTOR FOR MANHOLE INSPECTIONS

Professional Services from April 23, 2018 to June 3, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.20	85.00	17.00	
PROJECT MANAGER				
HAYNES, SCOTT	2.00	195.00	390.00	
Totals	2.20		407.00	
Total Labor				**407.00**
			Total this Task	**$407.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	6.00	195.00	1,170.00	
Totals	6.00		1,170.00	
Total Labor				**1,170.00**
			Total this Task	**$1,170.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	6.50	106.00	689.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
MCGINNIS, LAURA	7.50	175.00	1,312.50	
PROJECT MANAGER				
HAYNES, SCOTT	17.00	195.00	3,315.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	4.00	205.00	820.00	
Totals	35.00		6,136.50	
Total Labor				**6,136.50**
			Total this Task	**$6,136.50**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
ANTONUCCI, ROBERT	5.50	85.00	467.50	
ENGINEER/SCIENTIST/ARCHITECT II				
CATHCART, ERIC	1.50	106.00	159.00	
JENKINS, CAMERON	3.50	106.00	371.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	29.00	175.00	5,075.00	
PROJECT MANAGER				
HAYNES, SCOTT	11.00	195.00	2,145.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	3.00	205.00	615.00	
Totals	53.50		8,832.50	
Total Labor				**8,832.50**

Reimbursable Expenses

EQUIPMENT RENTAL				
5/7/2018	Pine Environmental Services LLC		61.90	
REIMB EMPLOYEE MILEAGE				
3/1/2018	ANDERSON, AMY	Portland Project Meeting	119.90	
	Total Reimbursables		**181.80**	**181.80**
			Total this Task	**$9,014.30**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount
ADMINISTRATIVE / TECHNICIAN			
ANTONUCCI, ROBERT	1.50	85.00	127.50
ENGINEER/SCIENTIST/ARCHITECT I			
MACDONALD, SETH	2.00	96.00	192.00

PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
PELLETIER, MICHAEL	2.00	185.00	370.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	6.50		894.50	
Total Labor				**894.50**
			Total this Task	**$894.50**
			Total this Invoice	**$17,622.30**

INVOICE

ARCADIS Design & Consultancy for natural and built assets

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62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	July 10, 2018
Project No:	26980001.0000
Invoice No:	0917600
Payment Terms:	30 Days
Invoice Due Date:	August 9, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- CONTINUOUS FLOW MONITORING, GROUNDWATER MONITORING AND RAIN GAUGING

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- MANHOLE INSPECTIONS AND COORDINATION WITH DPW AND SUBCONTRACTOR

Professional Services from June 4, 2018 to June 30, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.20	85.00	17.00	
PROJECT MANAGER				
HAYNES, SCOTT	1.00	195.00	195.00	
Totals	1.20		212.00	
Total Labor				**212.00**
		Total this Task		**$212.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	3.00	195.00	585.00	
Totals	3.00		585.00	
Total Labor				**585.00**
		Total this Task		**$585.00**

Task 00300 Data Gap Analysis

Project	26980001.0000	Citywide I/I Program	Invoice	0917600

Professional Personnel

	Hours	Rate	Amount	
PROJECT ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, SETH	.50	155.00	77.50	
Totals	.50		77.50	
Total Labor				**77.50**
			Total this Task	**$77.50**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
CATHCART, ERIC	1.00	106.00	106.00	
JENKINS, CAMERON	11.50	106.00	1,219.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	4.00	175.00	700.00	
PROJECT MANAGER				
HAYNES, SCOTT	7.50	195.00	1,462.50	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	8.00	205.00	1,640.00	
Totals	32.00		5,127.50	
Total Labor				**5,127.50**

Consultants

SUBCONTRACTOR COSTS			
6/30/2018	Flow Assessment Services, LLC	85,800.00	
	Total Consultants	**85,800.00**	**85,800.00**
		Total this Task	**$90,927.50**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT I				
HILL, JENNA	5.00	96.00	480.00	
PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT				
PELLETIER, MICHAEL	6.00	185.00	1,110.00	
Totals	11.00		1,590.00	
Total Labor				**1,590.00**
			Total this Task	**$1,590.00**
			Total this Invoice	**$93,392.00**

INVOICE

ARCADIS Design & Consultancy for natural and built assets

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
ACH: 071 000 039 | Wire: 026009 593 | SWIFT: BOFAUS3N
Remittance Info: remit-mailbox@arcadis-us.com
62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	August 27, 2018
Project No:	26980001.0000
Invoice No:	0925602
Payment Terms:	30 Days
Invoice Due Date:	September 26, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- CONTINUOUS FLOW MONITORING, GROUNDWATER MONITORING AND RAIN GAUGING

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- MANHOLE INSPECTIONS, SMOKE TESTING AND COORDINATION WITH DPW AND SUBCONTRACTOR

Professional Services from July 23, 2018 to August 19, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.30	85.00	25.50	
PROJECT MANAGER				
HAYNES, SCOTT	2.00	195.00	390.00	
Totals	2.30		415.50	
Total Labor				**415.50**
			Total this Task	**$415.50**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	4.00	195.00	780.00	
Totals	4.00		780.00	
Total Labor				**780.00**
			Total this Task	**$780.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	1.00	195.00	195.00	
Totals	1.00		195.00	
Total Labor				**195.00**
			Total this Task	**$195.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
WEST GEARY, CONOR	1.00	85.00	85.00	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	1.00	96.00	96.00	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	57.50	106.00	6,095.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	17.00	175.00	2,975.00	
PROJECT MANAGER				
HAYNES, SCOTT	15.00	195.00	2,925.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	92.50		12,381.00	
Total Labor				**12,381.00**

Reimbursable Expenses

REIMB EMPLOYEE MILEAGE				
7/18/2018	HAYNES, SCOTT	mileage	109.00	
Total Reimbursables			**109.00**	**109.00**
			Total this Task	**$12,490.00**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount
ADMINISTRATIVE / TECHNICIAN			
WEST GEARY, CONOR	5.00	85.00	425.00
ENGINEER/SCIENTIST/ARCHITECT I			
HILL, JENNA	2.50	96.00	240.00
MACDONALD, SETH	40.00	96.00	3,840.00
PRINCIPAL ENGINEER/SCIENTIST/ARCHITECT			
PELLETIER, MICHAEL	14.00	185.00	2,590.00
PROJECT MANAGER			
HAYNES, SCOTT	2.00	195.00	390.00

PROJECT DIRECTOR / PRINCIPAL IN CHARGE						
LACHMAYR, JENNIFER			1.00	205.00	205.00	
	Totals		64.50		7,690.00	
	Total Labor					**7,690.00**
Reimbursable Expenses						
TOLLS,PARKING,TRANSPORT,GAS						
8/9/2018	MACDONALD, SETH	Parking Portland ME			16.00	
LODGING AND APART RENTAL						
8/8/2018	MACDONALD, SETH	Hotel Stay 8/8			149.25	
REIMB EMPLOYEE MILEAGE						
8/8/2018	MACDONALD, SETH	Driving and Field Work 8/8			62.95	
8/9/2018	MACDONALD, SETH	Driving and Field Work 8/8			65.40	
	Total Reimbursables				**293.60**	**293.60**
					Total this Task	**$7,983.60**
					Total this Invoice	**$21,864.10**

INVOICE

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
ACH: 071 000 039 | Wire: 026009 593 | SWIFT: BOFAUS3N
Remittance Info: remit-mailbox@arcadis-us.com
62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	October 1, 2018
Project No:	26980001.0000
Invoice No:	0931871
Payment Terms:	30 Days
Invoice Due Date:	October 31, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- ANALYSIS OF FLOW MONITORING RESULTS
- SELECTION OF HIGH I/I AREAS FOR SSES ACTIVITIES
- FINALIZE HYDRAULIC MODEL GAP ANALYSIS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- ANALYSIS OF MANHOLE INSPECTION FINDINGS
- DEVELOPMENT OF REHABILITATION RECOMMENDATIONS
- SMOKE AND DYE TESTING, COORDINATION WITH DPW AND OVERSIGHT OF SUBCONTRACTOR

Professional Services from August 20, 2018 to September 23, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.40	85.00	34.00	
PROJECT MANAGER				
HAYNES, SCOTT	4.00	195.00	780.00	
Totals	4.40		814.00	
Total Labor				**814.00**

Reimbursable Expenses

REIMB EMPLOYEE MILEAGE				
7/19/2018	LACHMAYR, JENNIFER	mileage	70.85	
	Total Reimbursables		**70.85**	**70.85**
		Total this Task		**$884.85**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	5.00	195.00	975.00	
Totals	5.00		975.00	
Total Labor				**975.00**
		Total this Task		**$975.00**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	2.50	195.00	487.50	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	3.50		692.50	
Total Labor				**692.50**
		Total this Task		**$692.50**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	72.50	106.00	7,685.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	40.00	175.00	7,000.00	
PROJECT MANAGER				
HAYNES, SCOTT	17.50	195.00	3,412.50	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	5.00	205.00	1,025.00	
Totals	135.00		19,122.50	
Total Labor				**19,122.50**
		Total this Task		**$19,122.50**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount
ENGINEER/SCIENTIST/ARCHITECT I			
MACDONALD, SETH	64.00	96.00	6,144.00
STAFF ENGINEER/SCIENTIST/ARCHITECT			
MITCHELL, SEAN	17.00	145.00	2,465.00
PROJECT MANAGER			
HAYNES, SCOTT	4.50	195.00	877.50
PELLETIER, MICHAEL	2.00	195.00	390.00

PROJECT DIRECTOR / PRINCIPAL IN CHARGE						
LACHMAYR, JENNIFER			1.00	205.00	205.00	
	Totals		88.50		10,081.50	
	Total Labor					**10,081.50**
Reimbursable Expenses						
TOLLS,PARKING,TRANSPORT,GAS						
9/12/2018	MITCHELL, SEAN	Progress Meeting			5.60	
REIMB EMPLOYEE MILEAGE						
9/12/2018	MITCHELL, SEAN	Progress Meeting			105.73	
	Total Reimbursables				**111.33**	**111.33**
				Total this Task		**$10,192.83**
				Total this Invoice		**$31,867.68**

INVOICE

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
ACH: 071 000 039 | Wire: 026009 593 | SWIFT: BOFAUS3N
Remittance Info: remit-mailbox@arcadis-us.com
62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	November 6, 2018
Project No:	26980001.0000
Invoice No:	0938242
Payment Terms:	30 Days
Invoice Due Date:	December 6, 2018

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- PRELIMINARY SELECTION OF 2019 METER AREAS
- SELECTION OF HIGH I/I AREAS FOR 2019 SSES ACTIVITIES
- FINALIZE HYDRAULIC MODEL GAP ANALYSIS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- ANALYSIS OF MANHOLE INSPECTIONS AND SMOKE AND DYE TESTING RESULTS
- DEVELOPMENT OF REHABILITATION RECOMMENDATIONS
- SMOKE AND DYE TESTING, COORDINATION WITH DPW AND OVERSIGHT OF SUBCONTRACTOR

Professional Services from September 24, 2018 to October 21, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.20	85.00	17.00	
PROJECT MANAGER				
HAYNES, SCOTT	1.50	195.00	292.50	
Totals	1.70		309.50	
Total Labor				**309.50**
			Total this Task	**$309.50**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	2.50	195.00	487.50	
Totals	2.50		487.50	
Total Labor				**487.50**

Total this Task **$487.50**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	1.00		205.00	
Total Labor				**205.00**

Total this Task **$205.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	2.00	106.00	212.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	9.00	175.00	1,575.00	
PROJECT MANAGER				
HAYNES, SCOTT	13.50	195.00	2,632.50	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	1.00	205.00	205.00	
Totals	25.50		4,624.50	
Total Labor				**4,624.50**

Consultants

SUBCONTRACTOR COSTS			
10/17/2018 Flow Assessment Services, LLC		21,065.00	
10/17/2018 Flow Assessment Services, LLC		1,485.00	
Total Consultants		**22,550.00**	**22,550.00**

Reimbursable Expenses

REIMB EMPLOYEE MILEAGE				
7/19/2018	ANDERSON, AMY	Project Mtg	119.90	
9/12/2018	ANDERSON, AMY	Project Mtg	170.04	
	Total Reimbursables		**289.94**	**289.94**

Total this Task **$27,464.44**

Task 00500 SSES - Investigate Major I/I Sources

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	2.00	106.00	212.00	
Totals	2.00		212.00	
Total Labor				**212.00**

Total this Task **$212.00**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

		Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT I					
MACDONALD, SETH		18.00	96.00	1,728.00	
STAFF ENGINEER/SCIENTIST/ARCHITECT					
MITCHELL, SEAN		2.00	145.00	290.00	
PROJECT MANAGER					
HAYNES, SCOTT		1.50	195.00	292.50	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE					
LACHMAYR, JENNIFER		1.00	205.00	205.00	
	Totals	22.50		2,515.50	
	Total Labor				**2,515.50**

Consultants

SUBCONTRACTOR COSTS			
10/17/2018	Flow Assessment Services, LLC	11,493.57	
	Total Consultants	**11,493.57**	**11,493.57**

Reimbursable Expenses

TOLLS,PARKING,TRANSPORT,GAS			
10/2/2018	MACDONALD, SETH	11.00	
REIMB EMPLOYEE MILEAGE			
10/2/2018	MACDONALD, SETH	115.00	
	Total Reimbursables	**126.00**	**126.00**

Total this Task	**$14,135.07**
Total this Invoice	**$42,813.51**

INVOICE

ARCADIS Design & Consultancy for natural and built assets

Remit Payments To:
Arcadis US, Inc.
Bank of America | Acct. No. 8188093937
ACH: 071 000 039 | Wire: 026009 593 | SWIFT: BOFAUS3N
Remittance Info: remit-mailbox@arcadis-us.com
62638 Collections Center Drive | Chicago, IL 60693-0626

Benjamin Pearson, Pe, Compliance Coordinator
Portland Department Of Public Works
55 Portland Street
Portland, ME 04101

Invoice Date:	December 7, 2018
Project No:	26980001.0000
Invoice No:	0944034
Payment Terms:	30 Days
Invoice Due Date:	January 6, 2019

SANITARY SEWER SYSTEM INFILTRATION/INFLOW PROGRAM - PO# 043930

WORK COMPLETED THIS PERIOD:
CITYWIDE I/I ANALYSIS
- PROJECT MANAGEMENT AND ADMINISTRATION
- COORDINATION WITH DPW AND SUBCONTRACTORS
- REFINEMENT OF 2019 METER AREAS
- SELECTION OF HIGH I/I AREAS FOR SSES ACTIVITIES (FLOW ISOLATION AND CCTV)
- FINALIZE HYDRAULIC MODEL GAP ANALYSIS

TASK 7: WARREN AVE./CSO-042 INVESTIGATIONS
- ANALYSIS OF MANHOLE INSPECTIONS AND SMOKE AND DYE TESTING RESULTS
- DEVELOPMENT OF REHABILITATION RECOMMENDATIONS
- BEGAN SUMMARY REPORT FOR I/I INVESTIGATIONS FOR WARREN AVENUE/CSO-042 STUDY AREA

Professional Services from October 22, 2018 to December 2, 2018

Task 00100 Project Management

Professional Personnel

	Hours	Rate	Amount	
ADMINISTRATIVE / TECHNICIAN				
SLATER, DUANE	.20	85.00	17.00	
PROJECT MANAGER				
HAYNES, SCOTT	5.00	195.00	975.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	3.00	205.00	615.00	
Totals	8.20		1,607.00	
Total Labor				**1,607.00**
		Total this Task		**$1,607.00**

Task 00200 Kickoff, Data Collection, Publ

Professional Personnel

	Hours	Rate	Amount	
PROJECT MANAGER				
HAYNES, SCOTT	6.50	195.00	1,267.50	
Totals	6.50		1,267.50	
Total Labor				**1,267.50**
			Total this Task	**$1,267.50**

Task 00300 Data Gap Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	4.00	106.00	424.00	
Totals	4.00		424.00	
Total Labor				**424.00**
			Total this Task	**$424.00**

Task 00400 Flow Monitoring Program and I/I Analysis

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT II				
JENKINS, CAMERON	30.50	106.00	3,233.00	
SENIOR ENGINEER/SCIENTIST/ARCHITECT				
ANDERSON, AMY	24.00	175.00	4,200.00	
PROJECT MANAGER				
HAYNES, SCOTT	17.50	195.00	3,412.50	
Totals	72.00		10,845.50	
Total Labor				**10,845.50**
			Total this Task	**$10,845.50**

Task 00700 Warren Ave/CSO-042 Investigations

Professional Personnel

	Hours	Rate	Amount	
ENGINEER/SCIENTIST/ARCHITECT I				
MACDONALD, SETH	102.00	96.00	9,792.00	
STAFF ENGINEER/SCIENTIST/ARCHITECT				
MITCHELL, SEAN	5.00	145.00	725.00	
PROJECT MANAGER				
HAYNES, SCOTT	3.00	195.00	585.00	
PROJECT DIRECTOR / PRINCIPAL IN CHARGE				
LACHMAYR, JENNIFER	5.00	205.00	1,025.00	
Totals	115.00		12,127.00	
Total Labor				**12,127.00**
			Total this Task	**$12,127.00**
			Total this Invoice	**$26,271.00**

PURCHASE ORDER

CITY OF PORTLAND, MAINE
City Hall, 389 Congress Street
Portland, Maine 04101
(207) 874-8654

P.O. # 043930
Date: 05/05/17

ARCADIS U.S. INC.
630 PLAZA DRIVE,
SUITE 100
HIGHLANDS RANCH, CO 80129

City of Portland
PUBLIC WORKS ADMIN.
55 PORTLAND STREET
PORTLAND, ME 04101

VENDOR #
13543

DELIVER BY	SHIP VIA	TERMS
10/24/16		NET/30

CONFIRM BY	CONFIRM TO	REQUISITIONED BY
	RHONDA PROVENCHER	PMH (BP)

FREIGHT	CONTRACT NO.	ACCOUNT NO.	PROJECT	REQ. NO.	REQ. DATE
		30031004927010	C17508	4010	4/24/16

LINE #	QUANTITY	UOM	ITEM NO. AND DESCRIPTION	UNIT COST	EXTENDED COST
1	750000.00	EA	INFLOW & INFILTRATION PROGRAM	1.0000	750000.00
				SUB-TOTAL	750000.00
				TOTAL	750000.00

TERMS & CONDITIONS, AS DEPICTED ON THE REVERSE SIDE OF THIS ORDER, ARE A FORMAL PART OF THIS ORDER

FOR THE CITY OF PORTLAND, MAINE

AUTHORIZED SIGNATURE

AGREEMENT BETWEEN THE
CITY OF PORTLAND
AND
ARCADIS U.S., INC.

THIS AGREEMENT is entered into this 24th day of April, 2017, by and between the **CITY OF PORTLAND**, a body politic and corporate (hereinafter the "**CITY**"), and **ARCADIS U.S., INC.,** a Delaware corporation with a mailing address of (hereinafter the "**CONSULTANT**").

W I T N E S S E T H:

WHEREAS, the **CITY** is in need of infiltration and inflow removal and monitoring of its sewer and stormwater system and did advertise a Request for Proposals #3217 entitled "Planning and Engineering Services for a Infiltration and Inflow Program of the Sanitary Sewer System," dated October 25, 2016, as amended by Addendum 1 dated November 18, 2016 (hereinafter, collectively, the "Request for Bids"), a copy of which is attached as Exhibit A and made a part hereof; and

WHEREAS, the **CONSULTANT** has the requisite knowledge and technical ability to perform the required services and has submitted a proposal dated November 23, 2016, and an associated Scope of Services dated April 7, 2017 (collectively, the "Proposal"), a copy of which is attached as Exhibit B and made a part hereof; and

WHEREAS, after due consideration, the **CITY** decided to award this contract to **CONSULTANT;**

NOW, THEREFORE, in consideration of the mutual promises made by each party to the other, the parties covenant and agree as follows:

1. The **CONSULTANT** will furnish the materials, supplies, equipment and labor (hereinafter the "Work") in accordance with the specifications contained in the Request for Proposals and the Proposal.

Arcadis may perform the Services through a combination of its own employees and employees of its affiliates and that the use of such affiliate labor shall not be deemed a subcontract for purposes of this agreement.

The restatement in this document of any term of the Request for Proposals or the Proposal shall not be deemed to waive any term not so restated. If any disagreement is found between Request for Bids or the Proposal and this document, then this document shall govern; and the Request for Bids shall govern over the Proposal, to the extent they disagree; provided, however, that this document and its attachments shall be construed to be supplemental to one another to the extent possible.

2. The **CONSULTANT** covenants and agrees that all Work performed and furnished hereunder shall be in accordance with applicable professional standards, and that all Work shall be performed in a good workmanlike manner. Unless a longer warranty period is specified in the Exhibits hereto, all Work provided shall be warranted by the **CONSULTANT** for one (1) full year from the date of completion of all Work hereunder and acceptance thereof by the **CITY**. Notwithstanding the foregoing, any longer period specified in the attachments shall stay in effect.

3. Prior to the execution of this Agreement, the **CONSULTANT** shall, at its own expense, carry Professional Liability Insurance for errors, omissions and negligence, in the amount of One Million Dollars ($1,000,000.00) per claim. The **CONSULTANT** will also procure and maintain General Liability Insurance coverage and Automobile Liability Insurance coverage in amounts of not less than Four Hundred Thousand Dollars ($400,000.00) per occurrence for bodily injury, death and property damage, combined single limit each accident for Automobile Liability, naming the **CITY** as an additional insured thereon. Workers' Compensation Insurance coverage shall be provided by **CONSULTANT** to the extent required by law. With respect to the General Liability and Automobile Liability Insurance, the **CONSULTANT** shall name the **CITY** as an additional insured for coverage only in those areas where government immunity has been expressly waived by 14 M.R.S. A. § 8104-A, as limited by § 8104-B, and § 8111. This provision shall not be deemed a waiver of any defenses, immunities or limitations of liability or damages available under the Maine Tort Claims Act, other Maine statutory law, judicial precedent or common law. **CONSULTANT** will provide the **CITY** a certificate of insurance evidencing such coverage, in this way: certificate must say either: A) "the policy has been endorsed to name the City of Portland as an Additional Insured" and a copy of the endorsement must come to the City of Portland with the certificate, or B) "the policy already includes an endorsement, such as the General Liability Extension Endorsement, by which the City of Portland is automatically made an additional insured." A Certificate which merely has a box checked under "Addl Insr," or the like, or which merely states the City of Portland is named as an Additional Insured, will not be acceptable. The Workers' Compensation insurance shall include an endorsement waiving all rights of subrogation against the City of Portland, its officers or employees. The **CONSULTANT** shall furnish the **CITY** and thereafter maintain certificates evidencing

all such coverages, which certificates shall guarantee thirty (30) days' notice to the **CITY** of termination of insurance from insurance provider or agent.

4. To the fullest extent permitted by law, the **CONSULTANT** shall defend, indemnify and hold harmless the **CITY**, its officers and employees, from and against all claims, damages, losses, and expenses, just or unjust, including, but not limited to, the costs of defense and reasonable attorney's fees to the extent arising out of or resulting from the performance of this Agreement, provided that any such claims, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use therefrom, and (2) is caused in whole or in part by any negligent act or omission of the **CONSULTANT**, anyone directly or indirectly employed by it or its affiliates, or anyone for whose act it may be liable. Such obligation of indemnification shall not be construed to negate or abridge any other obligation of indemnification running to the **CITY** which otherwise exists. The extent of the indemnification provision shall not be limited by the provision for insurance in this Agreement. **CONSULTANT**'s obligations under this paragraph shall survive termination of this Agreement.

5. The **CONSULTANT** shall perform the work to the reasonable satisfaction of the Director of the Department of Public Works (hereinafter, the "Director") who will have the right of inspection at all times, and whose approval and acceptance of the work will be a condition precedent to payments by the **CITY** under this Contract. The **CONSULTANT** acknowledges and agrees that such inspection is for purposes of approving payment alone and such inspection shall not be deemed to impose any duty or liability upon the **CITY** to supervise any aspect of or approve the quality of the Work.

6. Time is of the essence in the performance of this Agreement. Upon receipt of executed contracts and insurance as required, the **CITY** will promptly send an executed contract to the **CONSULTANT**, which will commence work as soon as reasonably possible. The **CONSULTANT** agrees to complete the entire work by the end of a three-year term from the date of execution. The agreement may be extended at the mutual agreement of both parties for an additional two years. The time set for such completion may be extended only by written consent of the Director.

Except for the obligation to make payment for services performed pursuant to this Agreement, any delay in or failure of performance by either party to this Agreement shall not constitute a default under this Agreement nor give rise to any claim for damage, cost, or expense, if and to the extent such delay or failure is caused by an occurrence beyond the control of the delayed or non-performing party. Notwithstanding the foregoing, a party which is delayed in or prevented from performing for any such reason, shall promptly notify the other party in writing of the reason for the non-performance and the anticipated extent of any delay or non-performance, and shall take reasonable steps to minimize the adverse impact of the delay or non-performance.

7. In the event of any dispute as to the amount, nature or scope of the work required under this Contract, the design and judgment of the Director or designee will be final and binding.

8. For performance of all the terms and conditions of this Agreement, the **CITY** will pay the **CONSULTANT** an amount not to exceed One Million Seven Hundred One Thousand Eight Hundred Eighty-Six Dollars ($1,701,886.00) which will include any expenses. If any changes in work scope requested by the City increases or decreases the time required for the performance of the work or cost of the work, or if additional services are requested, an equitable adjustment shall be made by the parties to the Consultant's work schedule or its compensation, or both, as may be agreed upon in writing by the parties.

9. During the term of this Agreement, CITY shall grant to or cause to be made available to CONSULTANT reasonable and necessary nonexclusive access to any location as necessary for purpose of allowing CONSULTANT to perform the Work and fulfill its obligations under this Agreement. The CITY shall notify CONSULTANT if the CITY is unable to provide necessary access within a timely manner. Should ARCADIS be obstructed or delayed in the commencement, performance or completion of the Work due to the CITY's failure to provide timely access to a location, CONSULTANT will be entitled to a reasonable extension in the completion time requirements, provided that such extension is agreed to in writing by the parties.

10. The **CONSULTANT** shall keep accurate records of all services performed under this Agreement and shall submit such information to the **CITY** on a monthly basis. Payment for such Work shall be made to the **CONSULTANT** not more than thirty (30) days after receipt of an invoice and acceptance of the Work by the Director or designee.

11. The **CITY** agrees to furnish or provide access to the **CONSULTANT** to any information or material in its possession which is relevant to the **CONSULTANT**'s performance hereunder and **CITY** staff will cooperate with **CONSULTANT**. The **CONSULTANT** will not, without the **CITY**'s written consent, disclose, or permit disclosure, by any officer, employee, or agent or subcontractor of **CONSULTANT**, of any information or material furnished or generated under this Agreement. The **CONSULTANT** shall be entitled to rely upon the accuracy of such information. The provisions of this Article shall not apply to information which is published or comes into the public domain through no fault of the **CONSULTANT** or is required to be disclosed by law.

The following shall be requirements of this Agreement:

(a) All data collected shall be treated as confidential material and shall be disclosed *only* to authorized **CITY** representatives;

(b) The **CONSULTANT** shall not disclose or permit disclosure of any information or material furnished and/or generated under this Agreement without the **CITY**'s prior written consent; and

(c) All documents, data, studies, estimates, summaries and any other work or material developed under this Agreement shall be the property of the **CITY** and shall be promptly delivered to the appropriate Department Contact person upon completion of a particular service/assignment or upon the request of the **CITY**.

12. The **CITY** may terminate this Agreement for cause by written Notice to the **CONSULTANT**. In the event of such termination, the **CONSULTANT** shall not be entitled to any further payment under this Agreement for work performed after the date of receipt of said Notice.

13. The **CITY** shall have the right to terminate this Agreement at any time for its convenience on thirty (30) days' prior written Notice to the **CONSULTANT**. If the Agreement is terminated by the **CITY** for convenience, the **CITY** shall pay the **CONSULTANT** for all Work performed and all materials purchased pursuant to this Agreement prior to receipt of such Notice.

14. Out of concern for the public, **CITY** employees and the **CONSULTANT's** employees, all work performed by the **CONSULTANT** shall be in conformance with pertinent OSHA, local, state and federal government regulations.

15. No waiver of any breach of any one or more of the conditions of this Agreement by the **CITY** shall be deemed to imply or constitute a waiver of any succeeding or other breach hereunder.

16. This Agreement and its attachments represents the entire and complete agreement and understanding between the parties and supersedes any prior agreement or understanding, written or oral, between the parties with respect to the subject matter of this Agreement. This Agreement cannot be amended except by written instrument executed by the **CITY** and **CONSULTANT.**

17. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the obligations hereunder, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court.

18. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement. A signature in a pdf or electronic document shall be considered the equivalent of an original signature.

19. **CONSULTANT** warrants and represents that it has the full right and authority to enter into this Agreement, that there is no impediment that would inhibit its ability to perform

its obligations under this Agreement, and that the person signing this Agreement on behalf of **CONSULTANT** has the authority to do so.

IN WITNESS WHEREOF, the said **CITY OF PORTLAND** has caused this Agreement to be signed and sealed by Jon P. Jennings, its City Manager, thereunto duly authorized, and **ARCADIS U.S., INC.** has caused this Agreement to be signed and sealed by Jennifer Kelly Lachmayr its Principal-in-charge thereunto duly authorized, as of the day and date first above written.

WITNESS:

Sonia Bean

CITY OF PORTLAND

By: Jon P. Jennings

Jon P. Jennings
Its City Manager

WITNESS:

Kathryn B Edwards

ARCADIS U.S., INC.

By: Jennifer Kelly Lachmayr

Print or type name: Jennifer Kelly Lachmayr

Its: Principal-in-Charge

Approved as to form:

Corporation Counsel's Office

Approved as to funds:

Finance Director

EXHIBIT A

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
55 Portland Street
Portland, Maine 04101

Request for Proposal
for
Planning and Engineering Services
For a Infiltration and Inflow Program
of the Sanitary Sewer System

RFP # 3217

Dated: October 25, 2016

Sealed bids for providing Planning & Engineering Services and other responsibilities as described herein will be received until **3:00 pm, on Wednesday, November 23, 2016.** Copies of the above documents will be available at the Purchasing Office, Room 103, City Hall, 389 Congress Street, Portland, ME 04101. Each prospective bidder will be required to obtain from the City each copy of the proposal form; e-mail jrl@portlandmaine.gov, phone (207) 874-8654, or fax (207) 874-8652. Late, unsigned proposals, or proposals submitted electronically shall not be accepted.

All questions shall be directed, in writing, to the Matthew Fitzgerald, Purchasing Manager at the above address, and be received at least five business days prior to the stated opening date (FAX 207-874-8652, e-mail MFF@portlandmaine.gov). Questions received after this time will not be addressed. Responses from the City that substantially alter this request will be issued in the form of a written addendum to all document holders registered in the Purchasing office. Oral explanation or interpretation given before the award of the contract will not be binding.

Request for Proposals

The City of Portland Department of Public Works, Water Resources Division, is seeking proposals from engineering firms to perform a city-wide inflow and infiltration (I/I) investigation in the combined and separated wastewater collection system. The engineering firm must be experienced in collection system flow monitoring and metering; data collection and analysis; hydraulic sewer modeling; identification of infiltration and inflow from rain events and ground water impacts; and projects and programs to rehabilitate or replace collection system assets. The successful consultant shall enter into a three (3) year contract. The contract may be extended for up to two (2) years with City and consultant approval.

Project Background

The City of Portland (City) is located in Cumberland County along the Casco Bay in Southern Maine. City sewerage infrastructure consists of approximate 240 miles of sanitary sewer, 6,375 sewer manholes, and ten pumping stations. The Portland Water District (PWD) owns and maintains 15 pumping stations and 17.4 miles of sanitary sewer pipe. The PWD also maintains and operates the East End Wastewater Treatment Facility which is able to provide secondary treatment to approximately 34 million gallons per day and primary treatment for up to 80 million gallons per day. A majority of the sanitary sewer system is a combined system. The Environmental Protection Agency mandated the City to prepare a Capacity, Management, Operation, and Maintenance (CMOM) manual which was completed in 2014. The manual resulted in a Corrective Action Plan which outlines the I/I program in three phases.

Phase 1 – Investigation and quantification of I/I flows – January 1, 2019

Phase 2 – Identification of major I/I sources – July 1, 2019

Phase 3 – Schedule of target opportunities for cost effective mitigation – December 1, 2019

Scope of Work

The City must complete a three phase I/I program. The CMOM manual has recommendations for completing each phase. While the approach detailed in the CMOM has been communicated to the EPA, alternative methods may be considered. The consultant may follow their own methods deemed suitable and advantageous to complete each phase based on their experience with previous I/I investigation with City approval. The City is looking for a cost effective approach to reduce I/I and creative but effective technologies and strategies are encouraged. The three phases and associated deadlines are:

<u>Phase 1 - Investigation and quantification of I/I flows</u> – Completed by January 1, 2019

Phase 1 must identify data gaps within the City's previous modeling and metering work, and the GIS system in order to have an effective and robust hydraulic model. Phase 1 must also identify excessive I/I defined as greater than 4,000 gallons per day per inch-diameter/mile.

Task 1 – Data gathering and Gap Analysis

Activities to be undertaken include the following:

- Meet with City staff to identify available background information and reports;
- Collect and review reports, record drawings, operating and maintenance manuals, SCADA information, GIS information etc. as necessary to gain a full understanding of the wastewater collection system and missing asset information;
- Complete a gap analysis of the existing GIS system and collect data as required;
- Inspect existing facilities, review inspection reports and maintenance records as necessary;
- Review flow data along with available rainfall data from external sources;
- Collect other information considered relevant;
- Conduct a full assessment and of all metering and modeling completed previously; and
- Prepare a Background Information and Gap Analysis Report

Task 2 – Determine and Implement a Flow Monitoring Strategy

Activities to be undertaken include:

- Develop a flow monitoring strategy that includes the review of recommended sites from the CMOM report, identification of other suitable sites, field verification of these sites, recommendation of initial sites, installation of flow monitoring equipment and data collection and maintenance procedures for the flow monitoring equipment;
- Implement the flow monitoring strategy;
- Superimpose rain data on wastewater collection system flow data;
- Identify the potential sources of inflow and infiltration;
- Quantify the amount of inflow and infiltration;
- Prepare an inflow and infiltration Summary Flow Monitoring Report

<u>Phase 2 - Investigation and quantification of I/I flows</u> – Submitted by July 1, 2019

The goal of this phase is to further identify sources of inflow and infiltration in those areas where significant extraneous flows were seen in Phase 1.

Task 3 – Determine and Implement a Strategy for Further Investigation of Extraneous Flows

Activities to be undertaken include:

- Provide a gap analysis of flow data and recommend areas to be further investigation;
- Formulate an investigation strategy that includes manhole inspections, smoke testing, additional camera inspections of sanitary sewer mains and laterals as necessary plus any other investigative methods appropriate for this task.
- Provide recommendations for a future permanent flow monitoring program;
- Implement the investigation strategy;
- Identify significant sources of inflow and infiltration;

- Locate the sources of inflow and infiltration;
- Quantify the amount of inflow and infiltration per source;
- Quantify inflow and infiltration over the period of the study;
- Prepare a Summary Report

Phase 3 - Schedule of target opportunities for cost effective mitigation - Submitted by December 1, 2019

Task 4 – Wastewater Collection System Analysis and Action Plan

Prepare and submit a comprehensive Study Report analyzing the information gathered in all tasks.
Activities to be undertaken include the following:

- Determine strategies to reduce inflow and infiltration flows into the wastewater collection system;
- Prepare a detailed cost estimate for strategies to reduce inflow and infiltration flows;
- Establish priorities in rehabilitation, repair and replacement works;
- Develop a 10-year Capital Plan with short-term and long-term objectives;
- Provide recommendations for the installation of permanent flow monitoring stations; and
- Prepare a comprehensive Inflow and Infiltration Study Report that incorporates the findings of all reports.

The CMOM manual is available at the following FTP site:

Access: ftp://ftp.portlandmaine.gov/
Username: CSO (uppercase)
Password: portland (lowercase)

Submission Requirements

Interested and qualified firms or teams are invited to submit one (1) original, five (5) copies and one (1) CD of materials in PDF format that demonstrate their experience in performing a project of this scale and complexity. The proposal shall be submitted by a lead firm but may contain services from sub consultants.

Letter of Transmittal: Briefly describe your firm, its history, size, and its areas of expertise

The proposal should contain the following information:

1. Provide detail of the firm's qualifications for this type of project. Identify project leadership, reporting responsibilities, and, if applicable, how sub consultants will work within the management structure and what sub consultants are responsible for. Provide resumes of project team personnel along with a list of individual project team member's experience for the prime firm, and if applicable, any sub consultants.

2. For the Prime firm, list past experience with up to five (5) similar projects for other clients, particularly in Maine, for the past five (5) years. Similarly, list no more than three (3) projects per sub consultant which have been completed in the past five (5) years. All listed projects should include references, contact names, and telephone numbers;

3. A complete digital copy of a final report from a project your firm has completed with the past five (5) years that is most similar to this project;

4. Statement of availability, workload, and location of key personnel dedicated to the City of Portland assignment;

5. Provide the organizational structure and any firm specific tools that will be used in the project.

6. Provide a project outline based on your understanding of the project and previous experience.

7. Attach a fee statement in a separate, sealed, envelope to the original set of materials. This fee statement will not be opened or used to shortlist firms.

Additional materials are welcome and may be submitted; however the City reserves the right to make a decision without regard to any additional information submitted.

Selection Process

Firms who provide and meet the submission requirements will be scored using the selection criteria below. A Selection Review Committee will review the submitted documents, evaluate and score each submittal to create a shortlist. Firms that have been shortlisted will be asked to schedule an interview and give a presentation. After conducting the interviews, the Selection Review Committee will recommend a consultant to be awarded a contract.

The presentation should focus on and provide more detail for the firm's project approach and how the firm's previous experience with Inflow and Infiltration investigations have guided and shaped the approach. Firm's should be prepared to discuss the team's staff, organization structure, and demonstrated project experience. The Selection Review Committee will consider the depth of the project approach, quality of answers to questions and concerns, and the ability to work with the City to complete the program within the given time frame. Printed materials should be provided.

The City reserves the right to solicit information about the consultant from all sources available to the City and to request additional information from the consultant. In addition, City may consider history of firm in complying with project programs, schedules, and budgets on previous City projects.

Selection Criteria

The following criteria will be used to evaluate proposals and presentations. (100 points)

Criteria 1: Firm's Demonstrated Experience (past 5 years) - 35 point maximum

City is interested in the firm's and sub consultant's history and demonstrated success with projects of similar programs, goals, and municipal clients as the project described herein. The five submitted projects and references, the firm's ability to comply with project programs, schedules and budgets, and the final report will be considered. Previous experience with municipal entities, specifically the City of Portland, will also be considered.

Criteria 2: Experience and Availability of Proposed Staff, including Project Leadership – 30 point maximum

City is interested in the experience and availability of the proposed staff for this project, including project leadership. Availability and location of staff and experience of the firm and project leadership on similar projects will be considered.

Criteria 3: Project Outline - 20 point maximum

City is interested in the firm's understanding of the project issues, and the general approach to the project, including any innovative ideas to complete the phases. This may include any anticipated project issues and the firm's approach in addressing those issues.

Criteria 4: Team Structure - 15 point maximum

City is interested in the firm's organizational structure, reporting responsibilities, how the lead firm will interact with City staff, and how sub consultants will work within the management structure.

Submittals shall EITHER be mailed OR delivered to:

Purchasing Office
City Hall, Room 103
389 Congress Street
Portland, Maine, 04101

EQUAL EMPLOYMENT OPPORTUNITIES

Vendor shall comply fully with the Nondiscrimination and Equal Opportunity Provisions of the Workforce Investment Act of 1998, as amended (WIA, 29 CFR part 37); the Nontraditional Employment for Women Act of 1991; title VI of the Civil Rights Act of 1964, as amended; section 504 of the Rehabilitation Act of 1973, as amended; the Age Discrimination Act of 1975, as amended; title IX of the Education Amendments of 1972, as amended; and with all applicable requirements imposed by or pursuant to regulations

implementing those laws, including but not limited to 29 CFR part 37 and all other applicable laws, including the Maine Human Rights Act, ordinances and regulations regarding equal opportunity and equal treatment.

GENERAL

The successful bidder shall agree to defend, indemnify and save the City harmless from all losses, costs or damages caused by its acts or those of its agents, and, before signing the contract, will produce evidence satisfactory to the City's Corporation Counsel of coverage for General Public and Automobile Liability insurance in amounts not less than $400,000 per person, for bodily injury, death and property damage, protecting the contractor and the City, and naming the City as an additional insured from such claims, and shall also procure Workers' Compensation insurance.

All materials and equipment used as well as all methods of installation shall comply at a minimum with any and all Federal, OSHA, State and/or local codes, including applicable municipal ordinances and regulations.

It is the custom of the City of Portland, Maine to pay its bills 30 days following equipment delivery and acceptance, and following the receipt of correct invoices for all items covered by the purchase order. If your organization prefers to receive payment via electronic transfer rather than by check, please see the web link below* and include that EFT form with your bid submission. In submitting bids under these specifications, bidders should take into account all discounts; both trade and time allowed in accordance with this payment policy and quote a net price. The City is exempt from the State's sales and use tax as well as all Federal excise taxes.

*** http://www.portlandmaine.gov/DocumentCenter/Home/View/817**

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees. Bidders who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset which shall be established by the contract which shall be issued to the successful bidder.

October 25, 2016

Matthew F. Fitzgerald
Purchasing Manager

Request for Proposal
For
Planning and Engineering Services
For a Infiltration and Inflow Program
Of the Sanitary Sewer System

RFP # 3217

**** THIS SHEET MUST BE INCLUDED IN YOUR PROPOSAL ****

The undersigned hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, that it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same, and that no person acting for or employed by the City of Portland is directly or indirectly interested in this proposal or in any anticipated profits which may be derived there from.

The undersigned hereby declares that they have read and understand all conditions as outlined in this Request for Proposals, and that the proposal is made in accordance with the same.

The bidder acknowledges the receipt of Addenda numbered: _____

COMPANY NAME: _____

AUTHORIZED SIGNATURE: _____

DATE: _____

PRINT NAME & TITLE: _____

ADDRESS: _____

E-MAIL ADDRESS: _____

PHONE NUMBER: _____ FAX NUMBER: _____

TYPE OF ORGANIZATION - PARTNERSHIP, CORPORATION, INDIVIDUAL, OTHER:
_____

STATE OF INCORPORATION, IF APPLICABLE: _____

FEDERAL TAX IDENTIFICATION NUMBER (Required): _____

NOTE: Proposals must bear the handwritten signature of a duly authorized member or employee of the organization submitting a proposal.

CITY OF PORTLAND, MAINE

Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

RFP#3217

Current Date: November 18, 2016

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

****

ALL PROPOSERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY ACKNOWLEDGED ON THE RFP PROPOSAL FORM OR BY THE INSERTION OF THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.

****

MATTHEW FITZGERALD
PURCHASING MANAGER

Please find on the following pages our response to questions received related to this RFP. This will be the one and only addendum and we will be unable to respond to any further questions.

Receipt of **Addendum No. 1**to the City of Portland's **RFP #3417: Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System** is hereby acknowledged.

COMPANY: _____

NAME: _____

SIGNED BY: _____ DATE: _____

PRINT NAME & TITLE: _____

ADDRESS: _____

_____

ZIP CODE

Addendum #1

CITY OF PORTLAND, MAINE

Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

RFP#3217

1. *Task 1 suggests that a gap analysis of the GIS should be completed and we should "collect data as required". Can the City expand on the additional data collection? Is it the collection and review of data that already exists, or the collection of new data in the field? If the later, can the City provide guidance on the anticipated level of this field effort?*

   Response: Additional data collection may require both the collection and review of existing data and collection of new data. Additional data collection effort may vary based on the consultant's approach to the gap analysis and conclusions drawn from that effort. The City cannot anticipate a level of effort associated with the collection of data as the firm will decide what additional data may be necessary to complete the task.

2. *Task 1 suggests we "inspect existing facilities". Can the City expand on the "existing facilities" that are to be inspected? Are they pump stations (if so, how many), manholes, catch basins, etc.?*

   Response: Existing facilities include any sewer infrastructure relevant to the task. The consultant will have to decide whether an inspection of existing facilities is required to gather additional data or to help determine the best approach for completing the Inflow and Infiltration Program.

3. *The schedule in the RFP suggests that Phase 2 (Task 3) – Investigation and Quantification of I/I Flows, is to be completed between January 1, 2019 and July 1, 2019. This type of investigation would produce better results if it were completed in the spring/summer months. Is the City open to slight modifications in the schedule that would promote better data collection and I/I quantification?*

   Response: The winning consultant may choose to revise the initial start dates of the phases and create a schedule that benefits the investigation as needed. At this time, the City is unable to change the completion deadlines set by the Environmental Protection Agency Corrective Action Plan.

4. *Is the City anticipating the need for building inspections to identify specific sources of I/I from private property?*

   Response: The City would expect that the consultant will determine if building inspections will be required based on results from previous tasks and previous experience with Inflow and Infiltration Programs.

CITY OF PORTLAND, MAINE

Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

RFP#3217

5. *The submission requirements mention a "fee statement". Does the City have a preferred format for the fee statement? Much of the Phase 2 and 3 project scope depends on the results of the Phase 1 work. As such, it would be rather difficult to develop an overall project fee without making a significant number of assumptions. Is the City looking for more of a "unit price menu" that covers the range of potential services along with staff rates? If the City is looking for an overall project fee, can guidance be provided for the purpose of estimating the quantities of I/I Program services (i.e. LF of sewer to CCTV, LF of sewer to smoke test, number of flow meters and metering duration, etc.)?*

   Response: An overall project fee should not be provided for the initial submittal. For the initial submittal, a consultant may provide a fee schedule or a "unit price menu." An overall project fee will only be required of consultants that have been shortlisted and asked to be interviewed. At the interview, a separate sealed envelope with a free statement for the Inflow and Infiltration Program must be provided.

ARCADIS Design & Consultancy for natural and built assets

PROPOSAL

PLANNING AND ENGINEERING SERVICES FOR A INFLITRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

November 2016 | 66026980.0001

ARCADIS Design & Consultancy for natural and built assets

Matthew Fitzgerald
City of Portland
Purchasing Office
City Hall, Room 103
389 Congress Street
Portland, ME 04101

Arcadis U.S., Inc.
500 Edgewater Drive
Suite 511
Wakefield, MA 01880
Tel: 781.224.4488
Fax: 781.224.3033
www.arcadis.com

Subject: Planning and Engineering Services For a Infiltration and Inflow Program of the Sanitary Sewer System (RFP #3217)

Date:
November 23, 2016

Contact:
Jennifer Lachmayr, PE, BCEE

Phone:
781.213.4923

Email:
Jennifer.Lachmayr@arcadis.com

Our ref:
66026980.0001

Copies:
One Original
Five Copies
One CD

Dear Mr. Fitzgerald:

Arcadis U.S., Inc. (Arcadis) is excited for the opportunity to submit our qualifications to assist the City of Portland (City) through its Department of Public Works, Water Resources Division with this important city-wide Infiltration and Inflow (I/I) program.

With over 125 years of experience, Arcadis is an internationally recognized, full-service consulting firm specializing in water and wastewater resources engineering. We offer the City the following advantages:

Extensive Infiltration/Inflow and Sewer Rehabilitation Experience. Our project team has worked on numerous projects with similar urban settings as Portland's system, as demonstrated in Section 1 of our proposal. We have a long and established local presence in New England that will help facilitate communication and coordination with any needed specialty contractors to conduct work. This gives the City the confidence to know that we will always negotiate a fair price for any specialty system investigation work.

Experienced Project Team. We have compiled a team of individuals and subconsultants who are recognized throughout the industry for their breadth of knowledge regarding I/I programs, pipeline improvements, GIS and data management updates. Our project manager, Scott Haynes, PE, BCEE, has over 25 years experience of helping clients and communities reduce extraneous flows in the sanitary system in New England.

Cost Effective Tools. Over the past five years, Arcadis has overseen multi-million dollar sewer rehabilitation programs for systems with more than 3,000 miles of sewer in 10 metropolitan areas. Through this work we have developed tools such as the Arcadis *Data Profiler* and *Times Series Analyzer*. These tools provide our clients with better data analyses and updates to databases and GIS.

Client Satisfaction. We are proud of our client services track record and invite you to contact the references. Our references will provide direct testimony regarding the quality of our work on projects directly relevant to those sought by the City. We have included example reports on the enclosed flash drive.

Arcadis will demonstrate its understanding of the City's vision by using project approaches that are innovative and environmentally focused to help provide sustainable

We look forward to working with the City's staff and helping to support the growing community through sound collection system management practices. If you have any questions about our proposal or would like additional information, please do not hesitate to contact us.

Sincerely,

Arcadis U.S.,Inc.

Jennifer Kelly Lachmayr, PE, BCEE
Principal-in-Charge

Scott Haynes, PE, BCEE
Project Manager

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APPENDIX A. REQUIRED FORM

APPENDIX B. ADDITIONAL INFORMATION

This proposal and its contents shall not be duplicated, used or disclosed — in whole or in part — for any purpose other than to evaluate the proposal. This proposal and its contents shall not be disclosed to any third party except as permitted by applicable laws and regulations.

ARCADIS Design & Consultancy for natural and built assets

CITY OF PORTLAND

PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

1. FIRM'S DEMONSTRATED EXPERIENCE

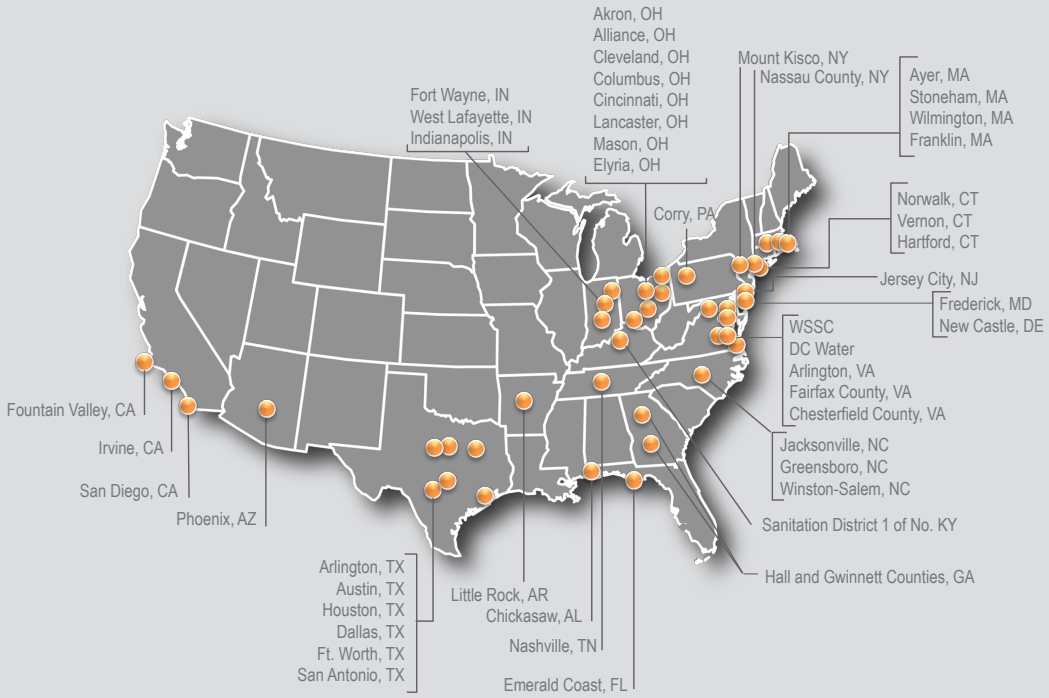
1. FIRM'S DEMONSTRATED EXPERIENCE

In this section we present our success stories for I/ I and prioritized sewer system rehabilitation programs demonstrating our capabilities to provide the services required in the RFP. Our team brings to the City expert knowledge and experience in:

- Successful I/I reduction
- Data collection and analysis
- Ground water influenced I/I
- Hydraulic modeling
- Sewer and manhole investigations, evaluations and recommendations
- Bypass pumping
- Inflow and Infiltration Identification
- Maintenance of traffic
- Life Cycle Cost Analysis
- Prioritized Programs for I/I removal
- Flow monitoring and metering

ARCADIS HAS PREPARED HUNDREDS OF DESIGN PACKAGES NATIONALLY, INCLUDING OVER 30 SEWER REHABILITATION PROJECTS WITHIN NEW ENGLAND IN THE PAST FIVE YEARS. THE MAP TO THE RIGHT HIGHLIGHTS THE LOCATIONS OF OUR I/I AND SEWER REHABILITATION PROGRAMS FOR WHICH MEMBERS OF OUR TEAM CONTRIBUTED AND / OR LED.

SEWER MANAGEMENT AND REHAB PROGRAMS



Arcadis is a trusted consultant throughout the U.S. Focusing on the eastern and southern portions of the U.S., Arcadis has completed sewer management and rehabilitation projects for numerous large and small municipal clients.

The photos to the right are from our construction projects in Franklin and Stoneham, MA.

Brick manhole getting lined

CIPP liner being installed in pipe

Wastewater Collection Systems

Arcadis has been involved in the evaluation, planning, design, and construction of collection and conveyance systems for over 100 years. Our engineers have provided these services to a wide range of municipal, industrial, and private clients, developing new or replacement systems as well as evaluating and upgrading existing systems. The firm's range of services related to wastewater collection systems includes:

- On-call and annual contract studies of sewer systems to quantify infiltration and inflow (I/I), eliminate sewage overflows, and increase hydraulic capacity
- Studies of combined sewer overflows (CSOs) and separate sanitary sewer overflows (SSOs) and their impacts on water quality
- Capacity, condition, and operation and maintenance (O&M) assessments to achieve efficient and effective collection system performance
- Facility planning for the rehabilitation, upgrading, and expansion of wastewater collection systems, or for the construction of new systems in unsewered areas
- Odor investigations and design of odor abatement programs for wastewater collection systems
- Pipeline routing studies and environmental assessments for new sewer systems
- Design, environmental monitoring, and construction phase services for new and rehabilitated trunk sewers, force mains, interceptors, and pump stations

Arcadis provides a full range of services directly related to I/I and other collection system issues:

- I/I reduction
- I/I studies
- Sewer System Evaluation Surveys (SSES)
- Sewer capacity evaluations
- Dynamic hydraulic modeling
- Consent decree compliance/regulatory assistance
- Design services for rehabilitation, replacement and new sewer construction
- Capacity, condition, and hydraulic performance modeling and master planning
- Operation and maintenance assessments to sustain efficient and effective collection system performance
- Rehabilitation and replacement program prioritization and long-term capital planning
- Studies of sewer overflows and their impacts on water quality
- Facility planning for rehabilitation, upgrading and expansion of wastewater collection systems
- Facility planning for construction of new systems in unsewered areas
- Flow Metering
- Odor and corrosion investigations and design of abatement solutions
- Pipeline routing studies and environmental assessments for new sewer systems
- Clearwater elimination
- Structural failure assessments
- Predictive condition assessments
- Construction administration and resident engineering
- Program management services for multi-year, multi-million dollar programs that include various combinations of the elements above

Unlike many of Arcadis' peer firms, we have the flexibility to adapt project delivery methods for SSES, I/I, and sewer rehabilitation services to suit the City's needs.

PRESENTED IN TABLE 1-1 BELOW ARE ARCADIS' REPRESENTATIVE WASTEWATER COLLECTION SYSTEMS PROJECT EXPERIENCE FOR RELEVANT PROJECTS WITHIN THE PAST FIVE YEARS. AS FURTHER DEMONSTRATED IN THE REMAINDER OF THIS SECTION, THE ARCADIS TEAM HAS COMPLETED I/I PROJECTS FOR CITIES OF SIMILAR TYPE, SCOPE, AND COMPLEXITY IN THE NORTHEAST AND THROUGHOUT THE UNITED STATES. FOR EACH PROJECT WE HAVE HIGHLIGHTED THE CLIENT REFERENCE AND CONTACT INFORMATION.

Table 1-1: Relevant Project Experience (Wastewater Collection Systems)	Flow Metering	Smoke/Dye Testing	Flow Isolation	CCTV Inspection	MH Inspection	I/I Reduction	Modeling	Assessment	Design/ Construction	Program Management	Private Source Investigation	Unique Approach/ Feature	Funding Assistance	Regulatory Driver
Greater New Haven WPCA: I / I Sewer Rehabilitation Program, East Haven and Hamden, CT	●				●	●		●	●		●		●	●
Ayer, MA System Wide I/I	●				●	●		●		●				●
Franklin, MA: Sewer System Investigations, Rehabilitation and Sump Pump Inflow Removal Program		●	●	●	●	●	●	●	●	●	●	●	●	
The Metropolitan District, CT: Sewer System Studies and Rehabilitation Design to Eliminate Sanitary Sewer Overflows	●	●	●	●	●	●	●	●	●		●	●		●
Stoneham, MA: Collection System and Pump Station Investigations and Rehabilitation for I/I Removal	●	●	●	●	●	●		●	●	●	●	●	●	●
Greater New Haven, CT WPCA: System-wide Infiltration/Inflow Improvements Program	●			●	●	●		●	●				●	●
Wilmington, MA: Multi-phase Sewer System Investigations and Rehabilitation	●	●	●	●	●	●		●	●	●	●	●	●	●
Norwalk, CT WPCA: Sewer System Master Planning and I/I Rehabilitation - Seaview and Cove and Norwalk River Interceptors	●	●	●	●	●	●	●	●	●	●		●	●	
New London, CT: Sanitary Sewer Capacity Improvements		●		●	●	●		●	●		●		●	
Norwalk, CT WPCA: Beacon Street Interceptor Service Area Sewer Rehabilitation		●		●	●	●		●	●			●		●
Vernon, CT: Sewer Rehabilitation and CMOM Program					●	●		●	●				●	
Groton, CT: Fort Hill Homes Sanitary Sewer Construction and Rehabilitation	●	●						●	●		●	●	●	
Columbus, OH: Comprehensive Rehabilitation Program for Eight Sewer Basins	●						●	●	●	●	●			●
DC Water (Washington D.C.): Sewer Program Management	●			●	●		●	●		●		●		
MWRA: Reading Extension Sewer & Metropolitan Sewer Improvements				●	●	●		●	●	●			●	●
Emerald Coast Utilities Authority (Pensacola FL) - Sewer Rehabilitation/Replacement Program	●	●	●	●	●	●	●	●	●	●				●
Vernon, CT: Vernon Regional Treatment Facility					●	●	●	●		●		●		●
New Castle County, DE: Brandywine Hundred Sewer Rehabilitation and Capacity Assurance Program	●	●	●	●	●	●	●	●	●	●	●		●	●
Bergen County Utilities Authority, NJ: Rain-Derived Infiltration/ Inflow SSO Management Services						●				●	●		●	●
New Castle County, DE: Clearwater Disconnection Pilot Program	●					●			●		●			●

SEWER SYSTEM INVESTIGATIONS AND REHABILITATION AND SUMP PUMP INFLOW REMOVAL PROGRAM

Franklin, Massachusetts

As the population of Franklin has rapidly increased through the 1990's, available conveying capacity in the wastewater collection system has decreased. As a result, the Beaver Street interceptor began to experience SSOs. To reclaim a portion of the capacity, the Town decided to develop an annual on-call services program for sewer system metering, modeling, and inspections and rehabilitation program to address its current and future needs.

Arcadis is helping the Town achieve their goals by providing up-to-date GIS mapping, pipeline and manhole inspections and condition assessment, and designing recommended improvements to address maintenance and capital needs.

I/I Rehabilitation/Sewer Rehabilitation. Arcadis provided design, bidding and construction phase engineering services for four Phases of the Town of Franklin's Sewer Rehabilitation program for the past 15 years.

We assisted the client with bidding and award and provided complete construction phase services, including construction administration and on-site resident engineering. **Through four phases, the Town constructed more than $4 million worth of improvements, including rehabilitation of more than 15 miles of pipeline and 600 manholes.**

Construction consisted of various trenchless repairs, including cured-in-place spot repairs, cured-in-place lining, chemical root treatment, and test and sealing of joints and service connections. Manhole rehabilitation has included manhole lining, chimney seals, sealing of leaks in walls, joints and pipe connections, re-construction of benches and inverts, and replacement of frames and covers.

Sump Pump/Inflow Removal Program. As an integral part of the Town's overall efforts to upgrade, improve and maintain its sanitary sewer collection system, Arcadis assisted the Town of Franklin with development and implementation of a program to find and eliminate sources of inflow by developing a sump pump program consisting of a database of known and suspected sump pumps and a protocol that can be used to verify and track the locations of sump pumps. The ultimate goal is to eliminate these sources of extraneous flows to free capacity for domestic flows and future expansion of the collection system.

Continuous Monitoring. The rehabilitation projects have removed significant extraneous flows from the Franklin sewer system, as shown through our annual flow monitoring program. **Between 2005 and 2013, Franklin's measured peak infiltration rate has decreased by more than 350,000 gpd (30% reduction) and the average infiltration rate has decreased by more than 325,000 gpd (35% reduction)**.

CLIENT
Town of Franklin

CONTACT
Robert Contoreggi
DPW Director
(508) 553-5520

COMPLETION DATE
2001 - Ongoing

I/I FLOW REMOVED
1.4 MGD

RELEVANT FEATURES
- I/I Rehabilitation
- Sewer Rehabilitation

BUDGET / SCHEDULE
Project is on budget and ahead of schedule

SYSTEM-WIDE INFILTRATION / INFLOW IMPROVEMENTS

New Haven, Connecticut

The Greater New Haven Water Pollution Control Authority (GNHWPCA) owns and operates the wastewater collection system and treatment plant that serves more than 2,000 residents in the communities of New Haven, East Haven, Hamden and Woodbridge. **The wastewater collection system includes both combined and separated sewers and consists of approximately 555 miles of sanitary sewer pipe, 14,000 manholes, 30 pump stations, eight (8) siphons.** Combine sewers are located in the city of New Haven only. The average daily flow at the East Shore Water Pollution Abatement Facility is approximately 40 MGD that is discharged to New Haven Harbor. **Arcadis's three most recent infiltration/inlfow removal related projects have targeted the removal of approximately 1.4 MGD of extraneous flows.**

Estimated extraneous flows removed or to be removed from rehabilitation recommendations:

- Phase III Infiltration/Inflow Rehabilitation: approximately 500,000 gpd
- East Haven and Hamden – Infiltration and Inflow Removal Phase II – SSES: 375,000 gpd targeted for ongoing sanitary sewer rehabilitation design
- Meter Area W-2 & W-2A, Woodbridge and Meter Areas 15, 18 & 23, East Haven: 545,000 gpd targeted from SSES recommendations (Report not approved by CTDEEP yet)

Phase III Infiltration/Inflow Rehabilitation. Arcadis provided design, bidding, and construction services to complete sewer rehabilitation in the Lower Farm River, Area 10 in East Haven and the State Street Sewershed in Hamden. Construction is scheduled for completion in early 2016 and consists of cured-in-place lining, service connection lining and sealing and structural manhole rehabilitation.

East Haven Infiltration/Inflow Study. Arcadis performed a study of the East Haven sewer system to examine the system's physical characteristics and identify areas of high I/I. The recommended plan will help reduce extraneous flows and reduce transport and treatment costs while providing a long-term, system-wide approach to effectively preserving the sanitary sewer system.

New Haven and Hamden I/I Rehabilitation. Arcadis provided design, bidding, and construction services to complete sewer rehabilitation in the Morris Cove, Lower Shepard, and Upper Thorpe Sewersheds.

East Haven and Hamden – Infiltration and Inflow Removal Phase II – SSES. Arcadis conducted Phase II SSES in Meter Areas 5, 9, and 13 in East Haven and in the Middle Thorpe Drive Study Area in Hamden to identify excessive I/I sources.

CLIENT

Greater New Haven Water Pollution Control Authority

CONTACT

Gabriel Varca

Director of Finance and Administration

(203) 466-5265

PROJECT DURATION

2012 - Present

I/I FLOW REMOVED

1.4 MGD

RELEVANT FEATURES

- I/I Rehabilitation
- Swer Rehabilitation

BUDGET / SCHEDULE

Project is on budget and on schedule

PROJECT DESCRIPTION - System-wide Infiltration / Inflow Improvements

Woodbridge Infiltration/Inflow Study. Arcadis conducted an I/I Study to identify excessive I/I in the Town of Woodbridge.

Collection System Affordability Study. The Greater New Haven Water Pollution Control Authority (GNHWPCA) is under an Administrative Order to prepare a modified facilities plan to update their Long-Term CSO Control Plan and provide final denitrifiation at the East Shore Water Pollution Abatement Facility and other related infrastructure improvements. Arcadis completed an affordability study in accordance with USEPA guidelines.

SEWER SYSTEM STUDIES AND REHABILITATION DESIGN TO ELIMINATE SANITARY SEWER OVERFLOWS

Hartford, Connecticut

Arcadis has been overseeing SSES studies, planning, and design services under an on-call contract with The Metropolitan District to eliminate sanitary sewer overflows (SSOs) in the Hartford metropolitan area. This work covers three municipalities located in the Windsor Interceptor basin (74 miles of sewer) and Rocky Hill Water Pollution Control Facility basin (148 miles of sewer serving the Towns of Rocky Hill and Wethersfield). Major SSOs historically have occurred at four locations in the two basins. The sanitary sewers in both basins were constructed more than 50 years ago.

The United States Environmental Protection Agency (USEPA) and the State of Connecticut issued a Consent Decree that requires a multi-year compliance program for the two basins**. Arcadis provided a variety of compliance-related services valued at $3.6 million**, which included:

- Flow metering for eight weeks at 46 locations
- Flow isolation testing of 550,000 linear feet (lf) of sewers
- Closed-circuit television inspection of 307,000 lf of sewers
- Inspection of 3,200 manholes
- Smoke testing of 657,000 lf of sewers
- Performance of 1,500 dye tests
- Development of a hydraulic model of the Rocky Hill Water Pollution Control Facility sewershed to determine capacity deficiencies.

We also performed approximately **10,000 building inspections for sump pumps and illicit connections to identify potential I/I sources in these flood-prone areas.** Field investigations revealed numerous private inflow sources that were contributing to SSOs, and the district plans to implement a source removal program. Recommendations included private source disconnection, cured-in-place lining of sewers, manhole rehabilitation, installation of new watertight manhole frames and covers, and other miscellaneous work. Arcadis completed final contract documents for implementing the recommendations from the first phases of our inspection program, including the recently constructed Goff Brook Trunk Sewer - South Branch replacement and rehabilitation.

The SSES work builds on Arcadis' designs of sewer rehabilitation projects prior to issuance of the Consent Decree and supported the design of additional sewer rehabilitation projects to meet the Consent Decree requirements by 2013. We utilized the results of the SSES studies to prepare designs and contract documents for cured-in-place pipe (CIPP) lining of sewers in the two basins.

CLIENT

The Metropolitan District

CONTACT

Alan Pelletier
Project Manager
(860) 278-7850

PROJECT DURATION

2006 - 2012

RELEVANT FEATURES

- SSES Studies
- Flow Metering
- CCTV Inspection
- Development of Hydraulic Model

BUDGET / SCHEDULE

Project was completed on budget and on schedule

BRANDYWINE HUNDRED SEWER REHABILITATION AND CAPACITY ASSURANCE PROGRAM

New Castle County, Delaware

New Castle County owns and operates approximately **1,600 miles of gravity sewer and interceptors** with the Brandywine Hundred portion of the system including four sewersheds and over 420 miles of sewer located in the County's most densely populated areas and containing some of the oldest and most problematic sewers in the County's inventory. This system also contains several structured sanitary sewer overflow structures that discharge excessive storm flows into the Delaware River and its tributaries. There was also a history of documented sanitary sewer overflows within upstream portions of the system.

Arcadis has provided program management, consulting, and engineering services since 2002 to assist in identifying, prioritizing, designing, constructing, and implementing cost-effective solutions to the I&I driven overflow and capacity problems in the Brandywine Hundred system. As part of the program **Arcadis installed flow meters at 42 locations.** The collected flow data was used to support a long-term modeling study for the Brandywine Hundred Sewer Rehabilitation and Capacity Assurance Program and to select and prioritize SSES investigations and subsequent pipe assessment and rehabilitation. By analyzing the flow data Arcadis determined the type and extent of I&I contributions in each subbasin. The subbasins were then prioritized for further investigation based on peak and sustained flow increases and the appropriate investigation methods were selected for each subbasin based on the measured I&I characteristics and qualitative interpretation of storm hydrographs. These efforts have ultimately led to a series of neighborhood sewer rehabilitation projects to reduce infiltration and wet weather overflows using such technologies as: pipe joint grouting, service connection grouting, cured-in-place lining of mains, cured-in-place lining of service laterals, and manhole repairs including chimney seals and reinforced cementitious lining. While most of this work is complete some rehabilitation projects are still in design or construction.

Most recently, **Arcadis installed 65 meters and 7 rain gauges for a 6-month study** to support a model recalibration that would determine the overall effectiveness of the I&I reduction program across the Brandywine Hundred sewershed. Although not all rehabilitation work was completed the **results of the model recalibration demonstrated a 98% reduction of the overflow volume at the structured overflows along the river, 67% reduction in manhole overflow volume across the upstream system, and overall 77% reduction of overflow volume. An innovative approach to evaluating effectiveness of the individual rehabilitation projects using a control basin methodology also demonstrated a range of I&I volume reduction from 32% to 97%.**

CLIENT

New Castle County

CONTACT

Rob Roff

Sewer Operations Manager

302-395-5868

PROJECT DURATION

2002 - Ongoing

I/I FLOW REMOVED

To be determined

RELEVANT FEATURES

- Pipe Inspection and Assessment
- Pipe Replacement, Rehabilitation and Realignment Design
- Easement & Permit Acquisition
- Bidding Support
- Design Services During Construction
- Construction Oversight
- Protection
- Structural

BUDGET / SCHEDULE

Project is on budget and on schedule

ANNUAL COLLECTION SYSTEM AND PUMP STATION INVESTIGATIONS AND REHABILITATION FOR I/I REMOVAL

Stoneham, Massachusetts

Sewer System Investigations and I/I Rehabilitation. To address crumbling infrastructure issues, the Town of Stoneham retained Arcadis to assist in an infrastructure maintenance and rehabilitation program. As part of the program, **Arcadis inspected and analyzed approximately 134,000 lf of 6-in to 15-in sewer lines**. The program included the in-line CCTV and manhole inspection of approximately 25 miles of the Town's collection system in five subareas of the oldest sections and known problem areas in the system. Investigations also included smoke testing, dye water testing and installation of back-flow preventers on low-lying, flood-prone homes.

The majority of Stoneham's collection system consists of asbestos cement pipe, vitrified clay pipe, and brick manholes. As such, the system is prone to severe I/I, particularly during storm events and the high groundwater season. This program successfully addressed these issues and significantly reduced the amount of I/I entering the Town's collection system.

Rehabilitation Construction and Inflow Removal with Backflow Preventers. Arcadis developed detailed construction specifications for five phases of sewer system rehabilitation and provided bidding services, construction services and resident inspection. Work included both open cut and trenchless pipeline rehabilitation or replacement, and manhole rehabilitation. Sources of inflow were also removed by the installation of backflow preventers on low-lying private services.

CLIENT
Town of Stoneham

CONTACT
Bob Radigan
Water and Sewer Foreman
(781) 507-2577

PROJECT DURATION
1998 - Ongoing

I/I FLOW REMOVED
1.1 MGD

RELEVANT FEATURES
- Sewer System Investigation
- I/I Rehabilitation

BUDGET / SCHEDULE
Project is on budget and ahead of schedule

Arcadis has been providing annual assistance to the Stoneham DPW since the late 1990's. As a result of the collection system evaluations and I/I removal rehabilitation projects, the Town has reduced its I/I and the associated costs paid to the Massachusetts Water Resources Authority (MWRA). The entire program has been funded through seven phase of I/I Reduction Grants provided by the MWRA.

BEACON STREET INTERCEPTOR SERVICE AREA, I/I INVESTIGATIONS AND SEWER SYSTEM REHABILITATION

Norwalk, Connecticut

Arcadis evaluated over 6 miles of interceptor and collector sewers for the WPCA, including comprehensive manhole inspections, smoke and dye testing and evaluation of pipeline CCTV videos. From our condition assessment, we designed an I/I removal sewer system rehabilitation construction project for the Beacon Street Interceptor Service Area.

Construction includes cured-in-place lining of 20,000 LF of 8-inch through 18-inch diameter pipe; spot repair liners; open-cut excavation repairs; and comprehensive manhole rehabilitation. Arcadis is currently providing complete construction phase engineering services, including full-time resident engineering.

Some of the challenges on the project included significant bypass pumping set-ups through public streets, City parks and athletic fields and easements. Close coordination amongst the WPCA, the residents and Norwalk's resident engineer and public works departments was facilitated by Arcadis' on-site resident engineers. Several sewer system defects discovered during construction required quick decisions, extra-work order negotiations and emergency construction repairs. Construction is scheduled for completion in June 2015.

Recent Past Projects

Hydraulic Modeling and Scenario Analysis. Arcadis worked with the City to select a hydraulic software package for future use in modeling various scenarios for the sanitary system to anticipate capacity-related remedial measures, and develop a detailed understanding of how the sewer system responds to wet-weather events. We created and calibrated the hydraulic model using the newly created GIS sewer layer data and information gathered during fl ow-monitoring activities. We also trained City personnel in the use of GIS data as well as the hydraulic and financial models.

Seaview and Cove Avenue Interceptor Rehabilitation. The interceptor consists of approximately 4,700 LF of pipe up to 30-inches in diameter, and 17 manholes or chambers between Fifth Street and Moore Place. Rehabilitation consisted of cured-in-place lining of sewers, cementitious and epoxy lining of manholes, and installation of watertight manhole covers on manholes or chambers below the 100-year flood elevation.

Norwalk River Interceptor Rehabilitation. The Norwalk River Interceptor was built in the same era as the Seaview and Cove Ave

CLIENT
City of Norwalk

CONTACT
Lisa Burns, PE
Operations Manager
(203) 854-7797

PROJECT DURATION
2012 - 2016

RELEVANT FEATURES
- I/I Investigations
- Sewer Rehabilitation

BUDGET / SCHEDULE
Project is on budget and completed on time

PROJECT DESCRIPTION - Beacon Street Interceptor Service Area, I/I Investigations and Sewer System Rehabilitation

Interceptor and exhibited many of the same signs of deterioration. This interceptor is also located along Norwalk Harbor and the Norwalk River, and therefore, subject to high infiltration. **Construction of the rehabilitation of over 5,600 lf of 48-in pipe and associated manholes** was completed in 2009. Along with severe hydrogen sulfide corrosion, a collapsed area of the interceptor was found underneath an industrial building. To repair this collapse, the contractor hired a pipe jacking company to jack a 42-in sleeve through the collapse prior to lining.

Arcadis is currently overseeing the construction of the Beacon Street Interceptor Service Area Sewer System Rehabilitation contract. We are working closely with the WPCA, the contractors, residents and various City departments to facilitate a smooth and successful completion to this highly visible project.

CONTINUOUS FLOW MONITORING PROGRAMS

Portland, Maine

Phase 1 (November 2013-January 2015)

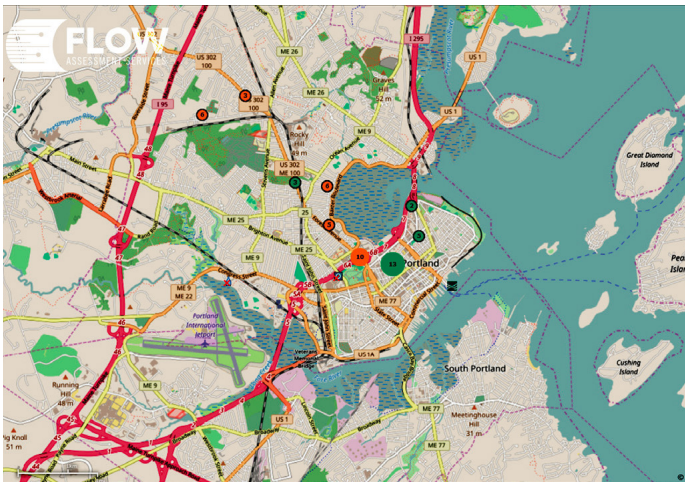
The Portland Public Works hired Flow Assessment Services in November of 2013 to **install twenty six (26) area velocity flow meters for a period of 52 weeks.** The sites were setup using wireless technology so officials could monitor the sites in real-time.

Phase 2 (January 2015-October 2016)

In January 2015 Portland Public Works started working with an Engineering firm to do a study for a storage conduit on Back Cove. The **study started with 15 sites and morphed to include 24 sites** as 9 were added after a brutal winter in May 2015. These sites remained in place through October 2016.

Phase 3 (October 2016-ongoing)

In October 2016 the City of Portland contacted Flow Assessment Services to remove several sites and reinstall the meters in different locations throughout the city. This resulted in monitoring at 16 new locations as well as continuing the metering at several of the original sites. This new phase of the project has been extended



CLIENT

Portland Public Works

CONTACT

Bradley A. Roland, PE
Project Manager
Portland Public Works
(207) 874-8840
Brad@portlandmaine.gov

PROJECT DURATION

2013 - Ongoing

RELEVANT FEATURE

- Flow Meter Installation
- Data Analysis

FLOW ASSESSMENT SERVICES

LONG TERM CSO MONITORING

Portland, Maine

The Portland Water District hired Flow Assessment Services in 2009 to i**nstall 11 flow meters to monitor their CSO sites in the City of Portland.** The sites were also setup to be wireless so the District could monitor the sites in real-time. In some cases, weirs were modified and additional level sensors were also installed.

In 2010 the District again hired Flow Assessment to install another 10 of these systems. **Currently Flow Assessment maintains 21 sites providing monthly reports and maintenance to the meters as necessary.**

CLIENT

Portland Water District

CONTACT

Charlene Poulin,
Project Manager
Portland Water District
(207) 774-5961 Ext. 3105
CPoulin@pwd.org

PROJECT DURATION

2009 - Ongoing

RELEVANT FEATURE

- Flow Meter Installation
- Data Analysis

FLOW ASSESSMENT SERVICES

ARCADIS Design & Consultancy for natural and built assets

CITY OF PORTLAND

PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

2. EXPERIENCE AND AVAILIBILITY OF PROPOSED STAFF, INCLUDING PROJECT LEADERSHIP

2. EXPERIENCE AND AVAILIBILITY OF PROPOSED STAFF

SECTION 2. EXPERIENCE AND AVAILABILITY OF PROPOSED STAFF, INCLUDING PROJECT LEADERSHIP

Introduction to the Arcadis Team

Arcadis is an international engineering firm specializing in the fields of infrastructure, environment, water and buildings. For more than 125 years, Arcadis has been designing the human habitat and setting industry standards with patented technologies and published works.

We have prepared hundreds of sewer designs for communities nationwide in a wide variety of terrain, and we have provided evaluation, design and construction phase services for new and rehabilitated trunk sewers, force mains, interceptors, laterals and branches, manholes, and pump stations. We have designed sanitary sewer interceptors ranging in length from a few hundred feet to more than 40 miles and sizes up to 150 inches in diameter for communities ranging in population from 3,000 to millions.

Our core project management team, located in Wakefield, MA, including Principal-in-Charge, Jennifer Lachmayr, Project Manager, Scott Haynes and Project Engineer, Amy Anderson have a deep understanding of the work to evaluate the Infiltration and Inflow Program of the City's Sanitary Sewer System and a proven track record for successfully removing I/I for many New England clients.. They are supported by the team members outlined in this section and in addition have 800 engineers and scientists located throughout New England and New York to assist. In addition, based on our experience with these types of sewer studies, we realize that needs for other services may arise during the course of a project. As a full service firm, Arcadis can provide a wide variety of requested services in-house.

"The Arcadis team demonstrated great creativity in developing new approaches to solving these I&I and operational problems, including working out how to fix leaking laterals under private property. The level of innovation and perseverance needed to work with thousands of individual home owners cannot be understated. This was achievable only through the use of new technologies that minimized the social and economic impacts of the works. The comprehensive rehabilitation of entire asset networks, including the public and private laterals, has been integral in achieving our goals of eliminating overflows and basement backups. These improvements have contributed to the significant reduction in sewer overflows we experience, a marked reduction in basement backups, and a reduction in O&M requirements for our operations department." ***- Rob Roff, Sewer Operations Manager***

Summary of Key Personnel Sewer Pipeline Experience / Capabilities

	Collection System Flow Monitoring / Metering	Data Collection & Analysis	Hydraulic Sewer Monitoring	I/I From Rain	I/I From Ground Water	Prioritized Rehabilitation Programs
Scott Haynes, PE, BCEE, Project Manager	●	●	●	●	●	●
Jennifer Lachmayr, PE, BCEE, PIC	●	●	●	●	●	●
Amy Anderson, Project Engineer	●	●	●	●	●	●
Paul Batman, PE, Design Quality Leader	●	●	●	●	●	●
Christopher Ranck, Hydraulics	●	●	●	●	●	●
Christopher Heltzel, GIS / Data Gap Analysis	●	●				
Stephen Perry, Resident Engineer	●	●	●	●	●	●
Sean Mitchell, Field Support	●	●	●	●	●	●

OUR PROJECT TEAM HAS WORKED ON NUMEROUS PROJECTS WITH SIMILAR URBAN SETTINGS AS THE CITY'S I/I PROGRAM. WE HAVE A LONG AND ESTABLISHED LOCAL PRESENCE IN NEW ENGLAND THAT WILL HELP FACILITATE COMMUNICATION AND COORDINATION WITH LOCAL CONTRACTORS AND REGULATORS.

We provided five phases of sewer rehabilitation support and CMOM program execution for the Town of Stoneham, MA.

Team members involved: *Scott Haynes, Amy Anderson, Stephen Perry, Sean Mitchell*

We are currently in the design phase of work for MWRA's Reading Extension Sewer Rehabilitation Project.

Team members involved: *Scott Haynes, Jennifer Lachmayr, Paul Batman, Stephen Perry, Sean Mitchell*

As a result of an eight-week flow metering program, we recommended rehabilitation of approximately 12,000 LF of sewer line for the Greater New Haven Water Pollution Control Authority.

Team members involved: *Scott Haynes, Sean Mitchell*

Meet the Arcadis Team Members

In assembling our team, we carefully studied the technical and administrative requirements of the project and selected individuals who possess the right mix of management and technical experience on similar projects.

Jennifer Lachmayr, PE, BCEE, Principal-in-Charge

Ms. Lachmayr is a Principal at Arcadis and resides in our Wakefield, MA office. She has extensive experience managing and conducting large, multi-phased water, wastewater and stormwater projects. Ms. Lachmayr understands the scope of services for this type of project and will ensure that necessary resources are available to the City and that quality work products are prepared and delivered. Ms. Lachmayr is a registered engineer in Maine with 30 years of utility system evaluation and rehabilitation experience.

Current Commitment / Availability: Ms. Lachmayr currently serves as the Project Director on MWRA's Remote Headworks Upgrades Design and HVAC Building Automation and HVAC Unit Replacement, and Reading Extension Sewer and Metropolitan Sewer Rehabilitation Contracts, Prison Point CSO Facilities Upgrade and Town of Ayer I/I Program. We currently anticipate that Ms. Lachmayr will be able to commit between 10% to 20% of her time to the City's Infiltration and Inflow Program of the Sanitary Sewer System.

Scott Haynes, PE, BCEE, Project Manager

Mr. Haynes brings to the City over 27 years of experience in planning, design, and construction engineering for collection system projects in New England. His experience includes collection system and pump station condition assessment and rehabilitation design, I/I analyses, O&M procedures, combined and separate sewer system evaluations, sanitary sewer overflow evaluations, sewer system rehabilitation/replacement projects, and wastewater treatment facility upgrade and expansion projects. With his numerous sewer assessment and rehabilitation projects in New England, proven capability to successfully communicate with our clients and established relationship with local pipeline contractors and regulatory agencies, Mr. Haynes will lead our team to meet the City's key project objectives and provide superior project deliverables. Currently he serves as the Project Manager for several citywide I/I projects in New England communities including the Greater New Haven WPCA, Franklin, Wilmington, Ayer and Stoneham, Massachusetts.

Current Commitment / Availability: Mr. Haynes is currently working as project manager and design quality leader for several collection system rehabilitation projects throughout New England. Some of his current commitments will be winding down and he will be available to begin this assignment in December 2016. We currently anticipate that Mr. Haynes will be able to commit between 25% to 35% of his time to the City's Infiltration and Inflow Program.

Amy Anderson, Project Engineer

Ms. Anderson is a Project Manager specializing in flow metering analysis, SSES programs, SSO elimination programs and I/I reduction program analyses. She has a vast knowledge and experience with analyzing flow data and SSES findings and developing recommendation for long-term I/I identification and removal programs. She also has experience with awareness regarding illicit connections to the sanitary sewer system, hydraulic capacity assessments, SSO evaluations, sanitary sewer rehabilitation projects and GIS mapping. Ms. Anderson manages large teams of staff and subcontractors to deliver and present high quality I/I-SSES studies to our clients.

Current Commitment / Availability: Ms. Anderson currently serves as the project engineer on the MWRA's Chelsea Creek Headworks Upgrade project, a 60 million construction cost project to automate and upgrade all processes of the headworks. She also assists with several sanitary sewer projects throughout New England. Ms. Anderson has 30% availability for this project.

Paul Batman, PE, QA/QC

Mr. Batman is Arcadis' Water Division Technology Knowledge and Innovation leader for Buried Infrastructure. He is aware of all sewer rehabilitation projects (including CIPP) within Arcadis and will bring that expertise to this project. Mr. Batman has supported the assessment and rehabilitation of large diameter sewers constructed of a wide range of materials in the Philadelphia, Washington DC, Baltimore and Cincinnati metropolitan areas and served as the design lead responsible for construction documents requiring detailed access, traffic control, and bypass pumping plans as well as plans for protection of environmentally and culturally sensitive areas. As Design Quality Leader, Mr. Batman will provide technical support to the project team. He also maintains the Arcadis database on rehabilitation construction costs and will assist with LCAA and cost estimates for the project work.

Current Commitment / Availability: Mr. Batman is currently working on the WSSC Consent Decree Sewer Rehabilitation Program, as well as Wilmington Delaware wastewater conveyance on-call, DC Water Sewer Program support, and providing general technical support to various buried infrastructure projects in the Northeast and Mid-Atlantic. Mr. Batman will commit between 5% to 10% of his time to this project.

Christopher Ranck, PE, BCEE, D.WRE, ENV SP, Hydraulics

Mr. Ranck specializes in hydraulics and watersheds, including planning, modeling and design for wastewater, water and stormwater projects. He has particular expertise in hydraulic and water quality modeling, value engineering, combined sewer overflow (CSO) regulatory compliance and Long-Term Control Plan (LTCP) development, green infrastructure master planning, total maximum daily load (TMDL) development, pipeline condition assessment, and preliminary design. Mr. Ranck has performed advanced water treatment (AWT) hydraulic evaluation and design, CSO/AWT value engineering, drainage design, and polychlorinated biphenyl (PCB) remediation. He has also developed several data management methods for linking hydraulic and water quality models to geographic information systems (GIS).

Current Commitment / Availability: Mr. Ranck is currently working on the following projects - Citizens Energy Group Model Expansion, Citizens Energy Group CSO Regulatory On-Call, Citizens Energy Group Hydraulics On-Call, Citizens Westfield I/I Evaluations, Los Angeles Dynamic Design Storm, Fort Wayne CSO Post-Construction Monitoring and Columbus, OH Mohler Street Interceptor. Mr. Ranck can commit 10% - 20% of his time to this project.

Stephen Perry, ENV SP, Resident Engineer

Mr. Perry is a Project Manager who serves on a variety of projects ranging from buried infrastructure condition assessment and rehabilitation oversight to wastewater treatment plant upgrade and improvements. He has extensive design coordination and field supervision experience, and is highly skilled in implementing contract administration. He possesses the project management skills necessary to oversee projects through completion, while ensuring conformance with all contract documents.

Current Commitment / Availability: Mr. Perry is currently involved with the MWRA Deer Island Treatment Plant HVAC Upgrades project 50% of the time and will begin work on two other projects in the near future; Town of Wilmington, MA I/I Analysis project and Trumbull, CT Beardsley Wastewater Pump Station Upgrades project; each are anticipated to involve 10%-15% of his time. Mr. Perry can commit 30 - 50% of his time to this project.

Eric Cathcart, Field Support

Eric Cathcart was hired by Arcadis in February, 2014 as a Risk Assessment Intern in the Portland, ME office. He currently works full time as a Risk Assessment Scientist. Mr. Eric Cathcart's environmental experience has been focused on site assessments. Projects experience have included environmental due diligence assessments, human and ecological risk assessments, and environmental permitting. Mr. Cathcart's experience with environmental site assessments has been focused in the state of Maine, with other project experience in states including but not limited to New Jersey, California, New York, Missouri, Texas, Washington, Massachusetts, New Hampshire, Connecticut and Georgia.

Current Commitment / Availability: Mr. Cathcart is currently working on a receptor evaluation, a vapor intrusion assessment report, two eco risk assessment updates, and other smaller vapor intrusion related tasks. Mr. Cathcart can commit up to 30% of his time to this project.

Sean Mitchell, Field Support

Mr. Mitchell has broad experience in engineering consulting with a strong focus on sanitary sewer collection systems. He has worked on projects in the study, design and construction phase, participating in field work, evaluating data, as well as the design and bidding phases for projects in Massachusetts and Connecticut. He is familiar with the permitting process associated with working in roadway and easement and permitting issues that may arise when evaluating design options.

Current Commitment / Availability: Mr. Mitchell is currently working on multiple I/I removal projects for Greater New Haven WPCA, the Reading Extension Sewer Rehabilitation Design for MWRA and study and design phase I/I removal projects for the Town of Stoneham DPW. Mr. Mitchell can commit up to 50% of his time to this project.

Christopher Heltzel, GIS / Data Gap Analysis

Mr. Heltzel specializes in information management and application development related to asset management. He has extensive experience in managing IT projects, including implementations of geographic information systems, computer-aided design software, hydraulic modeling, computer maintenance management systems, financial information systems, and condition assessment software.

Current Commitment / Availability: Mr. Heltzel is currently working on the following projects - Metropolitan Sewer District of Great Cincinnati Asset Management System Implementation, City of Houston Swepp Infrastructure Design Improvements, Jersey City Municipal Utilities Authority CSO Permit Compliance, as well as a few asset management plan projects. Mr. Heltzel will commit up to 25% of his time to this project.

Edward Kowalski, PE, PMP, SCADA

Mr. Kowalski has over 16 years of experience in the planning, design, and specification of instrumentation & process control systems for water and wastewater treatment facilities. He has extensive experience in WWTP unit process controls, hardware and software selection, automation system configuration, checkout and startup, as well as management of project procurement and delivery for all facets of Supervisory Control and Data Acquisition (SCADA) systems.

Current Commitment / Availability: Mr. Kowalski is working on a SCADA Upgrade Project at 20mgd Plant, a water distribution system design project, a centrifuge project design, high performance HMI specification for a client as well as project and group management. Mr. Kowalski can commit up to 25% of his time to this project.

Fernando Pasquel, CPM, Green Infrastructure

Mr. Pasquel is a water resources manager with 30 years of experience in developing and implementing stormwater management programs that involve monitoring, modeling; policy analysis; establishing funding alternatives; permitting; and designing drainage systems, flood control structures, stormwater management controls and green infrastructure assets. He assisted several municipalities and agencies including New York City Department of Environmental Protection; Washington DC; and Fairfax, Chesterfield, and Henrico Counties and City of Alexandria, VA with implementation of stormwater masterplans, designing of BMPs and green infrastructure, and development of program effectiveness indicators and alternative monitoring programs.

Current Commitment / Availability: Mr. Pasquel is working on NYC, Green Infrastructure Research & Development Program; Chesterfield County, Watershed Management, Stormwater Compliance; Williamsport, PA, Stormwater Utility; and Beatty Development Corporation/Honeywell, Stormwater Infiltration Study. Mr. Pasquel can commit up to 25% of his time to this project.

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CITY OF PORTLAND

PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

3. PROJECT APPROACH AND SCOPE

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SECTION 3. PROJECT APPROACH AND SCOPE

Project Background and Understanding

On September 29, 2012, the EPA issued an Order for Compliance and Complaint, including a proposed civil penalty, for sanitary sewer overflows (SSOs) from non-permitted portions of the City of Portland's collection system. In accordance with that Order, the City completed a "Capacity, Management, Operation and Maintenance (CMOM) and Corrective Action Plan" Report in November of 2013. The recommendations of the CMOM Report included an Infiltration/Inflow (I/I) Removal and Monitoring Program, as well as making improvements to the City's collection system GIS by supplementing and correcting data gaps. This I/I Program will address those recommendations and set the course for I/I mitigation and the City of Portland's continuing efforts to abate SSOs from the sanitary collection system.

Portland's collection system consists of 240 miles of separated and combined sewers and 9 Pump Stations. For the collection system, the CMOM study evaluated the City's infrastructure primarily by modeling asset conditions and using "risk-based" analysis to identify and prioritize renewal needs. Of the 6,977 pipe segments analyzed, 95% were determined low priority for placement, and only 1% were found to be high priority for renewal. **However, for your I/I Program, prioritizing assets for I/I investigations and rehabilitation needs based on the likelihood and consequence of failure (risk-based analysis), does not necessarily target or address infiltration and inflow mitigation.** As such, the City plans to conduct a well-structured I/I Program, monitoring flows within the collection system, locating and quantifying I/I, prioritizing I/I removal needs, and implementing cost-effective, high priority I/I removal projects.

Work in Progress

The City has begun to lay the foundation for the I/I Program by completing the CMOM, identifying data gaps, updating the hydraulic model, monitoring flows in select locations and inspecting portions of the sewer system using closed circuit television (CCTV) inspection.

Since 2013, the City has monitored flows within the collection system, utilizing approximately 25 meter sites. While most of the sites are within the combined sewer system, the data obtained can still be used to identify, quantify and target I/I for removal, either within the tributary meter area itself, or within adjacent, upstream or downstream areas. It is also helpful that some of the meter sites are currently being relocated, thus providing additional data points throughout the system which can be evaluated and utilized for the I/I Program. As part of this program, existing data can be used to help make decisions about where to place meters within the separated sewer system.

In addition, the City has cleaned and CCTV'd approximately 6% of the collection system annually for the past 3+ years, using both in-house resources and reputable subcontractors. If warranted, these inspections could be used to locate, quantify and target I/I for removal. On the other hand, if minimal or no I/I has been identified in certain pipelines, the information can be used to eliminate areas from the I/I Program, or make them a lower priority.

As shown within the other sections of this proposal, the Arcadis Team includes Flow Assessment Services and Ted Berry Company, subcontractors which have been working for the City of Portland on the collection system work discussed above.

Arcadis proposes to review the existing CCTV inspection findings to evaluate the quantity of I/I and target I/I removal rehabilitation. Our team includes staff who are certified by the Pipeline Assessment and Certification Program (PACP), as provided by the National Association of Sewer Service Companies (NASSCO).

Scope of Work Outline

The following narrative outlines our proposed Scope of Work for the City of Portland I/I Program, structured in accordance with the Phases and Tasks indicated in the RFP. Based on our wide-ranging I/I experience, we have also added proposed scope enhancements and innovative approaches to completing the I/I Program. On our numerous, annual I/I Program Management projects, we have assisted utilities with developing tailored strategies based on their specific needs and priorities. This doesn't always follow or include all the traditional Infiltration/Inflow and Sanitary Sewer System Evaluation Survey (SSES) tasks, but rather focuses I/I investigations and identification where it is more likely that the utility will have the follow-on resources and other support necessary to remove the extraneous flows.

That way, valuable resources are not spent on looking for and quantifying I/I sources that the City will not be able to remove due to financial, community or political hindrances.

PHASE 1: INVESTIGATION OF INFLITRATION / INFLOW SOURCES

Task 1: Data Gathering and Gap Analysis

Per the RFP, Task 1 will include the following items. Below the bullet list, we have expanded on our Approach, proposing specific, cost-effective enhancements to the prescribed tasks.

- Meet with City to identify program goals and develop a detailed Scope for the I/I Program
- Review past reports and studies, SCADA information, GIS files, collection system record drawings
- Perform a gap analysis of existing GIS
- Review available flow and rainfall data
- Assess previously completed metering and hydraulic modeling
- Prepare a background of GAP Analysis Report

For the gap analysis, Arcadis will use our in-house developed **Data Profiler™** software to analyze your collection system GIS for completeness and consistency. Arcadis uses the *Data Profiler* to identify data gaps, relationships between database tables and views, and to compare different versions of data. The Data Profiler has a simple interface that allows the user to:

- Select the source database (the City's Sewer GIS)
- Select which assets or attributes within the GIS you want to analyze
- Create the output results database

Utilizing Data Profiler can benefit your I/I Program by:

- Reducing costs by eliminating the need to manually search GIS databases for data gaps
- Quickly identifying data gaps, such as missing pipes or disconnected assets
- Improving data quality to provide the City with a more accurate and cost effective I/I Program

Data gaps are quantified and can then be prioritized so the most effective and coordinated process can be used to determine and apply corrections.

At the end of this section, we have included a single page information sheet describing *Data Profiler*™, which includes typical output and screen shots from its application.

Task 2: Flow Monitoring Program

Task 2 will include the following RFP items. Below we include details and specific proposed enhancements.

- Review recommended metering sites from the CMOM Report
- Identify other sites where it would be strategic to obtain data
- Field verify sites and install metering equipment
- Implement the selected flow monitoring strategy, including collection of flow and rain data
- Identify sources and quantify I/I
- Prepare a Summary Flow Monitoring Report

We recommend that the city start with a targeted, 8-week flow monitoring program conducted during the high groundwater season (beginning Spring 2017). Depending on your budget and priorities, this can be done system-wide or in a phased fashion, concentrating first on the area's most likely to exhibit high infiltration and inflow. Prioritization of meter locations should consider several sources of information and data, including:

- Recent and on-going flow monitoring and CCTV data
- Historic and recently discovered problem areas, where back-ups, surcharging, and overflows have occurred

- Areas which may not have known back-ups and overflows, but are tributary to areas which have had such problems
- Areas where the hydraulic model indicates potential I/I related capacity issues, such as those related to wet weather events or high groundwater periods
- Areas near water bodies
- The oldest and most densely populated areas of the collection system

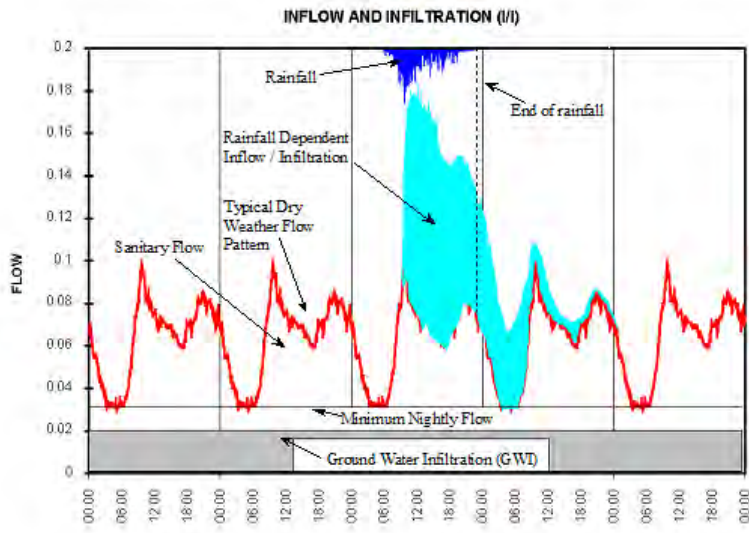
Tidal Impacts

A considerable portion of Portland's collection system is in close proximity to tidally influenced water bodies, including Back Cove, Capisic Brook, Portland Harbor and the Fore River. I/I from tidal influences could result from leaking pipes allowing groundwater to enter the system, or from tidal waters entering manholes covers which are not watertight. This influence might be seen during normal high tides (twice daily), or just during extreme high tides. During a full moon, an extreme high and low tide are present. Tidal impacts on sanitary and combined sewer flows can be evaluated by looking at collection system flow fluctuations with groundwater and tidal data, particularly during extreme high tides. In certain locations, we can also assess the use of salinity gauges during extreme high tides in evaluating tidal impacts.

Analyzing Flow Data and Estimating I/I

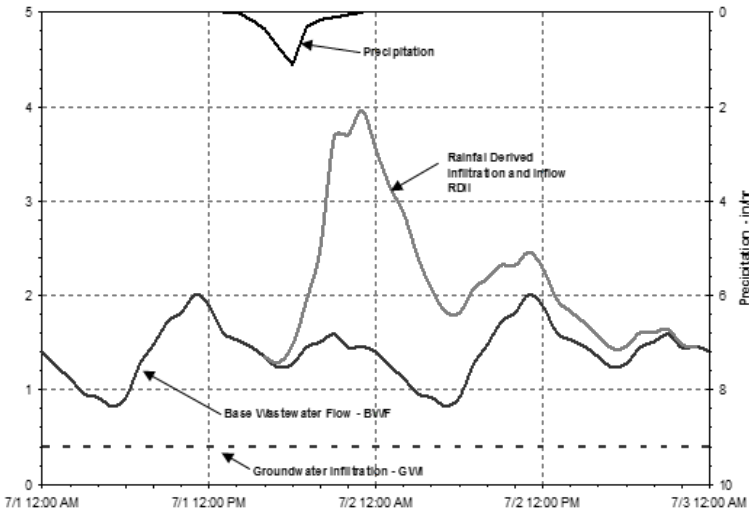
Time Series Analyzer (TSA) is a specialized data management program developed by Arcadis, which is capable of storing and managing extensive amounts of flow and rainfall data. TSA will be used to quickly and cost-effectively evaluate all flow data and calculate average daily flows, peak flows and infiltration and inflow from each of the tributary meter areas. Wet weather and dry weather flow patterns will be established, and peak, minimum and average flow rates will be calculated for each flow component. Daily and annual flow rates and volumes will be calculated.

With flow and rain data imported into TSA, the program calculates the average infiltration rate as 85% of the nighttime sanitary flow measured on dry days, from 12:00 am to 6:00 am, throughout the entire metering period. Only data for days that follow a minimum of 72-hours without a rainfall event are considered "dry days" to avoid inclusion of indirect inflow and rainfall induced infiltration (RII) in the infiltration estimates. The peak infiltration rate is defined as 85% of the nighttime sanitary flow measured on dry days during the high groundwater period.



Output from Time Series Analyzer

Direct inflow is defined and calculated as the portion of inflow that occurs during the actual storm event, emanating from direct cross-connections to the sanitary system, such as catch basins, holes in manhole covers, driveway drains and roof leaders. Delayed inflow is defined and calculated as the portion of inflow generated from indirect connections to the sanitary sewer system such as sump pumps, foundation drains, indirect sewer/ drain interconnections and rainfall-induced infiltration (storm water seeping into the ground and subsequently entering the sewer though manhole or pipeline defects). Indirect connections produce inflow after a significant time delay following the end of each storm event, whereas direct inflow sources have an immediate impact on the sewer system. Total inflow encompasses both direct and delayed inflow.



Graphic representation of Inflow

We will also characterize wet weather I/I by interpreting storm hydrograph signatures that often distinguish wet weather sources such as manhole inundation, roof leaders, area drains, storm drains, sump pumps, and rainfall-derived infiltration.

The analysis provided using TSA provides us with the information needed to rank tributary areas based on I/I severity to determine where SSES activities should be prioritized.

TSA will be applied by Arcadis to develop the flow analysis results necessary for characterizing the I/I severity from each of the monitored tributary areas. Base flow patterns, in conjunction with rain events and measured daily flow are used to quickly produce estimates of infiltration and inflow (I/I) providing efficiencies and cost savings to the City.

PHASE 2: IDENTIFICATION OF MAJOR INFILTRATION/INFLOW SOURCES

Once the Phase 1 flow monitoring program is completed and I/I has been quantified for each meter area, the areas can be prioritized for appropriate additional investigations, such as manhole and pipeline inspections, night-time flow isolation and smoke testing, depending on whether the area exhibited high infiltration, high inflow, or both.

Task 3: Strategy for Further Investigation of Extraneous Flows

Task 3 will include the development and implementation of a targeted, Sewer System Evaluation Survey (SSES):

- Identification of gaps in flow data
- Development and implementation of a strategy for further investigations, such as CCTV inspections, manhole inspections and smoke testing, in areas which exhibited significant extraneous flows
- Identification, location and quantification of I/I by source, and total I/I identified over the course of the study
- Recommendations for a permanent flow monitoring program
- Summary I/I Analysis Report, with recommendations for I/I removal

Once a flow monitoring program identifies high infiltration and inflow areas, most wastewater utilities follow a prescribed process for identifying the specific sources of extraneous flows. While most of these methods are well-proven and would provide benefits to the City of Portland, there are certain aspects of prescribed programs that should be modified in light of your specific goals, priorities and financial commitments.

For high infiltration areas, the strategy would be to perform night-time flow isolation to more precisely pinpoint infiltration resources, which can then be investigated by CCTV inspections. This saves the cost of conducting CCTV in areas where you don't anticipate finding infiltration. Arcadis would review the CCTV inspections completed by our subcontractor and provide evaluation and rehabilitation recommendations by our PACP certified staff.

Targeting the Right I/I Sources

As mentioned previously, Arcadis recommends that Portland focuses SSES investigations where it is more likely that the City will have the follow-on resources and other support necessary to eliminate the extraneous flows. That way, valuable resources are not spent on looking for and quantifying I/I sources that the City will not be able to remove due to financial, community or political hindrances.

Specifically, we often discuss with clients the likelihood of removing certain private sources of inflow, such as sump pumps, roof leaders and driveway drains. In some instances, there is a readily available solution for redirecting these sources away from the sanitary sewer system, but that is not always the case. In particular, permanent removal of sump pumps presents a difficult challenge to communities. While some communities have had success offering amnesty programs or financial incentives to assist with the removal of sump pumps, most times the home owners and businesses do not have a viable alternative to discharge their sump pumps. And forced removal programs can often result in replacement of sump pumps by home owners if an alternative solution is not implemented.

Removal of other sources of private inflow can also be challenging from technical, financial and community relations standpoints. Among other issues, communities struggle with forcing a financial burden on tax paying residents and businesses; and spending public dollars on private property modifications is often challenged by the community. Given these challenges, the City should first determine the likelihood of removing private inflow sources before spending money on locating these sources through such means as building surveys and private source dye testing. The money might better be spent on identification of infiltration and public inflow sources, where the removal of such sources is within better control of they City.

Typically, the most cost-effective sources to target are sources such as severely leaking manholes (internal or surface / covers), directly connected stormwater assets (such as catch basins), and major sources of groundwater infiltration, particularly those which can be fixed by trenchless technologies, as further discussed under Task 4.

PHASE 3: SCHEDULE OF TARGET INFILTRATION/INFLOW MITIGATION

Task 4: Wastewater Collection System Analysis and Action Plan

This Task will include the following scope, as further detailed below:

- Present strategies to reduce I/I to the collection system, as well as associated cost estimates
- Prioritize rehabilitation and replacement
- Assist the City with developing a 10-year capital plan
- Recommend a permanent flow monitoring strategy
- Comprehensive Infiltration and Inflow Study Report

In developing an I/I mitigation Action Plan, we propose to work with the City to first establish short-term and long-term goals. This approach typically involves identifying the “low hanging fruit”, or most efficient and cost-effective I/I removal opportunities: fix the problems that will remove the greatest amount of I/I for the amount of money invested. Prioritizing rehabilitation needs would come directly out of the flow monitoring and SSES results, and phased sewer system rehabilitation projects can be developed in light of I/I removal quantities, available budgets and the criticality of individual rehabilitation needs.

As we do with numerous clients throughout New England and across the country, Arcadis works with communities to develop cost-effective rehabilitation contracts that can be implemented relatively quickly, and with little disruption to the community. Most often, this means designing projects entirely or mostly comprised of “no dig”, or trenchless sewer rehabilitation technologies, such as cured-in-place pipe lining, internal sealing or lining of sewer lateral connections, and in-situ manhole lining. As detailed in Section 1 of this proposal, Arcadis has been managing such annual I/I removal programs for many clients.

Long Term Flow Monitoring

Establishing a long term flow monitoring program is a prudent strategy which would provide many benefits to the City, including:

- Comparison of pre- and post-rehabilitation flow data to track the effectiveness of I/I removal projects
- Compliance with the EPA Order and Corrective Action Plan

- Updates for your hydraulic model
- Identification of new I/I issues which may arise as the collection system ages and other future changes impact the system

Infiltration and Inflow Study Report

The I/I Study Report will summarize all data, information, evaluations and findings and recommendations. The Report will include results from all three phases of the project, and will include an Executive Summary and recommendations for I/I removal and sewer system rehabilitation.

Results of the flow monitoring program and SSES activities will be summarized, and all data, logs, videos and other field-collected data will be provided. Draft versions of the report outline and final report will be submitted for review and comment by the Portland DPW. We will prepare and deliver paper and electronic copies and present the Final Report to the appropriate officials.

The Final Report will include:

- A summary of our review of existing data and past and ongoing related studies and projects
- A clear explanation of our methodology for developing the flow monitoring and SSES strategies
- Maps and plans showing the selected meter areas and meter locations
- A detailed explanation of how data was analyzed, verified, and utilized to calculate the various flow components
- A description of how we used the flow monitoring results to target follow-on SSES
- Cost estimates and a schedule for conducting cost-effective Sewer System Rehabilitation Contracts and other I/I removal activities

Project Schedule

This section presents our proposed schedule. The Schedule outlined below indicates completion of all Tasks well ahead of the 2019 deadlines indicated in the RFP. Thus, the City will have the flexibility to Phase the I/I Program – both flow monitoring and SSES activities - to suit your priorities and reconcile project costs with your annual budget.

We would first like to have a project kick-off meeting with the City's key departments and staff to align project objectives and milestones. Throughout the project, we will meet with the City to assure our direction is coordinated with your goals and budget, as well as regulatory requirements. We anticipate the project will progress as follows:

- **December 2016:** Execute Contract for I/I Program
- **January 2017 – March 2017:** Data gathering and gap analysis
- **March 2017 – April 2017:** Flow monitoring program
- **April 2017 – August 2017:** Analysis of flow metering, I/I source identification, prioritization for SSES activities
- **August 2017 – April 2018:** Conduct Phase 1 SSES activities in high priority I/I areas
- **April 2018 – TBD:** Implementation of long-term flow monitoring program
- **May 2018 – August 2018:** Evaluation of Phase 1 SSES findings, collection system condition assessment, identification of I/I rehabilitation needs
- **September 2018 – October 2018:** Draft and Final ***Wastewater Collection System Analysis and Action Plan*** Report

The *Wastewater Collection System Analysis and Action Plan* Report will lay out the City of Portland's prioritized, short-term and long-term I/I Rehabilitation Program.

Based on the findings of the Phase 1 flow monitoring, I/I analysis and SSES activities, we anticipate that additional I/I identification and SSES activities will take place in successive years, concurrently with prioritized I/I Sewer System Rehabilitation construction. This Phased approach will be determined based on the City's budget and environmental compliance requirements.

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CITY OF PORTLAND

PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

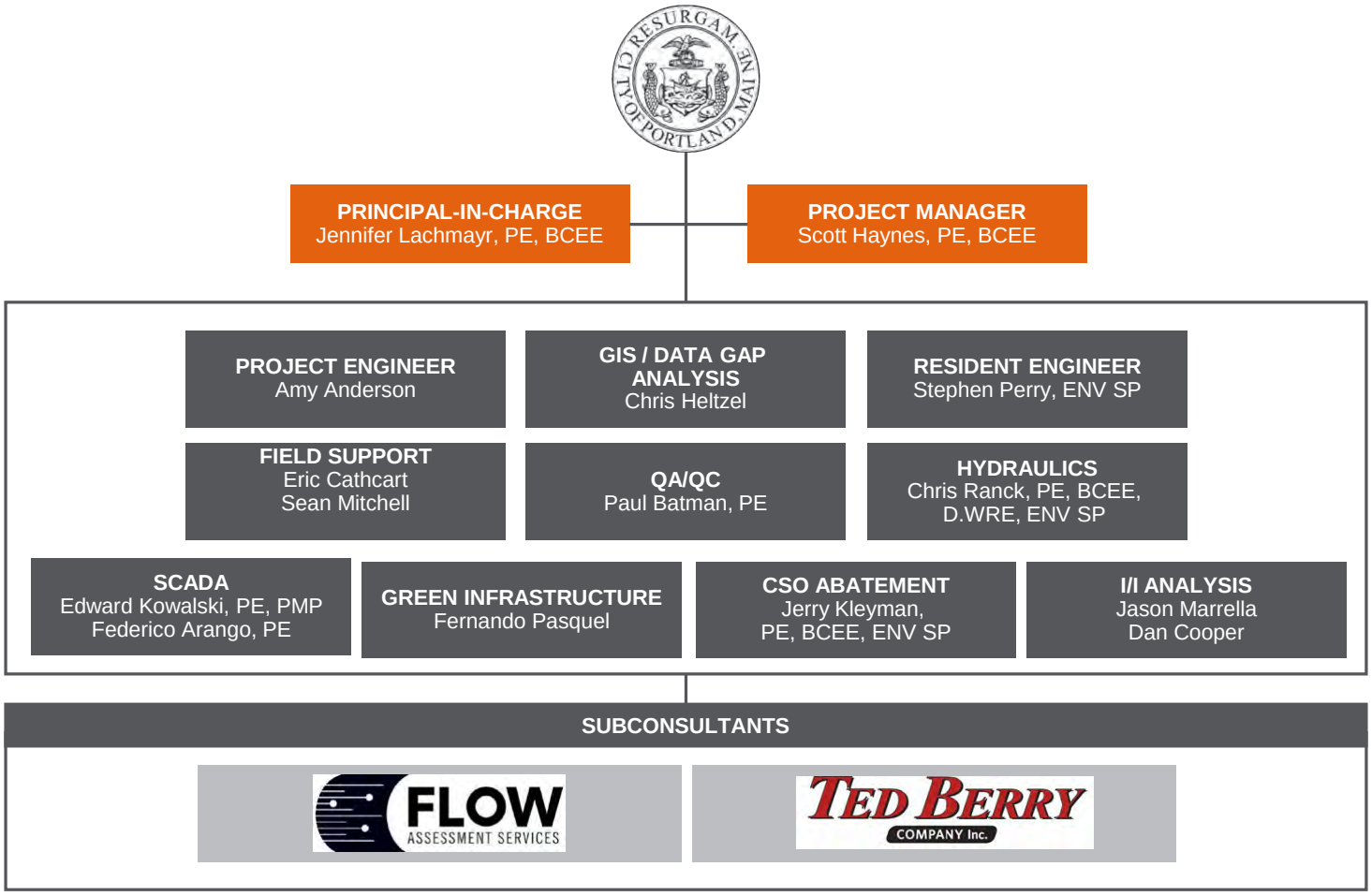
4. TEAM STRUCTURE

4. TEAM STRUCTURE

SECTION 4. TEAM STRUCTURE

Organization Chart

We have a team of experienced personnel managing our speciality subcontractors who are familiar with the City's collection system. This project will be staffed out of our Wakefield, MA office and supported by staff in our Portland, ME office. Provided below is our Project Organization Chart for this assignment. **Resumes for project staff are provided at the end of this section.**



We have a team of seasoned personnel, including speciality subcontractor partners, who are familiar with the City's sewer system.

Management Approach

Interaction with City Staff

To us, Quality Client Service means taking extra steps to assure our technical services and products meet or exceed our client's expectations. Some of the important principles we apply to our projects include:

- Carefully listening to be certain we understand your problem and needs relative to solving the problem.
- Confirming that we are proceeding according to plan through frequent contact.
- Early project planning/review by senior management for proper approach and assignment of project team members.
- Our project management team and approach have been specifically designed to:
- Stay continuously in contact with the Authority on developing strategies in order to address critical coordination functions and issues that are key to achieving the City's objectives.
- Utilize veteran personnel who have first-hand engineering and operational experience with project requirements.
- Provide seasonal management personnel with experience working on similar infrastructure assignments to provide seamless continuity and guidance from start to finish.
- Achieve the all-important managerial balance between the often competing objectives and demands of Quality vs. Budget vs. Schedule.

Project Manager, Scott Haynes will lead overall project administration and execution. He will be continuously involved with and responsible for the production of project deliverables and for the effective use of project staff and resources to the City's best advantage. He will manage subconsultants and will be the primary project team interface for interaction with the City's project manager for project execution.

As Principal-in-Charge (PIC), Jennifer Lachmayr is responsible for promoting the City's satisfaction. She will be in regular contact with Mr. Haynes and City personnel assigned to this project, so that all work phases are completed in a timely and expeditious manner. It is our goal to exceed your expectations and deliver services based on specifications defined by the City.

Schedule and Cost Control

Mr. Haynes will apply the globally accepted Project Management Institute's (PMI) standards so that the project will be initiated, planned, executed, monitored, controlled, and closed in concert with world-class principles and procedures. The following are some benefits to the City resulting from our project management approach:

- Prioritizing competing activities and providing clear direction to the project team will minimize unwanted deviations to scope, schedule, and budget and maintain an efficient production of design.
- The City will have a clear understanding of all key elements of work required to complete the project through the detailed work breakdown structure of the project schedule.
- This will also facilitate understanding of the impact of scope, schedule, and budget changes or of other additional activities.
- Our project schedule will allow the City to understand progress at any point and impacts to the project schedule when critical path activities are affected.
- A critical component to maintaining project control is cost control. We will maintain a scope change log to track deviations in scope, the associated cost impact and the decision regarding the implementation of scope modifications. No changes in scope/cost will be implemented without prior approval from the City.

Computerized Project Management System

Our computerized Project Management System permits managers to monitor projects weekly, or on demand. Our system stresses currency and has proven highly effective in monitoring progress for individual projects on a task-by-task basis, coordinating staff assignments, and projecting short- and long-term manpower and expenditure requirements for project tasks.

Web-Based Information-Sharing Portal

We provide secure project SharePoint web portals for ease of transmission of information among our team members, the project client and all associated contractors, in order to ensure all information is readily available in real-time to those who are granted access.

Subconsultants

Arcadis proposes to use the following subconsultants to assist with the work for this project. Both of these firms currently provide similar services for the City.

- Flow Assessment Services, LLC
- Ted Berry Company Inc.

Flow Assessment Services, LLC

Flow Assessment Services, LLC is a wastewater collection system company providing services in the field of flow monitoring and other sewer system evaluation. They provide the following services in New England and the Mid-Atlantic States:

- Open Channel Flow Monitoring
- Closed Pipe Flow Monitoring
- Inflow/Infiltration Studies
- Pump Station Flow Monitoring
- Smoke Testing
- Flow Isolation
- Telemetry Systems
- Manhole Inspections
- Dye Water Testing/Tracing
- Building Inspection (inflow sources)
- Automatic Sampling

They will provide MH Inspections, flow metering, manhole inspections and follow on investigative work as needed.

Ted Berry Company Inc.

Founded in 1972 the Ted Berry Company Inc. has deep roots in the community with its home base located in Livermore, Maine less than 60 miles from the City of Portland. The Ted Berry Company has completed various projects for the City ranging in size and complexity and has become a trusted service provider to the City. From unplanned emergency services to large scale planned cleaning and CCTV inspection projects the Ted Berry Company has proven its reliability and resiliency. We offer industry leading technology and an extre mely knowledgeable staff of over 60 local employees. A family owned and operated business with the owner and President, Matt Timberlake being intimately involved in the daily operation and management of the company, the Ted Berry Company is the contractor of choice for municipal waste water collection system managers throughout New England. They will provide manhole and pipeline inspection services.

Sanitary Sewer I&I Project Experience:

- The City of Portland utilizes the services of Ted Berry Company to assess the condition of sewer lines and manholes located within the City of Portland Maine. The overall goal is to develop a strategy that will supplement the City's in-house program. The Ted Berry Company performs full service sewer/storm cleaning and inspection. The recently completed 2015-2016 contract with the City of Portland includes 81,000 feet of various sized pipe for cleaning and conditional assessment, with customized reporting. Additions to the original Scope of Work have been provided as funds were released as the result of another contractor's failure to complete the 2014-2015 project.

- In 2015, the Ted Berry Company was involved in a single year contract with the City of Lewiston Public Works Department for cleaning and obtaining CCTV data on existing sanitary sewer mainlines and manholes. Last year, over 170,000 feet of sewer lines and 600 manholes were cleaned and inspected in residential neighborhoods, remotely located pipes, and busy commercial areas. The original Scope of Work called for 93,000 feet of cleaning and inspection, but additional funds were made available from an unspent 2014 budget as another contractor did not complete their Lewiston contract. The 2015 scope increased to 171,000 feet, which Ted Berry completed prior to our contract deadline.

Resumes for each of the project team members identified on the organization chart are presented on the following pages.

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SCOTT HAYNES, PE, BCEE

Project Manager

EDUCATION

- BA Engineering Stonehill College 1987
- BS Civil Engineering University of Notre Dame 1988
- MS Civil Engineering Tufts University 1997

YEARS OF EXPERIENCE

- Total - 28 years
- With Arcadis - 13 years

PROFESSIONAL REGISTRATIONS

- Professional Engineer - MA, CT
- Board Certified Env Engineer - US

PROFESSIONAL ASSOCIATIONS

- American Public Works Association
- American Water Works Association
- Massachusetts Water Works Association
- New England Water Environment Association, Member, Program and Membership Committees

AWARDS

- NEWEA 5S Member -Secret Society of Sanitary Sludge Shovelers

Overview

Mr. Haynes has served as both project manager and technical expert on a variety of I/I, sewer evaluation, hydraulic modeling and sewer rehabilitation projects. He is responsible for project delivery and project management for all phases of projects. Mr. Haynes' experience includes planning, design, and construction engineering services for major sewer rehabilitation projects, wastewater treatment facilities expansions, wastewater collection system and pump station designs, I/I analyses, combined and separate sewer system evaluations, sanitary sewer overflow evaluations, and sewer system rehabilitation/replacement projects.

Project Experience

Reading Extension Sewer and Metropolitan Sewer Rehabilitation

MWRA: Wakefield, Stoneham, and Wodurn, MA

Project Manager on this sanitary sewer rehabilitation contract. Work includes design of cured in place pipe lining and manhole rehabilitation for four sections of interceptor through these three towns, coordination with abutters, municipalities and permitting agencies, plans and specifications and bidding documents as well as bidding and construction phase services.

Phase III – I/I Rehabilitation

Greater New Haven WPCA: CT

Project manager for the continuing I/I reduction program for the Greater New Haven Water Pollution Control Authority. This project includes inspection, evaluation and rehabilitation by cured-in-place lining of 35,000 LF of pipe ranging in size from 8-inch to 27-inch in diameter: Lower Farm River, Area 10, East Haven: 11,400 LF of sewer and 55 manholes; the State Street sewershed, Hamden: 23,350 LF of sewer and 145 manholes; and the Upper Thorpe Drive sewershed Paradise Avenue Easement (UTDSPAE), Hamden: 2,110 LF of pipe and 10 manholes.

Sewer System Rehabilitation

Town of Wilmington: Wilmington MA

Project manager for management and oversight of a construction project recommended on the basis of previous system investigations performed

by Arcadis. The project included construction administration and full-time resident engineering services for manhole and pipeline repairs such as pipeline joint testing and sealing, manhole grouting and lining, and cured-in-place pipeline repairs.

Infiltration/Inflow Analysis Program

Town of Ayer, Massachusetts

Project Director for Ayer's multi-year I/I identification and removal program. Project includes flow monitoring, I/I quantification and follow-on recommendations for sewer system investigations to pinpoint infiltration and inflow for removal.

Sewer System Rehabilitation

Town of Franklin: Franklin, MA

Project Director for five phases of design and construction of this major sewer system rehabilitation project, which was developed based on the recommendation of previous sewer investigations and condition assessments. The projects included trench-less pipeline rehabilitation methods such as CIPPL, cured-in-place spot repairs, and pipeline point testing and sealing. The project also entailed cleaning and CCTV inspection from which the engineer and owner would develop additional rehabilitation recommendations which would be added to the construction contract by work orders. The project is estimated to remove over 500,000 gpd on I/I.

SSO Elimination Program/SSES

The Metropolitan District (MDC): Hartford, CT

Project manager for the MDC's Sanitary Sewer Overflow Elimination Program for the communities of Rocky Hill, Wethersfield and Windsor, CT. This project included a Sewer System Evaluation Survey (SSES), consisting of evaluation of over 100 miles of 8-inch to 39-inch diameter sanitary trunk sewers and interceptors. Work included flow isolation of 550,00 LF of sewers, closed circuit television inspection of 300,000 LF of pipeline, 3,200 manhole inspections, 650,000 LF of smoke testing, dye water testing and flooding and 7,000 building inspections. The goal of the project is to eliminate SSO's in accordance with the EPA and CT DEP Consent Decree by eliminating sources of I/I.

Main Street Interceptor Rehabilitation Planning and Design

Town of Wilmington: MA

Project manager and design quality leader for the inspection, condition assessment and design of in-situ (CIPPL) of this badly deteriorated 36-inch interceptor, which conveys all of the Town's wastewater flow to the MWRA sewer system. Project included CCTV inspection of the pipe, manhole inspections and rehabilitation after removal and disposal of large volumes of sediment.

Tunnel - Storm Drain Design, Logan Airport

Massport and Central Artery: Boston, MA

Engineer for the design of 1,300 l.f. of 72" RCP storm drain and associated cast-in-place drainage structures located at Logan Airport. Developed engineering and construction cost estimates, performed hydraulic analysis, prepared a storm drain design and coordinated with subconsultants, Massport executives, and CA/T personnel.

Grand Gorge I/I

NYCDEP, New York

Project Manager for this sewer system investigation and rehabilitation project for the New York City DEP. The project consists of a fast-track, comprehensive I/I removal project including continuous flow monitoring, flow isolation, closed circuit television inspection, manhole inspections and smoke testing. The project goal is to reduce I/I to the Grand Gorge collection, where I/I outweighs domestic flow within the system during much of the year. Mr. Haynes is responsible for all project deliverables, staff management, sub-contractor coordination and implementation of final rehabilitation recommendations.

Beacon Street Interceptor Service Area Sanitary Sewer System Rehabilitation Construction Services

City of Norwalk, CT

Project manager for the evaluation of CCTV and manhole inspections for 6 miles of interceptors and collection sewers. Based on the condition assessment, Arcadis designed a comprehensive sewer system rehabilitation project to eliminate I/I.

JENNIFER LACHMAYR, PE, BCEE

Principal-in-Charge

EDUCATION

- BS Mechanical Engineer, Cornell University 1985

YEARS OF EXPERIENCE

- Total - 30 years
- With Arcadis - 13 years

PROFESSIONAL REGISTRATIONS

- Professional Engineer - MA NH, ME, CT, RI
- Board Certified Environmental Engineer - US

PROFESSIONAL ASSOCIATIONS

- American Water Works Association
- New England Water Environment Association, Member, WEF Delegate, Executive Committee
- Water Environment Federation, Member, Collection Systems Committee
- American Public Works Association
- New England Water Works Association, Sponsors Committee

AWARDS

- Golden Manhole - WEF Collection Systems Committee
- Golden Shovel -Secret Society of Sludge
- Shovelers - NEWEA

Overview

Ms. Lachmayr serves as Contract Principal for numerous municipal clients in all New England states. She has a strong background in all phases of municipal engineering projects from planning and design through construction. Ms. Lachmayr has managed or designed more than 35 miles of pipe, and has extensive experience in pump station sizing, design, and modifications, and helping clients to meet the United States Environmental Protection Agency's requirements for CSO policy and inflow/infiltration evaluation and elimination projects. Ms. Lachmayr has provided direct oversight in illicit connection detection, best management practices (BMP), and stormwater receiving water quality sampling programs. Ms. Lachmayr currently serves as the Project Director on the MWRA's Remote Headworks Upgrades Design, HVAC Building Automation and HVAC Unit Replacement, Reading Extension Sewer and Metropolitan Sewer Rehabilitation and Prison Point CSO Improvements Contract.

Project Experience

Reading Extension Sewer and Metropolitan Sewer Rehabilitation Contract No. 7163

MWRA: Wakefield, Stoneham, and Woburn, MA

Project Director on this sanitary sewer rehabilitation contract. Work includes design of cured in place pipe lining and manhole rehabilitation for four sections of interceptor through these three towns, coordination with abutters, municipalities and permitting agencies, plans and specifications and bidding documents as well as bidding and construction phase services.

Nut Island Headworks Electrical and Conveyors Improvements Contract No. 7312

Massachusetts Water Resources Authority, Quincy, Massachusetts

Project director providing design, construction administration and resident engineering services for the improvements at the Nut Island Headworks which has an average design flow of 125 mgd and a peak capacity of 400 mgd. The upgrades include replacement of concrete-embedded electrical conduits and wiring; and improvements to the grit and screenings belt conveyor transport systems.

Infiltration/Inflow Analysis Program

Town of Ayer, Massachusetts

Principal-in-Charge of a multi-year infiltration/inflow analysis program. Duties include the development and implementation of sewershed wide flow monitoring program, identifying high infiltration and inflow areas for future investigation and rehabilitation of the sanitary sewer system.

Upper Neponset Valley Sewer Inflow Survey

Boston Water and Sewer Commission: Boston, MA

Project manager for the comprehensive investigation of the sources of stormwater inflow to the sanitary sewers in the West Roxbury neighborhood of Boston. Work included more than 1,150 manhole inspections, detailed analysis of two years of flow metering data, sewer cleaning and television inspection, 1,500 building inspections, smoke testing of 75,000 LF of sewer, and dye testing of 400 downspout and drain sources to identify and quantify sources of inflow. The study identified sources contributing more than six million gallons of inflow during a one-year storm event and recommended a rehabilitation program to eliminate those sources.

Sewer Separation

The Metropolitan District: Hartford, CT

Project manager for sewer separation in Hartford's Upper Albany Avenue area. Work included the design of 11,000 feet of new storm and sanitary pipes to separate the combined system and alleviate local street and basement flooding. Work also included preliminary design, field investigation, hydraulic analysis, traffic management, and permitting.

Sewer Separation

Lynn Water and Sewer Commission

Managed the preliminary and final design and continuing reports for the Eastern Avenue Phase II sewer separation project. The project included 23,500 ft of concrete pipe,18-in-diameter to 8-ft by 7-ft box culvert, jacking, rock removal, and significant utility coordination. Prior to that assignment, served as design engineer for the sewer separation construction projects (Nos. SS-2 and SS-3), which included approximately 6,000 ft of 60-in-diameter to 9-ft by 7-ft box culvert, all installed along Eastern Avenue.

Sewer Separation

Lynn Water and Sewer Commission

Performed SSESs and I/I studies and reports for the Western Interceptor tributary area. Work included groundwater monitoring, continuous-flow gauging, flow isolation, and TV and manhole inspections along sewer pipelines within the area. Summarized the field investigations, performed a cost-effectiveness analysis, and made recommendations for sewer system rehabilitation.

Remote Headworks Concept Design

MWRA: Deer Island, MA

Project director and quality assurance manager for an asset management and planning project to develop a complete inventory of facility components, to conduct condition assessments, and to identify and prioritize replacement / rehabilitation projects for the next 20 years for three large remote headworks facilities. The three facilities provide pretreatment in the form of grit and screenings removal for average daily flows of 135, 90, and 60 mgd respectively, prior to wastewater transport to the Deer Island Treatment Plant. The project involves the preparation of two concept design reports; the first for priority improvements related to screenings, grit separation, and materials handling systems, and the second for all other ancillary components and systems. The scope includes the structures, architectural features and site work, as well as all the mechanical process and support equipment, and the electrical and instrumentation systems. The two reports also contain comparative evaluations of alternatives for six of the most important components or systems in those facilities. The report concludes with the identification of concept level design features, cost estimates, and implementation recommendations for the timing and packaging of construction contracts.

AMY ANDERSON

Project Engineer

EDUCATION

- BS Environmental Engineering Roger Williams University 2005

YEARS OF EXPERIENCE

- Total - 11 years
- With Arcadis - 11 years

Overview

Ms. Anderson specializes in flow metering analysis, SSES programs, SSO elimination programs and I/I reduction program analyses. She has a vast knowledge and experience with analyzing flow data and SSES findings and developing recommendation for long-term I/I identification and removal programs. She also has experience with awareness regarding illicit connections to the sanitary sewer system, hydraulic capacity assessments, SSO evaluations, sanitary sewer rehabilitation projects and GIS mapping. Ms. Anderson manages large teams of staff and subcontractors to deliver and present high quality I/I-SSES studies to our clients.

Project Experience

Town of Franklin: Sewer System Investigations

Town of Franklin: Franklin, MA

Project Manager for the 2005-2016 evaluations of the sanitary sewer system. Project work included the development and implementation of a multi-year sewershed wide flow monitoring program, CCTV investigations and manhole inspections. The project included a capacity assessment and updates to the existing hydraulic model. Duties include detailed flow analysis, project coordination and preparing final deliverables

MDC SSO Elimination Program - SSES

The Metropolitan District: Hartford, CT

Engineer for the MDC's Sanitary Sewer Overflow Elimination Program for the communities of Rocky Hill, Wethersfield and Windsor, CT. This project includes a Sewer System Evaluation Survey, consisting of flow isolation of 550,000 linear feet (LF) of sewers, 280,000 LF of closed circuit television inspection, 3,200 manhole inspections, 640,000 LF of smoke testing, dye water testing and flooding and 10,000 building inspections. The goal of the project is to eliminate SSO's in accordance with the EPA and CT DEP Consent Decree by eliminating sources of infiltration and inflow (I/I).

Infiltration/Inflow Analysis Program

Town of Ayer, Massachusetts

Project Manager of a multi-year infiltration/inflow analysis program. Duties include the development and implementation of sewershed wide flow monitoring program, identifying high infiltration and inflow areas for future investigation and rehabilitation of the sanitary sewer system.

Long Term Flow Study

Metropolitan Sewer District of Greater Cincinnati: Cincinnati, OH

Project Engineer for long term multi-year flow meter study. Duties include scattergraph and hydrograph analysis of sanitary and combined sewer flow data for 250 meters, development of RTK values using EPA SSOAP toolbox and management of GIS data and mapping.

Phase 4 Sanitary Sewer Rehabilitation Project

Town of Franklin: Franklin, MA

Project Manager/resident engineer for the rehabilitation of 10,000 lf of sanitary sewer with the Beaver Street Interceptor Sewershed. Responsibilities included developing all contract documents including contract drawings, specifications and bid documents in accordance with MA General Law, resident engineering and field oversight,construction administration, development of site specific health and safety plan, subcontractor coordination and schedule.

Remote Headworks Upgrade

Massachusetts Water Resources Authority: Chelsea, MA

Project Engineer for the design and construction administration services improvements to the Chelsea Creek Headworks, 160 mgd average flow and 182 to 350 mgd maximum flow. The upgrade will include replacement and automation of all solids handling equipment including screens, grit collector systems and solids conveyance systems; odor control and HVAC systems will be replaced and redundancy added; ancillary systems, including emergency generators and fuel oil tanks, will be replaced; and instrumentation and control systems will be upgraded. This project is funded through the Commonwealth of Massachusetts SRF fund administered by the MADEP.

Grand Gorge Infiltration and Inflow Analysis - SSES

New York City Department of Environmental Protection: NY

Project Engineer for this sewer system investigation and rehabilitation project for the NYCDEP. The project consists of a fast-track, comprehensive I/I removal project including continuous flow monitoring, flow isolation, closed circuit television inspection, manhole inspections and smoke testing. The project goal is to reduce I/I to the Grand Gorge collection, where I/I outweighs domestic flow within the system during much of the year. Ms. Anderson works on all project deliverables, sub-contractor coordination and implementation of final rehabilitation recommendations.

Lower Central Interceptor and Montcalm Siphon Phase 2 Evaluations and Hydraulic Model

Town of Weymouth: Weymouth, MA

Project Engineer for this evaluation of sanitary sewer overflows along the Lower Central Interceptor and Montcalm Siphon. The study included field investigations, two periods of flow monitoring, manhole inspections, CCTV investigations, and the development of a hydraulic model. Responsibilities included writing the report, analyzing flow monitoring and salinity data, assisting with the development of the hydraulic model, sub- contractor coordination, and development of the final rehabilitation recommendations to eliminate SSOs.

PAUL BATMAN, PE

QA / QC

EDUCATION

- BS Environmental Health West Chester University, 1996
- MS Environmental Engineering Drexel University 1999

YEARS OF EXPERIENCE

- Total - 19 years

PROFESSIONAL REGISTRATIONS

- Professional Engineer - DE, MD, DC, MA
- Certified Construction Documents Technologist (CDT)
- NASSCO Pipeline, Lateral, and Manhole Assessment and Certification Programs (PACP, LACP, and MACP)

Mr. Batman has been involved as program manager, project manager, or senior engineer in sewer infrastructure investigation and rehabilitation efforts for projects and programs across the mid-Atlantic region as well as providing technical support for projects nationwide. His experience includes inflow/infiltration (I/I) studies, infrastructure evaluations, physical condition assessments, gravity sewer design, gravity sewer operations and maintenance planning and implementation, water distribution design, sanitary sewer rehabilitation, storm system rehabilitation, preparation of construction/bid documents, construction administration services design support during construction, community relations, and flow data analysis for evaluating effectiveness of I/I reduction efforts.

Mr. Batman is currently Arcadis' national practice leader for buried infrastructure assessment, design and rehabilitation and is responsible for identifying and sharing our best talent, tools and practices with project teams and clients nationwide.

Project Experience

Brandywine Hundred Flow Monitoring and I/I Reduction Effectiveness Evaluation

New Castle County DE

Senior Engineer and Project Manager for the monitoring and analysis of flows across a 500-mile system during a decade long program. The work included all installation and maintenance of flow meters and rain gages (performed 100% by Arcadis) in support of I/I studies, an I/I reduction and sewer rehabilitation program, hydraulic modeling and operational needs. Analysis techniques and tools were developed to determine the effectiveness of rehabilitation at reducing I/I across more than 30 bidded rehabilitation contracts utilizing approximately 60 unique monitoring points. Results across the spectrum of rehabilitation project areas completed to date showed 32% to 97% overall reduction of I&I volume.

Consent Decree Sewer Rehabilitation Program

Washington Suburban Sanitary Commission, Laurel, MD

Principal Engineer and Professional Engineer of record for the physical condition assessment and design of rehabilitation for over twenty individual rehabilitation contract packages across five sewersheds and totaling over $50M in construction costs. Rehabilitation technologies included cured-in-place pipe lining, pipe bursting, excavated repair or replacement, and manhole lining. The work also included stabilization of

streambanks and stream channels for at-risk sewer assets. Also served as Senior Engineer providing guidance and QAQC for staff conducting flow data evaluation work in selection of pilot project locations for private-side I/I reduction.

Brandywine Hundred - Infiltration and Inflow Evaluations

New Castle County, DE

Project Manager and Project Engineer for I/I evaluations for an area spanning 4 sewersheds and containing over 420 miles of sewer and over 20,000 residences and businesses. Smoke testing was conducted to identify inflow sources. Night-time flow isolation weiring to identify pipes with high baseline infiltration and greatest potential for rainfall-derived infiltration. Results were used to prioritize the system for inspection, assessment and ultimately rehabilitation.

Bynum Run Flow Monitoring, I/I Study, and I/I Abatement Program Development

Harford County, MD

Senior Project Engineer and Project Manager responsible for preparing recommendations for an I/I abatement program for a 260-mile sanitary sewer system. Work also included development and implementation of a flow monitoring and I/I study and a night-time flow-isolation and infiltration study. Responsibilities included project planning and administration, data collection, flow data interpretation, site walks, development of recommendations, technical memo and client meetings.

Inflow and Infiltration Study

Lehigh County Authority, Allentown, PA

Senior Project Engineer and Project Manager overseeing I&I analysis of flow data from over 150 flow meters. Responsibilities included project planning, information collection, flow data interpretation, development of recommendations, QAQC, and tracking project progress and schedule as well as budget.

District 3 Flow Monitoring and I/I Study

Erie County, NY

Technical advisor providing project planning, execution guidance and QA/QC for this flow monitoring and I/I analysis utilizing 22 flow meters and 3 rain gages over a 6-month study period.

I/I Study/Rehab Effectiveness

Emerald Coast Utilities Authority, Pensacola, FL

Senior Project Engineer providing QAQC of I&I analysis as well as technical guidance for the implementation of flow monitoring for assessments that would determine the effectiveness of rehabilitation efforts at reducing I&I.

Operation and Maintenance Program Optimization

New Castle County, DE

Project Engineer and Project Manager in development of a new approach to O&M for a 2,000-mile sanitary sewer system aimed at reducing overflows and blockages while managing increasing costs by optimizing the frequency of cleaning and inspection activities. This included the development of program elements addressing issues such as fats, oils, and grease (FOG), mainline blockages and overflows, roots, trunklines, interceptors, and preventive maintenance of collection sewers.

Sewer Management Program

DC Water, Washington, DC

Technical advisor providing guidance, expertise, and quality assurance for pipe inspection and pipe rehabilitation technologies and techniques as well as QA/QC and guidance for Arcadis-performed flow monitoring and analysis work.

Brandywine Hundred Program - Sewer Rehabilitation Projects

New Castle County, DE

Project Manager and Design Leader for a series of sewer rehabilitation projects totaling over 100,000 LF of collection pipe and associated manholes and laterals. Responsible for the PACP-based condition assessment, basis of design, preparation of drawings and specifications, bidding support, and design services during construction. Rehabilitation technologies included cured-in-place pipe lining, pipe joint grouting, and excavated repairs.

Reading Extension Sewer and Metropolitan Sewer Rehabilitation Contract No. 7163

MWRA, Boston, MA

Technical advisor providing technical expertise and quality assurance for cured-in-place pipe lining design of 12,000 LF of 16-24” trunk sewer.

ARCADIS Design & Consultancy for natural and built assets

CHRISTOPHER HELTZEL

GIS / Data Gap Analysis

EDUCATION

- MA Engineering Technology Kent State University 1987
- BS Aerospace Engineer Kent State University 1986

YEARS OF EXPERIENCE

- Total - 29 years
- With Arcadis - 17 years

PROFESSIONAL REGISTRATIONS

- Geographic Information Systems - OH

PROFESSIONAL ASSOCIATIONS

- American Water Works Association
- Water Environment Federation

Overview

Mr. Heltzel specializes in information management and application development related to asset management. He has extensive experience in managing IT projects, including implementations of geographic information systems, computer-aided design software, hydraulic modeling, computer maintenance management systems, financial information systems, and condition assessment software. Additional experience includes custom and retail software development, Local Area Network and Wide Area Network design and administration, corporate email, and relational database administration

Project Experience

SWMP Implementation

Town of North Reading, North Reading, Massachusetts

Mr. Heltzel provided information management assistance for North Readings comprehensive storm water management program. This project included storm water mapping, screening, and outfall assessment for over 400 storm water outfalls. Support was provided for other efforts including creation of storm water system component review and methodologies for follow-on work by town including creation of inspection forms, training, protocols for inspection, database management, and GIS system updates.

Combined Sewer Overflow Long-Term Control Plan Development and Update

Buffalo Sewer Authority, Buffalo, New York

Mr. Heltzel was a member of a team of IT specialists, GIS technicians, and engineers who digitized Buffalos combined sewer system based on as-built drawing records, background maps, and field verification. The information was managed through the MP Digitizer GIS tools that have been specifically designed for buried asset management. This data management approach resulted in the delivery of a complete collection system GIS in addition to the XP-SWMM input files for system modeling.

Asset Management and CIP Planning Services

The Metropolitan District, Hartford, Connecticut

As part of the MDC asset management project, a model has been produced to predict the useful life of the water distribution infrastructure

and to develop a 50-year rehabilitation and replacement R&R budget. This asset model requires supporting data from many sources including the SAP maintenance tracking system, geographic information system, hydraulic model and spreadsheets. From these disparate sources the data relevant to the asset model must be extracted, transformed and loaded ETL into the asset model. GIS was targeted as the platform for the ETL application because much of the data is related spatially. Examples include relating soil condition to the pipes residing within defined areas and aggregating multiple connected pipes with similar characteristics. Additionally the asset model results must be displayed through the GIS to facilitate execution of the R&R plan. Mr. Heltzel designed the GIS-based ETL program that allows the user to specify up to 15 different data sources to be processed. Each source is validated prior to processing and warnings are generated if discrepancies are present in the data. In most cases, problematic data sources can be skipped, allowing the remaining sources to be processed. The user is then only required to correct the discrepancies and process those remaining data sources instead of rerunning the entire ETL program from start to finish. This asset model pre-processing application allows MDC to effectively collect, validate and review the supporting data prior to running the model.

DWSD Oakwood Swmm Modeling

Detroit Water and Sewerage Department, Detroit, Michigan

The Oakwood Sewer District covers approximately 1,200 acres in southern Detroit, land that is evenly divided between residential and industrial occupation. Historically, the district has had significant flooding problems due to an undersized pump station on the downstream end of the system and undersized sewers. To relieve the flooding problems, Mr. Heltzel assisted in enhancing an existing SWMM model of the sewer trunk mains to include system laterals. The MP Digitizer tool set was used to integrate data from varying sources such as the previous model, ArcView shape files, and Microstation CAD files to rapidly develop the new GIS-based model. Once the expanded model has been developed, a variety of different alternatives for alleviating the flooding problems will be examined.

Collection System Model and Analysis

City of Sandusky, Sandusky, Ohio

Lead developer of the MP Digitizer GIS data management program used to digitize the combined sewer system. This tool includes layer management, network validation and tracing, model input file generation, and postprocessing of model results. Using the MP Digitizer allowed multiple engineers to work on the GIS/Model development from different offices at the same time.

Organization and Operational Review

City of Detroit, Michigan

Responsible for management of citywide water distribution GIS and hydraulic model data. Imported disparate sources of data into a unified connected network GIS. The project included development of a data-scrubbing utility to process billing records into water demands that were linked to the distribution model's nodes. Performed additional cleanup on existing GIS information to establish an accurate network topology. The data management system was designed with the capacity to create EPANet hydraulic model files and merge multiple models into one.

Creation of Stormwater Utility

City of Lancaster, Lancaster, Ohio

This project established criteria for storm water rates based on the size of impermeable areas associated with each land owner in the city. Data from the city databases, county databases, and county GIS, together with other layers, were combined in a GIS base information management system. The impermeable area was defined by creating polygon boundaries in the GIS based on orthophotography. The city was then provided with the resulting data in a compatible format with their billing software. Mr. Heltzel designed, implemented and supervised the integration of the necessary data systems for this project.

OEC Capital

City of Columbus, Columbus, Ohio

Mr. Heltzel managed the development and integration of four software tools into a flexible integrated framework. The tools included the Time Series Analyzer - QA/QC, graphing and analysis of large datasets; Qual2e Digitizer - define river network in GIS, capture modeling information and export to Qual2e engine then import result for display and analysis; River Profiler - graph model results and monitor data for multiple locations; WASP Digitizer - define river network in GIS, capture modeling information and export to WASP engine, then import result for display and analysis

STEPHEN PERRY, ENV SP

Resident Engineer

EDUCATION

- BS Civil Engineering Wentworth Institute of Technology 2003

YEARS OF EXPERIENCE

- Total -13 years
- With Arcadis - 13 years

PROFESSIONAL REGISTRATIONS

- Construction Documents Technologist - MA
- Confined Space Training - MA
- Envision Sustainability Professional - ISI
- OSHA Construction Safety Health - OSHA

Overview

Mr. Perry is a Project Manager who serves on a variety of projects ranging from buried infrastructure condition assessment and rehabilitation oversight to wastewater treatment plant upgrade and improvements. He has extensive design coordination and field supervision experience, and is highly skilled in implementing contract administration. He possesses the project management skills necessary to oversee projects through completion, while ensuring conformance with all contract documents.

Project Experience

Infiltration/Inflow Investigation and Analysis

Town of Wilmington, Massachusetts

Project Manager for the installation of eight flow meters and the evaluation of flow monitoring results to estimate average daily flows and I/I rates in eight tributary areas within Town. Project goal is to prioritize high I/I areas for follow-on sanitary sewer evaluation study and assess risk of sanitary sewer overflows and will include 30,000 LF of CCTV inspection and 180 manhole inspections.

Town-Wide Sewer System Investigations

Town of Franklin, Massachusetts

Project Engineer for the 2005-2016 evaluations of the sanitary sewer system. Project work included the development and implementation of a multi-year sewer-shed wide flow monitoring program, CCTV investigations and manhole inspections. The project included a capacity assessment and updates to the existing hydraulic model. Duties included detailed flow analysis, project coordination and preparing final deliverables.

Main Street Interceptor Sewer System Rehabilitation

Town of Wilmington, Massachusetts

Project Engineer and Resident Inspector responsible for all aspects of construction administration and resident inspection for the cured-in-place pipe lining of 3,000 LF of a 36-inch reinforced concrete interceptor. Rehabilitation required an around-the-clock bypass pumping operation to bypass flow around the project area. Other sewer rehabilitations included 3 formed-in-place manhole liners and 13 epoxy lined manholes.

Nut Island Headworks Electrical and Conveyors Improvements

Massachusetts Water Resources Authority, Quincy, Massachusetts

Project Engineer for the design of an electrical improvements and grit/screenings conveyors improvements project which included; replacement of all slab-embedded and wall-embedded electrical wiring from the Electrical Room to the Bottom Level with surface-mounted wiring, waterproofing, replacement of primary belt scrapers and addition of secondary belt scrappers on grit and screenings conveyors, removal of two screenings presses and one edgewall conveyor and replacement with a new edgewall

Owner's Representative for Design-Build-Operate Wastewater System Improvements Contract

City of East Providence, Rhode Island

Project Engineer serving as Owner's Representative for a $51.5M wastewater system improvements project that includes full Phase 2 BNR upgrade to the treatment plant, new Headworks Building, primary treatment improvements, a new 10 MGD pump station and associated force main, and other pumps station/ collection system improvements. Responsibilities on this project include coordination of design review for conformance with design standards detailed in the agreement, shop drawing audits, review of manufacturer start-up and certificate forms, review of acceptance test plans and test results, sign-off on construction payment applications, and attendance at monthly progress meetings with City and D/B firm to discuss all aspects of design/construction and resolution of issues.

Phase 2 and Marble Street/Main Street Rehabilitation

Town of Stoneham, Massachusetts

Project Engineer and Resident Inspection with the responsibilities of assembling the contract documents necessary for Stoneham, MA to bid these sanitary sewer rehabilitation projects. Also, assisted the Town in selecting a qualified contractor and provided Resident Inspection for construction. Projects consisted of approximately 14,000 LF of cured-in-place pipe lining, 9 open cut excavation spot repairs, and 1 open cut excavation pipe replacement.

Deer Island Treatment Plant North Main Pump Station Rehabilitation

Massachusetts Water Resources Authority, Boston, Massachusetts

Deputy Project Manager for the replacement of 10 variable frequency drives and 10 pump motors at the North Main Pump Station located at the Deer Island Treatment Plant. Responsibilities for this project included; coordination with the design group to ensure project deadlines are met and overall monitoring of design progress, presentation of design concepts and resolution of issues with the MWRA, field investigation work to aid in the design, budget tracking, monthly project reporting, including the monthly progress report, preparation of specifications and attendance at monthly project meetings.

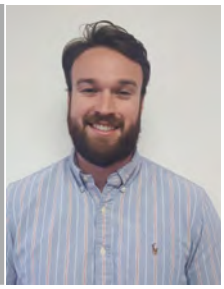
Deer Island Treatment Plant HVAC Building Automation and HVAC Units Replacement

Massachusetts Water Resources Authority, Boston, Massachusetts

Project Controls/Coordinator for the replacement of HVAC systems, laboratory fume hoods, and the building automation control system at Deer Island Treatment Plant (DITP). Project includes preliminary design, final design, and engineering services during construction, for these HVAC upgrades and improvements, which are mainly focused on the Administration and Laboratory Building, but also includes equipment and control work in many other buildings at DITP.

ERIC CATHCART

Field Support



EDUCATION

- BS Biology, Providence College, 2012

YEARS OF EXPERIENCE

- Total - 2 years
- With Arcadis - 2 years

Overview

Eric Cathcart was hired by Arcadis in February, 2014 as a Risk Assessment Intern in the Portland, ME office. He currently works full time as a Risk Assessment Scientist. Mr. Eric Cathcart's environmental experience has been focused on site assessments. Projects experience have included environmental due diligence assessments, human and ecological risk assessments, and environmental permitting. Mr. Cathcart's experience with environmental site assessments has been focused in the state of Maine, with other project experience in states including but not limited to New Jersey, California, New York, Missouri, Texas, Washington, Massachusetts, New Hampshire, Connecticut and Georgia. Throughout his time with Arcadis he has been involved in the various aspects of human risk assessment with a particular focus on vapor intrusion investigations for national and international sites. He also has experience with ecological risk assessment. His particular involvement in risk assessing has included: compiling analytical tables, writing investigative reports, assisting in CADD and GIS figure production, site recommendations, field sampling, and guidance documents reviews.

Project Experience

Phase I ESA and Environmental Audits – Solar Energy

Maine

Completed a facility Phase I ESA reports, including the site visit and environmental audit site visit, for a proposed solar photovoltaic installation. The environmental assessment included an environmental due diligence aspect, and was responsible for technical support and recordkeeping of provided facility documentation.

Environmental Site Assessment – Industrial Facilities

Maine

Assessed housekeeping activities at a chemical packaging and distribution facility. Assessed site practices according to ASTM standards internally for the client. Activities include the write up of the summary report, coordinator of site visit activities, and conductor of site interviews.

National VI Program

Develop and implement indoor air quality assessments for our client according to various state guidance's. Evaluate data to determine what, if any, mitigation measures are necessary. Coordinate with subcontractor's a field personnel to install mitigation systems according to state specific specifications if deemed necessary.

North Adams, Massachusetts

Coordinate a residential vapor intrusion sampling program for properties overlying an impacted groundwater plume. Oversee third-party utility clearance procedure prior to invasive, subsurface sampling activates. Interpret and evaluate the resulting data and determine if mitigation measures are necessary. Oversee installation of remediation systems, if deemed necessary.

Indiana, Various Sites

Oversee the installation of a vapor intrusion mitigation system and the closed cell foam sealing subcontractor. Oversee direct push drilling technique subcontractors as they assist in the collection of soil samples.

St Louis, Missouri

Design and implement a vapor intrusion study on a 50,000 square foot chemical handling facility. Oversee third-party utility clearance activities. Interpret data and report recommendations to client and state regulator.

Kenvil, New Jersey

Developed an ecological risk assessment for a TNT production facility which included trophic level modeling to evaluate different levels of the food chain. Determined proper remedial efforts and assisted in developing a pilot study to calibrate the remediation effort

Springfield, Massachusetts

Design and implement a vapor intrusion study on a 180-acre manufacturing site with multiple possible at risk buildings. Oversee third-party utility clearance activities. Interpret data and report recommendations to client and state regulator.

Nassau, Bahamas

Evaluate on-site and off-site properties following a petroleum leak. Perform data evaluation and risk calculations

California

Executed a risk assessment on exposed portions of an Air Force Base available to receptors

SEAN MITCHELL

Field Support

EDUCATION

- BS Environmental Engineer University of New Hampshire 2012

YEARS OF EXPERIENCE

- Total - 4 years
- With Arcadis - 4 years

Overview

Mr. Mitchell has broad experience in engineering consulting with a strong focus on sanitary sewer collection systems. He has worked on projects in the study, design and construction phase, participating in field work, evaluating data, as well as the design and bidding phases for projects in Massachusetts and Connecticut. He is familiar with the permitting process associated with working in roadway and easement and permitting issues that may arise when evaluating design options.

Project Experience

Infiltration and Inflow Removal Phase 2

Greater New Haven WPCA, New Haven, Connecticut

Project Engineer for a Sanitary Sewer Evaluation Survey (SSES) of Meter Areas 5, 9, and 13 in East Haven and the Middle Thorpe Drive Study Area in Hamden to identify excessive I/I sources. SSES tasks included evaluation of 120,000 linear feet of flow isolation data to make CCTV recommendations. 638 manhole inspections and 60,000 linear feet of CCTV data were evaluated and a cost effective analysis was developed to establish a cost effective approach to revitalizing the aging system. Various figures and tables were developed for the report to show characteristics of the system and to back up recommendations made. The report is expected to be completed by the end of 2013 and follow on rehabilitation design work is expected.

Phase III - I/I Rehabilitation Design and Bidding

Greater New Haven WPCA, New Haven, Connecticut

Project Engineer for the continuing I/I reduction program for the Greater New Haven Water Pollution Control Authority. The project consisted of design and bidding services for Area 10, Lower Farm River, Sewershed in East Haven, and the State Street Sewershed in Hamden. The Lower Farm River, Area 10, East Haven consists of 11,400 linear feet of sanitary sewer and 55 manholes being rehabilitated. The State Street Sewershed in Hamden consists of 23,350 linear feet of sewer and 145 manholes being rehabilitated. Design tasks included assisting with site plans, site visits for verification of manhole locations and conditions, and obtaining local inland wetlands permits. Design was completed in the spring of 2013 and construction begin in 2014.

Buckeye Permitting East Hartford and Rocky Hill

Buckeye Pipeline Company, East Hartford, Connecticut

Project Engineer for permitting assistance for two test pits and repair of a petroleum pipeline located within the flood protection system of the Connecticut River. Required permits included an Army Corps of Engineers Work Plan, Major Development Permit in Flood Hazard Zone and Inland Wetlands Permit from the Town of East Hartford and a General Permit for Water Resource Construction from the Connecticut Department of Energy and Environmental Protection. Permitting tasks included site visits, development of the permit applications and site plans, and presentations to the Town of East Hartford's Planning and Zoning Commission and Inland Wetlands Commission. Permits were obtained in 2012 and construction was completed in spring of 2013. During construction, tasks included coordination with town engineers and contractors and ensuring all construction activity was compliant with permit requirements.

Hartford Water Pollution Control Facility Wet Weather Expansion Project

The Metropolitan District, Hartford, Connecticut

Project Engineer for $400 million WWEP. Task included assisting with staging of potable water tie-ins and shutdowns during construction to ensure vital processes are not taken out of service and assisting the startup and developing the Standard Operating Procedure for the Temporary Sodium Hypochlorite Disinfection System for wet weather overflow.

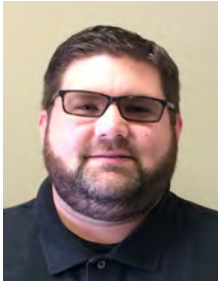
Phase II BRN Ca Services

The Metropolitan District, Hartford, Connecticut

Project Engineer for BNR upgrades project to implement improvements included in the Hartford Water Pollution Control Facility Master Plan. Project included upgrade of the six existing aeration tanks, upgrade and replacement of process equipment and new electrical, instrumentation and controls. Tasks included reviewing contractor submittals and revisions to Operation and Maintenance Manuals. Field tasks included assisting with loop checks and functional testing of all valves, gates, mixers and instruments for startup of aeration tanks.

JASON MARRELLA

I/I Analysis



EDUCATION

- BS Civil Engineering Lehigh University 2003

YEARS OF EXPERIENCE

- Total -13 years
- With Arcadis - 13 years

PROFESSIONAL REGISTRATIONS

- Fundamentals of Engineering (PA, Civil)
- Certified Construction Document Technologist (CDT), CSI
- NASSCO Pipeline, Lateral, and Manhole Assessment and Certification Programs (PACP, LACP, and MACP)
- Maryland Erosion and Sediment Control Certification (Green and Yellow Card)
- Delaware Sediment and Stormwater Management Certification (Blue Card)

Overview

Mr. Marrella has 13 years environmental engineering experience including condition assessment, design engineering, and construction management for collection systems. He has experience in municipal wastewater design, construction, and rehabilitation systems. Mr. Marrella's engineering experience includes: inflow/infiltration studies and infrastructure evaluations; conceptual through detailed construction design of gravity sewers and force mains; preparation of construction documents; and construction services.

Project Experience

I/I and Sewer Rehabilitation Program

Town of Wallkill, New York

Served as primary field lead and project engineer for the Phase II Infiltration and Inflow (I/I) study for 5 priority mini-areas. Data was collected and analysed for 20 weiring locations. 515 manholes were inspected with estimated contributing I/I rates. 58,000 LF of sanitary sewer were CCTV inspected, reviewed and PACP coded for defects and leakage. 4 of the 5 mini-areas were smoke tested. Access databases were developed for storage of data from manhole inspections, CCTV inspections and smoke testing. Dye testing was performed in selected areas. Photos and videos were digitally recorded. Developed recommendations and costs for I/I rehab and replacement of system components contributing I/I. Prepared contract documents (Phase III Stage I Design) for the sewer rehabilitation work including open cut replacement, cured-in-place pipe lining, pipe bursting and manhole rehabilitation

Highland Woods Trunk Line Assessment and Rehabilitation

New Castle County, New Castle, Delaware

Performed the condition assessment using PACP CCTV results, manhole inspections, trunk line walk and development of basis of rehabilitation for the Highland Woods project area. The project area consisted of 60 pipes and 10,000 linear feet of sanitary sewer. Prepared the rehabilitation design for the trunk line pipes and manholes.

Brandywine Hundred SSES

New Castle County, New Castle, Delaware

Member of the field team that performed smoke testing in to identify inflow sources in the North Brandywine and Naamans sewersheds which contained more than 200 miles of pipe. Notified residents of smoke testing procedure and purpose. Conducted smoke testing, manhole inspections, and basement sump pump and floor drain inspections. Photo-documented findings and entered results into GIS database.

Clearwater Elimination Pilot Program

New Castle County, New Castle, Delaware

Project engineer for effort to remove illicit clearwater connections such as sump pumps in targeted neighborhoods of North Brandywine encompassing over 600 residences. Tasks performed included conducting basement inspections of homes to identify clearwater connections and oversight of construction work to disconnect clearwater connections to the sanitary sewer system with typical types of work including adjustments to floor drains, french drains and sump pumps

Consent Decree Sewer Rehabilitation Program BOA

Washington Suburban Sanitary Commission, Laurel, Maryland

Design leader for the five-year consent decree program including 35 miles of PACP-based condition assessment and ensuing design of sewer rehabilitation and replacement projects. To support the WSSC sewer consent decree program, the project team produced design documents and provided construction observation and environmental compliance monitoring (COEM) services for projects located in Environmentally Sensitive Areas (ESA). The project areas include pipelines ranging from 6 to 84 inches in diameter as well as 500 manholes, 400 cleanouts and 1,400 laterals. Rehabilitation technologies included cured-in-place pipe lining, excavation and replacement, pipe bursting, and manhole lining.

Storm Sewer System Rehabilitation Program

Fairfax County MSM Division, Fairfax, Virginia

Design engineer for the rehabilitation design of 30,000 linear feet of stormwater conveyance pipes, channels, and related structures for the Catchment 126 project area. Conducted the condition assessment of pipes, channels and structures by reviewing PACP CCTV inspections of all pipes, inspecting all structures and making rehabilitation recommendations for each. Technologies included of cured-in-place pipe liners, packer injection grouting, and open-cut excavation and replacement of structures and pipes. Prepared construction documents for each type of rehabilitation work.

Inspection and Cleaning Program

DC Water, Washington, DC

Project Manager for the management and oversight of cleaning and inspection of the DC Water sewer system at a rate of 60-75 miles per year. Tasks include preparing bid packages, permits, and access agreements; identifying flow control, access and permitting issues and heavy cleaning needs; field locating of assets to be inspected; preparing cost estimates; negotiating task orders with contractors; reviewing PACP inspection deliverables; and recommending payment for completed work.

Brandywine Hundred 2009 Test and Seal Construction

New Castle County, New Castle, Delaware

Provided construction oversight for trenchless rehabilitation project using pipe joint and service connection testing and sealing (grouting) technologies. Project included rehab of 40,000 linear feet of 8”-12” diameter sanitary sewer mains, 750 laterals, and 10 manholes. 38 spot repairs were performed using Cured-in-Place methods.

Also provided coordination, field training of other inspectors, and oversight of post-construction warranty testing, and analysis of warranty testing results.

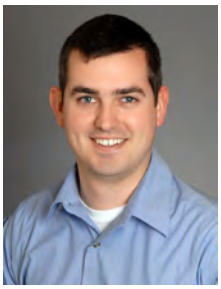
NA2 and Ashbourne Hills Manhole Rehabilitation Design

New Castle County, New Castle, Delaware

Performed condition assessment of 221 manholes located in the NA2 and Ashbourne Hills project areas. Assisted in making recommendation for rehabilitation utilizing technologies including manhole lining, chimney seal, injection grouting and rebuild and replace. Prepared bid package including plans, specifications and cost estimate. Prepared and obtained DelDOT permit. Provided bidding assistance, including evaluation of prequalification statements. Prepared and obtained Temporary Access Agreements.

DANIEL COOPER

I/I Analysis



EDUCATION

- BS Environmental Systems Engineer Pennsylvania State University-Main Campus 2007

YEARS OF EXPERIENCE

- Total - 9 years
- With Arcadis - 9 years

PROFESSIONAL REGISTRATIONS

- Fundamentals of Engineering - PA
- Construction Document Technologist
- NASSCO Pipeline, Lateral, and Manhole Assessment and Certification Programs (PACP, LACP, and MACP)

PROFESSIONAL ASSOCIATIONS

- Water Environment Federation
- Chesapeake Water Environment Association

Overview

Mr. Cooper's an experienced water resources engineer who has provided design and construction support for projects involving water, storm, combined, and sanitary sewer pipelines throughout the Mid-Atlantic region. He has led investigative field studies for the condition assessment of sanitary sewer pipelines and manholes and supporting rehabilitation prioritization while applying industry recognized NASSCO PACP standards. He is proficient with design phase services, including utility coordination, permitting, geotechnical investigations and reporting, contract drawing development utilizing AutoCAD, AutoCAD Civil 3D, and GIS, contract specification development, project management, and cost estimation.

Project Experience

Consent Decree BOA Sewer Rehabilitation

Washington Suburban Sanitary Commission, Laurel, Maryland

Project engineer for the development of sewer system rehabilitation & replacement plans and designs for two major sewer basins: Northeast Branch (42 sq. mi; 298 miles of sewer) and Parkway (14 sq mi; 140 miles). The sewer system rehabilitation & replacement work was organized into two sets of construction bid packages for each basin: work located within the road system; and work located within Environmentally Sensitive Areas (ESAs). This project was driven by a consent decree with EPA and the state environmental agency and is aimed at reducing wet weather overflows.

SP-23 Sewer Rehabilitation Design

New Castle County, New Castle County, Delaware

Assisted the Project Design Leader to determine the most applicable rehabilitation approach and develop the contract drawings and specifications for: Cured-in-place Pipe Lining contract, the Cleanout Installations contract, and the Lateral Lining contract for this subbasin project. This included the review of sonding information and figures from a subcontractor to determine the location of over 220 cleanouts and extent of the corresponding lateral liners to be installed, and preparation and negotiation of Lateral Rehabilitation Agreements to gain access to private properties to install cleanouts and rehabilitate the laterals. The series of rehabilitation projects for the SP-23 subbasin yielded 49%

reduction in I&I volume within the subbasin based on flow monitoring conducted before and after rehabilitation.

SP-27 Sewer Rehabilitation Design

New Castle County, New Castle County, Delaware

Assisted the Project Design Leader to determine the most applicable rehabilitation approach and develop the contract drawings and specifications for: Joint and Service Connection Grouting contract, Cured-in-place Pipe Lining contract, Cleanout Installations contract, Lateral Lining contract, and Manhole Rehabilitation contract for this subbasin project. The series of rehabilitation projects for the SP-27 subbasin yielded 69% reduction in I&I volume within the subbasin based on flow monitoring conducted before and after rehabilitation.

Sewer Capacity and Rehabilitation Program

Lehigh County Authority, Allentown, Pennsylvania

Performed the condition assessment for over seven miles of the Western Lehigh Interceptor which ranges from 24 to 36” in diameter. Assessment phase involved review of closed-circuit television inspections of all pipes, assigning physical condition ratings based on the condition of the assets including PACP defects, and making the recommendations for rehabilitation that would restore structural integrity and remove I&I.

Sewer Management Program

DC Water, Washington, District of Columbia

Responsible for drafting reports about major sewer assets for the client’s 2014 Sanitary Sewer Facilities Plan, which included the history from initial construction, previous assessments and rehabilitation, criticality, condition and risk assessments should an asset fail, and recommendations of future CIP projects. Responsible for developing remaining service life estimates for each major asset that led to the development of cost estimations for CIP budget prioritization purposes

I&I Study, SSES and Condition Assessment

Emerald Coast Utilities Authority, Pensacola, Florida

Performed SSES including night-time weiring in various locations across Pensacola to obtain baseline infiltration measurements for further SSES activities. Performed the condition assessment for about five miles of pipe in the downtown south area of the city involving the review of PACP CCTV inspections of all pipes, assigning physical condition ratings based on the PACP defects of the assets, and prepare recommendations for rehabilitation.

Old Shellpot Interceptor Rehabilitation

New Castle County, Wilmington, Delaware

Assisted in the design of access ways and interceptor rehabilitation plans for approximately 3.5 miles of interceptor located in largely inaccessible easements. Performed a field assessment of local topography to efficiently design the access ways. Assisted in the development of drawings and specifications. Also performed easement research and acquisition of legal access to private properties as needed to conduct the construction work. Performed prequalification of potential bidders for the Phase I portion of the project that included contacting references on past projects to confirm the contractors’ qualifications.

Crosslands Manhole Rehabilitation

Nichols Excavating, Middletown, Delaware

Provided construction oversight for the rehabilitation of 25 new precast manholes due to an improper precast material used that was not hydrogen sulfide resistant. Rehabilitation included the installation of a fiber-reinforced cementitious lining to create a barrier resistant to hydrogen sulfide degradation

Brandywine Hundred Construction Administration and Observation

New Castle County, Wilmington, Delaware

Provided construction oversight and construction administration support for sewer rehabilitation projects across the Brandywine Hundred system. Rehabilitation technologies included grouting of pipe joints and service connections, cured-in-place lining of mains and laterals, point repairs and various manhole rehabilitation technologies. Observed contractor activities to ensure compliance with specifications, completed daily reports, attended progress meetings, communicated with residents, and coordinated with the client. Served as inspector for the installation of 5,000 LF of 15-inch trunk sewer including a 250-foot installation by jack and bore method under a major thoroughfare

CHRISTOPHER RANCK, PE, BCEE, D.WRE, ENV SP

Hydraulics

EDUCATION

- MS Engineering University of Michigan-Ann Arbor

YEARS OF EXPERIENCE

- Total - 16 years
- With Arcadis - 4 years

PROFESSIONAL REGISTRATIONS

- Professional Engineer - HI
- Professional Engineer - IN
- Envision Sustainability Professional - ISI
- Diplomate, Water Resources Eng - National
- Board Certified Env Engineer - US

Overview

Mr. Ranck specializes in hydraulics and watersheds, including planning, modeling and design for wastewater, water and stormwater projects. He has particular expertise in hydraulic and water quality modeling, value engineering, combined sewer overflow (CSO) regulatory compliance and Long-Term Control Plan (LTCP) development, green infrastructure master planning, total maximum daily load (TMDL) development, pipeline condition assessment, and preliminary design. He was the first person in the state of Indiana to be awarded both the Diplomate of Water Resource Engineering (D.WRE) certification from the American Academy of Water Resources Engineers (AAWRE) and the Board Certified Environmental Engineer (BCEE) certification from the American Academy of Environmental Engineers (AAEE). He was the fourth person in the state of Indiana to be awarded the Envision Sustainable Professional (ENV SP) certification from the Institute for Sustainable Infrastructure (ISI).

Mr. Ranck also has performed advanced water treatment (AWT) hydraulic evaluation and design, CSO/AWT value engineering, drainage design, and polychlorinated biphenyl (PCB) remediation. He has developed several data management methods for linking hydraulic and water quality models to geographic information systems (GIS). He is an experienced user of SWMM, WASP, TAP, STORM, SSOAP, EPANET, MIKESWMM, MIKE URBAN, InfoWorks ICM, StormNET, WaterNetworks, KYPIPE, SLIICER, ArcView GIS, Spatial Analyst, and 3D Analyst

Project Experience

Interceptor Hydraulic Modeling

Citizens Energy Group

Served as Project Manager and Technical Lead for a 5-year continuous simulation of the full-system Indianapolis SWMM model. Developed custom model post-processing routines to evaluate alternate LTCP configurations and wrote a detailed technical memorandum. The technical memorandum served as the foundation for several value engineering initiatives.

Served as Citizens' hydraulic modeling liaison for sustainable initiatives, industrial discharge, private developer, and design team data requests. Provided technical review for hydraulic models developed by design teams.

Served as Project Manager and Technical Lead for the following sanitary interceptor model expansion projects utilizing SWMM and InfoWorks ICM:

- Belmont West: 2007
- Castleton: 2008
- West Marion County: 2008
- Bridgeport: 2009
- Lick Creek, Bean Creek, East Marion County Relief: 2010
- Nora, Williams Creek: 2011
- Upper Pleasant Run: 2011
- Upper Bridgeport: 2012
- Upper Fall Creek: 2012

Model expansion project tasks included flow monitoring coordination, sewershed delineation, model development, calibration, hydraulic assessment, and the technical report. The completed hydraulic assessments are used to assist in interceptor and lift station facility planning and design. The total length of interceptor model expansion for the seven projects is 130 miles.

In 2012, Mr. Ranck provided technical leadership and oversight for the conversion of the 9000-node EPA SWMM model to InfoWorks ICM. The converted model was successfully verified for consistency and accuracy with the legacy SWMM model.

CSO Long-Term Control Plan

City of Noblesville Wastewater Utility, Noblesville, Indiana

Developed and calibrated a planning-level NetSTORM model of the combined sewer system to characterize the combined sewer system and LTCP facility sizing. Assisted in the development of the LTCP alternatives analysis, cost estimation, implementation schedule, and report writing. Provided technical support in regulatory meetings with IDEM. The LTCP was approved in 2007.

Downtown Combined System Renovations (CIP 650719)

City of Columbus, Division of Sewerage and Drainage, Columbus, Ohio

Deputy Project Manager and Technical Lead for the development of combined sewer hydraulic profiles using GIS, record, and operational data. Confirmed the findings using the City's SWMM 4.4h model, and MIKEVIEW. Provided technical review on the basis-of-design report.

Wet Weather Flow Data Analysis

Knoxville Utilities Board, Knoxville, Tennessee

Reviewed GIS and flow data for the South Knoxville basin. Assisted in developing the wet-weather data review and analysis procedures; coordinated the sewershed delineation; and performed flow monitoring QA/QC, SHAPE analysis, and SWMM model simulations to evaluate the impacts of future growth.Reviewed GIS and flow data for the South Knoxville basin. Assisted in developing the wet-weather data review and analysis procedures; coordinated the sewershed delineation; and performed flow monitoring QA/QC, SHAPE analysis, and SWMM model simulations to evaluate the impacts of future growth.

Interceptor Hydraulic Model Expansion: South Marion County Regional and Belmont North

City of Indianapolis, Indianapolis, Indiana

Expanded the Indianapolis EXTRAN model to include additional sanitary interceptors, utilizing EPA SWMM and MIKESWMM. Project responsibilities included the development and execution of an advanced water consumption data geocoding process, and inflow/infiltration characterization using the SHAPE program. Developed the South Marion County Regional and Belmont North Interceptor Model Expansion reports.

U.S. 31 Hamilton County and U.S. 31 South Bend

Indiana Department of Transportation, Indianapolis, Indiana

Deputy Project Manager and Technical Reviewer for the drainage design associated with U.S. 31 expansions. Managed schedule and performed technical review for detention design, culvert sizing, and bridge hydraulic analysis for DNR/FIS permitting. Coordinated drainage analysis using HY-8, WinTR-20, Hydroflow Hydrographs, and HEC- RAS software packages

EDWARD KOWALSKI, PE, PMP

SCADA

EDUCATION

- B.Eng Electrical Engineering Hofstra University 1995
- BS Electrical and Computer Engineering Hofstra University 1995

YEARS OF EXPERIENCE

- Total - 16

PROFESSIONAL REGISTRATIONS

- Professional Engineer - NY
- Certified Construction Documents Technologist (CDT)
- LEED Green Associate
- Project Management Professional

Mr. Kowalski has over 16 years of experience in the planning, design, and specification of instrumentation & process control systems for water and wastewater treatment facilities. He has extensive experience in WWTP unit process controls, hardware and software selection, automation system configuration, checkout and startup, as well as management of project procurement and delivery for all facets of Supervisory Control and Data Acquisition (SCADA) systems.

Project Experience

Bay Park Sewage Treatment Plant Program Management Support

Nassau County Department of Public Works, NY

Quality control instrumentation and controls / SCADA engineer for multiple design projects for Tier I and Tier II facilities needing rehabilitation due to Hurricane Sandy. Designs include Dewatering Facility 30% design, new Effluent Pumping System 30% design, SCADA site coordination.

Yonkers Joint WWTP Post-Hurricane Sandy Rehabilitation - Phase III

Westchester County, NY

Design leader responsible for scoping of identified tasks and determination of rehabilitation method – replacement and/or mitigation. Responsible to coordinate instrumentation and controls, electrical and mechanical disciplines on project execution. Project included hazardous materials remediation. Worked with team to prepare detailed configuration budget to rehabilitate the plant's SCADA system in conjunction with the rehabilitation project work.

Wards Island Water Pollution Control Plant – Plant Stabilization 2 – BNR Treatment and Miscellaneous Improvements

New York City DEP, Bronx, NY

Responsible for Instrumentation design services during Construction and field/startup assistance for the BNR project for the 275 mgd plant. Modifications included RAS / WAS replacement and controls, plant aeration tanks and process air system installation for BNR, the addition

of a hypochlorite system to support process operations, upgrade of blower system including new control panels, cascade control automation, and overall SCADA system to link 12 aeration tanks (4 batteries). Successful implementation and loop tuning of automatic blower control and aeration DO control strategy.

Plant-wide Control System and SCADA System Upgrade

Stamford Water Pollution Control Authority / Stamford, CT

Project Manager for the ongoing plant-wide SCADA system upgrade project, involving migration from Honeywell PlantScape DCS to Allen-Bradley Control Logix PLC and GE Proficy Human Machine interface platform and installation of new secure SCADA network.

Coney Island WPCP Primary Settling Tanks Odor Control System (Contract 105)

New York City Department of Environmental Protection, Brooklyn, NY

Managed instrumentation/controls design, PLC/HMI configuration, and startup for odor control system consisting of 3 scrubbers, chemical addition, and 11 carbon absorbers with flow s of 55,000 cfm. Control system consists of 5 ControlLogix PLC panels linked over Ethernet fiber optic and the control room Factory Talk HMI.

Aeration and Final Settling Tanks Improvement Project

The Metropolitan District, Hartford, CT

Instrumentation and controls quality assurance/quality control for instrumentation and controls for 90 mgd plant expansion. The expansion included an addition of two aeration tanks and two final settling tanks and the upgrade of an existing RAS pump station. The upgrades also included A-B Compact Logix platform and DeviceNet valve network for all valves associated with both new aeration tanks and final settling tanks as well as the new valves in the existing RAS pump station.

Blower System Rehabilitation Project

Town of Greenwich, Greenwich, CT

Lead instrumentation designer for replacement of existing aeration blower system and associated process controls for the 19 mgd plant. System consists of three 250hp single-stage centrifugal blowers with automated control system. AB Logix platform selected for blower controls with Ethernet link back to the plant Foxboro DCS system. Coordinated interface between blower control strategy and existing automatic DO control strategy existing for optimal operational efficiency.

Headworks Rehabilitation Project

Town of Greenwich, Greenwich, CT

Lead instrumentation designer for rehabilitation of the headworks for the 19 mgd plant. System included four main sewage pumps, and a washer compactor system. AB Logix platform selected for blower controls with Ethernet radio link back to the plant Foxboro DCS system.

Plant Optimization and Automation Projects

Westchester County, Westchester County, NY

Planned, designed, managed and implemented SCADA upgrades and additions to all eight Department of Environmental Facilities' wastewater treatment plants ranging from 5 to 80 mgd. Close coordination with County IT department to setup secure reliable TCP/IP connections to 8 plants, 26 computer workstations and 50 remote facilities. Improvements included automation and optimization of screening, grit handling, chlorination, dechlorination, chemical addition, aeration tank DO control, primary and secondary sludge handling, blower controls. Designed and implemented a web platform for centralized SCADA monitoring and data collection/reporting for all 8 facilities and the 45+ pump stations in the collection system. Created working Standards documents currently in use by the County for instrumentation and controls design and SCADA implementation at the plants and pump stations.

ARCADIS Design & Consultancy for natural and built assets

FEDERICO ARANGO, PE

SCADA

EDUCATION

- BME Mechanical Design University of America (Colombia) 1999
- ME Environmental Engineering Manhattan College 2008

YEARS OF EXPERIENCE

- Total - 14 years

PROFESSIONAL REGISTRATIONS

- Professional Engineer - NY
- ABB Composer Automation Architect
- ABB Configuring Process Portal B Parts 1 & 2
- ABB Harmony Rack I/O Hardware
- CDT(Construction Document Technologist)
- Intellution Fix 32 Programming Software
- RSView SE Programming

Mr. Arango has extensive experience designing and specifying instrumentation and control systems for water and wastewater treatment plants. He is proficient in PLC programming, HMI and OIT configuration, LAN Network design, SCADA and Radio Telemetry Systems design, process loop checkout and start-up activities. In addition, he has been involved in CCTV system design and security vulnerability assessments.

Project Experience

Plant-wide Control System and SCADA System Upgrade

Stamford Water Pollution Control Authority / Stamford, CT

As I&C technical advisor, responsible for the SCADA upgrade work from the initial assessment/study, design up to the final implementation. It includes replacement of seven Honeywell PlantScape DCS system control panels, HMI and historian software. Control panels were retrofit with Allen Bradley Controllogix series PLC, Proficy iFix and iHistorian software what use HMI and data collection. The new SCADA system also includes a completely secure Ethernet network that allows safe remote monitoring of the system, alarm notification via emails and automatic report generation and delivery.

Alternative Water Supply for the Northern Kensico Bronx Pipeline UV Facilities

Westchester County / White Plains, NY

As Instrumentation & Controls discipline leader, responsible for the Design of the instrumentation and control of two UV facilities. One of them shall be integrated into the operations of a pump station owned by others. The design include hardwired interlocks between the pump station and the UV facility.

Provided design services during construction. Responsible for the submittal reviews of the UV reactors, instrumentation and redundant PLC system that will act as the Master Control, response to inquirers of contractors, and design or resolution of change orders.

Led the configuration of the control system at each UV facility. The configuration of each site consisted on programming a redundant Allen Bradley Controllogix PLC, Panel View Plus and a Micrologix 1400 that interface with the generator. The facility shall be connected to the County-wide SCADA system for monitoring, alarming and report generation.

Ultraviolet Disinfection Replacement

Town of Wallkill / Wallkill, NY

Led instrumentation and control system design team for the upgrade of the UV system. Project included remote alarming and monitoring of the UV system from the admin building. Communication were accomplished using 900 MHz unlicensed Ethernet radios. Commissioning successfully completed in 2015.

CatDel UV Disinfection Water Treatment Plant

New York City DEP / Valhalla, NY

Assisted during the startup phase and commissioning of the facility as part of the Construction Management team. Worked relentlessly at resolving issues, navigating commissioning, prodding contractors and designers, pushing commissioning and loop checks both hardwired and over communication link, witnessing testing, resolving complex control strategy issues, pushing for and resolving alarm issues, nuisance alarms, alarm floods, complex network communication issues, bridging the gap with operations and water quality staff. Verified system compliance to specifications and recommended best practices of extracting historical data for more than 65,000 point using Historian software. Overseen the development of regulatory reports and its automation.

WSA C4 Detailed Design

Williamsport Sanitary Authority / Williamsport, PA

Led instrumentation and control system design team for the upgrade of the central plant to a Control Logix PLC & Rockwell Automation HMI platform. Project included evaluating HMI software for both Central and West plants, instrumentation and control design for the headworks building, Primary and secondary settling tanks, BNR, denitrification filter, chlorination and de-chlorination systems of Central Plant. Assisted on the Design of the West Plant BNR implementation project.

Commissioning successfully completed in 2014.

Distributed Control System

Narragansett Bay Commission / Providence, RI

Design of I&C for Phase I of the Narragansett Bay Combined Sewer Overflow (CSO) Facilities Program. The design involved a 900 MHz license radio telemetry system to monitor and control a 350-feet deep-rock tunnel, underground storage facilities, a pump stations and seven drawdown flow control structures, and integration with the existing DCS network.

Provided design services during construction. Responsible for the submittal reviews of the Remote telemetry system, instrumentation and ABB DCS system, response to inquirers of contractors, and design or resolution of change orders.

Led the configuration of the ABB DCS unit that monitor and control the CSO tunnel and its underground structure. The configuration consisted on programming four bridge controllers and their back-ups, integration with the existing Infi 90 loop, 35 HMI screen and 1500 I/O points. The SCADA system consisted on two servers and three clients. Commissioning successfully completed in 2009.

SCADA Implementation

Walnut Valley Water District / Walnut, CA

Lead programmer responsible for development of new SCADA system for remote monitoring and control capabilities of over thirty sites from the Water District's central operations building. Work included: configuration of thirty remote Modicon PLCs, optimization of the Ethernet radio network and serial radio links, field testing of network communications with the SCADA system, loop checks and start up. Commissioning successfully completed in 2012.

FERNANDO PASQUEL, CPM

Green Infrastructure

EDUCATION

- MS, Civil Engineering/ Water Resources, Virginia Polytechnic Institute & State University, 1985
- BS, Civil Engineering, Virginia Polytechnic Institute & State University, 1981
- Master's Certificate in Project Management, University of Pittsburgh, Katz Graduate School of Business, 2006

YEARS OF EXPERIENCE

Total - 32 years

PROFESSIONAL REGISTRATIONS

- Certified Project Manager, PMLG

PROFESSIONAL QUALIFICATIONS

- Serves as Arcadis National Director for Stormwater and Watersehd Management
- Member of WEF Watershed Management Committee (Current Chair)
- Member of the Board of Directors, Center for Watershed Protection (2003 – 2012)
- American Society of Civil Engineers

Mr. Pasquel is a water resources manager with 30 years of experience in developing and implementing stormwater management programs that involve monitoring, modeling; policy analysis; establishing funding alternatives; permitting; and designing drainage systems, flood control structures, stormwater management controls and green infrastructure assets. He assisted several municipalities and agencies including New York City Department of Environmental Protection; Washington DC; and Fairfax, Chesterfield, and Henrico Counties and City of Alexandria, VA with implementation of stormwater masterplans, designing of BMPs and green infrastructure, and development of program effectiveness indicators and alternative monitoring programs. Mr. Pasquel manages multidisciplinary programs/projects requiring the expertise of hydrologists, landscape architects, ecologists, environmental scientists, engineers, public information and GIS specialists, project managers, and economists.

Project Experience

Project Tracking and Asset Management System

New York City Department of Environmental Protection Office of Green Infrastructure, NY

Subject Matter Expert supporting the delivery of project monitoring and quality assurance services to evaluate, select, and implement a green infrastructure Project Tracking and Asset Management System (PTAMS). The system will facilitate compliance with DEP amended Consent Order; track green infrastructure assets from concept development and planning to design, construction, and maintenance; and will include a database, GIS mapping, asset management. He is also serves as QA/QC lead and technical advisor for several NYC GI design projects.

Low-Impact Development (LID) / Green Infrastructure (GI) Implementation Projects

Washington DC, Fairfax County and City of Alexandria, Virginia

Led a team in the planning, design, and implementation of several sustainable LID/GI projects at the site and watershed level. Participated in stakeholder meetings and project management activities.

General Engineering Services for Design of Green Stormwater Infrastructure (GSI)

Philadelphia Water Department, Pennsylvania

Program Manager responsible for overall program/ project execution and leading design teams. GSI improvements are located in the urban environment at various publicly owned sites. These locations include streets, alleys, parking lots, schools, parks and recreation properties, and vacant lots. The improvements include disconnecting imperious areas, stormwater street bumpouts, subsurface infiltration beds, bioswales and tree trenches. Coordinate client services.

Design Manuals and Training

He has coauthored BMP/LID/green infrastructure manuals in Pennsylvania (1998 BMP Handbook for Developing Areas), Virginia (1992 Northern Virginia BMP Handbook and 2007 LID Design Supplement) and WEF (2014 GI Implementation - Chapter on Financing Strategies). He has conducted over 71 workshops covering all aspects of water resources management, including the use of green infrastructure for stormwater management and flood risk management.

Stormwater Engineering Services

Loudoun County, VA

Project director and task leader for a team that completed a variety of stormwater engineering tasks. Developed comprehensive public information and outreach program for the County's MS4 program; conducted an organizational analysis of the County's Public Works and Facilities Maintenance departments; and conducted a study to investigate potential sources of sedimentation accumulating in a stormwater facility. Also supported the development of cost estimates and evaluation of policies for compliance with the Chesapeake Bay TMDL.

Watershed Planning and Stormwater Improvements Project

Metropolitan Saint Louis Sewer District, MO

Task leader for the development of a stormwater detention policy and watershed management strategy to integrate the combined sewer overflow (CSO), sanitary sewer overflow (SSO), and stormwater permit requirements.

Little Calumet River / Cal Sag Channel Gray/Green Infrastructure Pilot Program

Metropolitan Water Reclamation District of Greater Chicago, IL.

Technical Advisor for the development of a stormwater master plan to redefine urban drainage with technically feasible, innovative green infrastructure solutions that take into account wet weather vulnerability risks, hydraulic model analysis, and long-term capital planning. The master plan includes green and gray solutions to minimize flooding, optimize water quality, spur economic development, and improve quality of life for local residents.

Watershed Management Professional Engineering Services

Chesterfield County, VA

Project Director for a 5 year contract to assist with the development of a compliance plan for the stormwater MS4 permit and Chesapeake Bay TMDL requirements. The project also involves development stormwater management plans, identification of green infrastructure/stormwater control measures to achieve compliance, and development and implementation of a stormwater systems inspection program.

JERRY KLEYMAN, PE, BCEE, ENV SP

CSO Abatement

EDUCATION

- MS, Civil and Environmental Engineering, State University of New York, Buffalo, 1994
- BS, Civil/Structural Engineering, Moscow Engineering Institute, 1984

YEARS OF EXPERIENCE

- Total - 29

PROFESSIONAL REGISTRATIONS

- Professional Engineer: NY
- Board Certified Environmental Engineer
- Envision Sustainability Professional

Overview

Mr. Kleyman worked on wet weather planning studies and completed Long-Term Control Plans (LTCPs) for numerous facilities with wet weather capacities ranging from 6 to 600 mgd. He serves as Arcadis' Global Leader for Water Conveyance and NYWEA Green Infrastructure Task Force member. Mr. Kleyman's area of expertise is maximizing CSO reduction and other benefits of GI programs. He served as technical manager for a recently completed multi-year CSO compliance planning program for Buffalo Sewer Authority. The final LTCP approved by USEPA included a cost-effective balance of green and grey technologies, increased the level of control and reduced the compliance costs by 30% as compared to the original plan.

Project Experience

Preliminary Design Services for GI Work in Connection with Newtown Creek DEP Priority CSO Tributary Area (NCQ-077)

DDC, NY

Arcadis Project Manager for ongoing Preliminary Site Assessment, Hydraulic Evaluations and Field Reconnaissance Task Order (No. 1) for 175 ROW Bioswales and Green Streets in DEP priority Tributary Area NCQ-077. Technical advisor for ongoing design phase.

Preliminary Green Infrastructure Design

Bridgeport Water Pollution Control Authority, Bridgeport CT

Technical advisor for an ongoing project to select GI technologies and develop preliminary GI design within the downtown area of the City to reduce CSO discharges and minimize the need for additional gray improvements. Project activities include state-of- the-art 2D H&H modeling, site selection, GI technology evaluations and citywide standard development.

CSO Long-Term Control Plan

Buffalo Sewer Authority, Buffalo NY

Technical manager for a multiphase CSO Long-Term Control Plan (LTCP). Phase 1 involved system mapping, data collection, development of a system-wide hydraulic model, CSO control alternatives and incorporating them into a comprehensive system-wide LTCP. Phase II involved

additional collection system and water quality sampling and model refinement activities. Phase III included development and evaluation of additional CSO control alternatives including system- wide green infrastructure, innovative technologies and real-time control evaluations. The final LTCP has been developed per US EPA administrative order requirements and recently accepted by US EPA

LTCP

City of Bridgeport, Bridgeport CT

Technical advisor for the development of a LTCP for CSO abatement. Project included development and evaluation of CSO control alternatives, receiving water quality evaluations, affordability analyses and an implementation schedule preparation.

Upper Allegheny Basin Planning

Allegheny County Sanitary Authority, Pittsburgh, PA

Project manager for the recently completed ALCOSAN Upper Allegheny Basin Wet Weather Planning project. Project involved development and calibration of combined and separate sewer system hydraulic models, and evaluating overall wet weather flow management alternatives for the ALCOSAN facilities as well as a number of customer municipalities' combined and separate sanitary sewer systems. Evaluated alternatives for the ALCOSAN and customer municipalities included a wide range of green source control, green infrastructure, conveyance, and storage and treatment technologies.

Williamsport Sanitary Authority Act 537 Facilities Plan, CSO and BNR Study

Williamsport Sanitary Authority, Williamsport, PA

Project manager for comprehensive facilities planning to address two regulatory requirements for the Williamsport Sanitary Authority- Enhanced Nutrient Removal (driven by the Chesapeake Bay Nutrient Reduction Program) and revision of their CSO control plan. The studies involved an evaluation of a range of compliance alternatives and identification of the environmental benefit for each. The LTCP has been developed per USEPA administrative order requirements and approved by US EPA (Region 3) and PA DEP.

Combined Sewer Overflow Management and Control Program

Capital Region Water, Harrisburg, PA

Technical advisor for the development of a comprehensive CSO management and control program, which included all aspects of CSO planning such as flow monitoring, collection system modeling, water quality monitoring and modeling, and alternatives evaluation. Project manager for a nitrogen removal study at THAs high-purity oxygen advanced wastewater treatment facility. The first milestone for this program included development of a detailed Action Plan. The Action Plan outlined the major activities and implementation schedule to complete the CSO management and control program. The major activities include:Planning and implementation of a field data collection program, flow monitoring and water quality sampling and testing programs.Development of a computerized conveyance system hydraulic model and existing system characterization.Development and evaluation of alternatives for CSO abatement. Selection of recommended alternative and completion of LTCP report. The planning and implementation of the field data collection program have been completed and the modeling and system characterization activities are currently underway. The project also involved a study that examined modification of the existing secondary process at the AWTF to accommodate nitrification and denitrification, as well as separate processes for nutrient removal.

ARCADIS Design & Consultancy for natural and built assets

CITY OF PORTLAND

PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

APPENDIX A. REQUIRED FORM

Request for Proposal
For
Planning and Engineering Services
For a Infiltration and Inflow Program
Of the Sanitary Sewer System

RFP # 3217

**** THIS SHEET MUST BE INCLUDED IN YOUR PROPOSAL ****

The undersigned hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, that it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same, and that no person acting for or employed by the City of Portland is directly or indirectly interested in this proposal or in any anticipated profits which may be derived there from.

The undersigned hereby declares that they have read and understand all conditions as outlined in this Request for Proposals, and that the proposal is made in accordance with the same.

The bidder acknowledges the receipt of Addenda numbered: N/A

COMPANY NAME: Arcadis U.S., Inc.

AUTHORIZED SIGNATURE: Jennifer K. Lachmayr

DATE: November 23, 2016

PRINT NAME & TITLE: Jennifer Lachmayr, PE, BCEE / Principal-in-Charge

ADDRESS: 500 Edgewater Drive, Suite 511, Wakefield, MA 01880

E-MAIL ADDRESS: jennifer.lachmayr@arcadis.com

PHONE NUMBER: 718-213-4923 FAX NUMBER: N/A

TYPE OF ORGANIZATION - PARTNERSHIP, CORPORATION, INDIVIDUAL, OTHER: Corporation

STATE OF INCORPORATION, IF APPLICABLE: Delaware

FEDERAL TAX IDENTIFICATION NUMBER (Required): 57-0373224

NOTE: Proposals must bear the handwritten signature of a duly authorized member or employee of the organization submitting a proposal.

CITY OF PORTLAND, MAINE

Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

RFP#3217

Current Date: November 18, 2016

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

****

ALL PROPOSERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY ACKNOWLEDGED ON THE RFP PROPOSAL FORM OR BY THE INSERTION OF THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.

****

MATTHEW FITZGERALD
PURCHASING MANAGER

Please find on the following pages our response to questions received related to this RFP. This will be the one and only addendum and we will be unable to respond to any further questions.

Receipt of **Addendum No. 1** to the City of Portland's **RFP #3417: Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System** is hereby acknowledged.

COMPANY: Arcadis U.S., Inc.

NAME: Jennifer Lachmayr

SIGNED BY: _____ DATE: November 23, 2016

PRINT NAME & TITLE: Jennifer Lachmayr, PE, BCEE / Principal-in-Charge

ADDRESS: 500 Edgewater Drive, Suite 511

Wakefield, MA 01880

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CITY OF PORTLAND

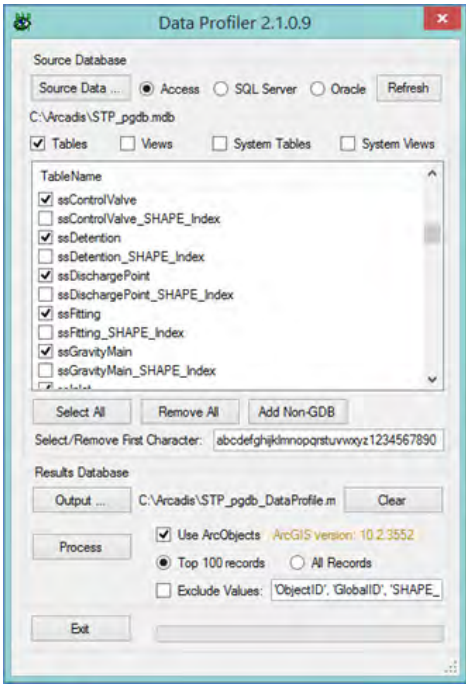
PLANNING AND ENGINEERING SERVICES FOR A INFILTRATION AND INFLOW PROGRAM OF THE SANITARY SEWER SYSTEM

APPENDIX B. ADDITIONAL INFORMATION

APPENDIX B. ADDITIONAL INFORMATION

COST SAVINGS TOOLS

ARCADIS *DATA PROFILER™*



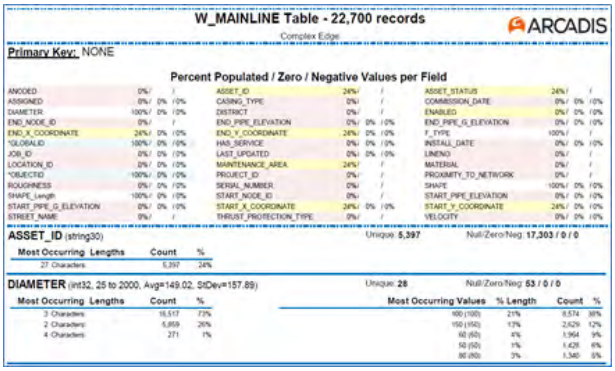
The Arcadis Data Profiler is used to analyze GIS and other databases for completeness and consistency. Arcadis uses the Data Profiler to identify data gaps, relationships between database tables and views, and to compare different versions of data.

The Data Profiler has a simple interface that allows the user to perform the following steps:

1. Select the source database (the City's Sewer GIS)
2. Display the database tables and/or views
3. Select the tables or view objects to analyze (which assets or attributes within the GIS you want to analyze)
4. Select the output results database
5. Specify options to use ArcGIS, include all values or exclude values

Output Data / Views

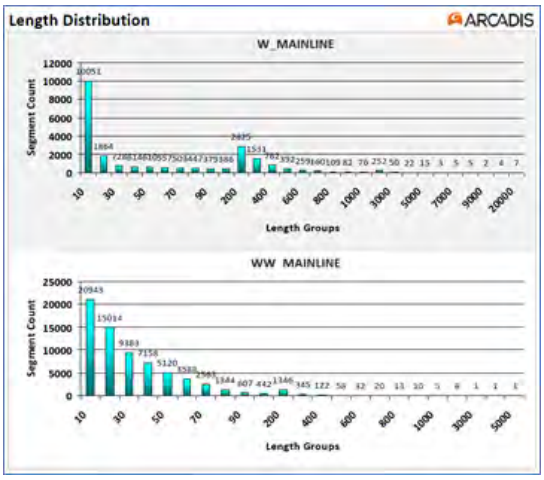
The results are stored in a Microsoft Access database that contains queries and reports about the data.

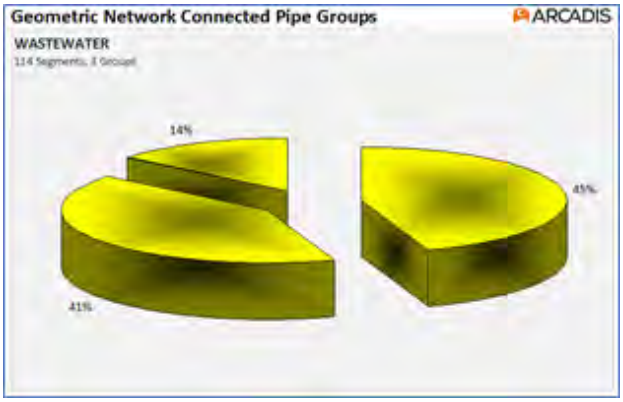


The primary "Table Analysis" report lists the profiled database object names and their record counts. Empty objects are highlighted red and tables without a Primary Key are highlighted yellow. Each field is listed with the percent populated, zero and negative values. Details are listed for each field regarding their data type and range of values.

GIS specific functionality reports on the types of geometric features, domain values, length distribution of records and geometric network connectivity.

Arcadis Data Profiler provides a quick understanding of large datasets by quantifying their content and enabling prioritized recommendations for filling data gaps and correcting or enhancing a utility's data.





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Wakefield, Massachusetts 01880
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www.arcadis.com

City of Portland, ME

Proposal for Planning and Engineering Services for Infiltration/Inflow Program

Scope of Services

Project Background and Goals

On September 29, 2012, the EPA issued an Order for Compliance and Complaint, including a proposed civil penalty, for sanitary sewer overflows (SSOs) from non-permitted portions of the City of Portland's collection system. In accordance with that Order, the City completed a "Capacity, Management, Operation and Maintenance (CMOM) and Corrective Action Plan" Report in November of 2013. The recommendations of the CMOM Report included an Infiltration/Inflow (I/I) Removal and Monitoring Program, as well as making improvements to the City's collection system GIS by supplementing and correcting data gaps. This I/I Program will address those recommendations and set the course for I/I mitigation and the City of Portland's continuing efforts to abate SSOs from the sanitary collection system.

Portland's collection system consists of 240 miles of separated and combined sewers and 9 Pump Stations. For the collection system, the CMOM study evaluated the City's infrastructure primarily by modeling asset conditions and using "risk-based" analysis to identify and prioritize renewal needs. Of the 6,977 pipe segments analyzed, 95% were determined low priority for placement, and only 1% were found to be high priority for renewal. However, for this I/I Program, prioritizing assets for I/I investigations and rehabilitation needs based on the likelihood and consequence of failure (risk-based analysis), does not necessarily target or address infiltration and inflow mitigation. As such, the City plans to conduct a well-structured I/I Program, monitoring flows within the collection system, locating and quantifying I/I, prioritizing I/I removal needs, and implementing cost-effective, high priority I/I removal projects. To assist the City of Portland with these initiatives, Arcadis proposes to complete the following Scope of Services on behalf of the City.

Task 1: Project Management

Project management will be provided throughout the three-year contract duration and includes: coordination and meetings with the City of Portland and other City entities, stakeholders, staff and subcontractors; presentations to the City at the completion of each task or key milestone; scheduling and management of staff resources; quality assurance/quality control; budgeting, cost controls and monthly billing; progress reports; and development and enforcement of a project-specific Health and Safety Plan.

Task 1 deliverables will include:

- Meeting agendas and minutes
- Project Health and Safety Plan

- Progress reports, schedules and budget updates
- Slide show presentation to the City annually, or at the completion of key milestone tasks, outlining work completed, progress made, Infiltration and Inflow identified and proposed next steps for the I/I Program
- Updates and suggested budgets for anticipated, related work and costs to be incurred as required to complete the services under the I/I Program, including:

    - ✓ Water use and debris disposal costs associated with field work.
    - ✓ Police details/traffic control where needed for field work.
    - ✓ Access to private property facilitated by the City.
    - ✓ Updates to the City's website.

Task 2: Kickoff Workshop, Data Gathering, Public Participation

Arcadis proposes that the project begin with a Kickoff Workshop amongst DPW staff, Arcadis and any other parties you suggest. We have assumed a two-day, in-person workshop, to be followed by continued discussions and coordination as the final approach and schedule is shaped. At the Workshop, we will discuss project goals, individual tasks, project schedule, personnel, responsibilities, lines of communication and coordination protocols.

- Prior to the Workshop (and during the Workshop), we will collect and review any available, pertinent data regarding your collection system, including GIS and other mapping, the collection system hydraulic model, metering data and other pertinent reports, studies, and data from past or on-going sewer system investigations.

This task also includes Public Participation meetings and preparation of informational materials for use related to field activities or other desired discussion topics. We have assumed two meetings per year over the three-year contract term, and will provide additional information for the City to add to the City or DPW website, or to utilize through other public outreach mediums.

Task 2 deliverables will include:

- Agenda and goals for the Project Kickoff Workshop
- Letter or memorandum summarizing Kickoff Workshop discussions, conclusions, and decisions regarding the course of the I/I Program
- Agendas and necessary materials for Public Participation meetings
- Sample public information notices and bulletins for the City to disseminate through the City website or other media outlets

Task 3: Data Gap Analysis

GIS Gap Analysis

Arcadis will utilize our *Arcadis Data Profiler* program to complete a gap analysis of the City's GIS and make recommendations for filling the data gaps. We will review the data gaps with the City's staff to ensure that you know what missing information needs to be obtained.

Arcadis will use Data Profiler to identify data gaps, relationships between database tables and views, and to compare different versions of data. Data Profiler's interface allows us to:

- Select the source database (the City's Sewer GIS)
- Select which assets or attributes to analyze
- Create the output results database to allow for identification of data gaps

In addition to utilizing Data Profiler, and in conjunction with the data gathering conducted under Task 2, Arcadis will collect and review reports, record drawings, operating and maintenance manuals and other GIS information, as necessary to gain a full understanding of the wastewater collection system and assess missing asset information.

Wherever field investigations conducted under other Tasks of the I/I Program coincide with GIS data gaps, we will collect and provide information for the City to fill the data gaps. For example, if we are inspecting a manhole where there is missing information on system connectivity or flow direction, we will record this information and relay it to the City to update the GIS.

Hydraulic Model Gap Analysis: Arcadis will evaluate the City's hydraulic model(s) and determine if the modeled network should be expanded and if the model should be recalibrated. We will make recommendations for updating or improving the model by adding data points or other information, to support the I/I Program or any related programs the City is undertaking.

Wherever field investigations conducted under other Tasks of the I/I Program coincide with hydraulic model gaps, we will collect and provide information for the City to fill the model data gaps.

Background Information and Gap Analysis Report, which will summarize the existing information, data and reports which have been reviewed and state the findings and recommendations from the GIS and Hydraulic Model Gap analysis.

Task 3 deliverables will include:

- *Background Information and Data Gap Analysis Letter Report*, including recommendations for the City to update the Sewer GIS and hydraulic model(s) to close or correct data gaps.
- Meeting with the City to discuss the Gap Analysis Report recommendations

Task 4: Flow Monitoring Program

Under this Task, Arcadis will assist the City with developing a flow monitoring strategy that includes review of recommended meter sites from the CMOM report, identification of other suitable sites, field verification of these sites, recommendation of initial sites, installation of flow monitoring equipment and data collection and maintenance procedures for the flow monitoring equipment. In conjunction with implementation of the flow monitoring program, we will superimpose rain data on wastewater collection system flow data and identify excessive infiltration and inflow study areas.

The flow monitoring program will consist of:

- Installation, maintenance and monitoring of 40 flow meters (over a two-year program)
- Each meter will be in operation for a period of 12 weeks (480 meter-weeks in total)
- One permanent groundwater gauge and one rainfall gauge, both of which can be supplemented with additional gauges which already exist within the City.

Prioritization of meter locations will take into consideration a number of factors and sources of information, including:

- Recent and on-going flow monitoring and CCTV data
- Historic and recently discovered problem areas, where back-ups, surcharging, and overflows have occurred
- Areas which may not have known back-ups and overflows, but are tributary to areas which have had such problems
- Areas where the hydraulic model indicates potential I/I related capacity issues, such as those related to wet weather events or high groundwater periods
- Areas near water bodies and areas which are tidally influenced
- The oldest and most densely populated areas of the collection system

Tidal Impacts: A considerable portion of Portland's collection system is in close proximity to tidally influenced water bodies, including Back Cove, Capisic Brook, Portland Harbor and the Fore River. I/I from tidal influences could result from leaking pipes allowing groundwater to enter the system, or from tidal waters entering manholes covers which are not watertight. This influence might be seen during normal high tides (twice daily), or just during extreme (full moon) high tides. Tidal impacts on sanitary and combined sewer flows can be evaluated by looking at collection system flow fluctuations with groundwater and tidal data, particularly during extreme high tides. In certain locations, we will assess the use of salinity gauges during extreme high tides in evaluating tidal impacts.

Engineering Analysis of Flow Data: Arcadis will provide engineering analysis of flow data, including calculation of average daily flow, peak daily flow and peak hourly flow for each meter area. We will quantify infiltration and inflow by meter area and for entire metered system. Meter areas will be ranked by quantity of infiltration and inflow, and follow-on investigation recommendations (SSES activities, per Task 5) will be made according to those prioritized rankings to further investigate major I/I sources. We will provide a summary flow monitoring report for each year of flow monitoring and meet with the City to discuss findings and SSES recommendations.

Task 4 deliverables will include:

- Meeting with the City to discuss the Flow Monitoring Program strategy and implementation
- Annual "Flow Monitoring Program Letter Report", with findings, results and SSES recommendations

Task 5: Investigation of Major I/I Sources - Sewer System Evaluation Survey (SSES)

Under this Task, Arcadis will develop and conduct a collection system I/I investigation strategy that includes flow isolation, closed circuit television (CCTV) inspections, manhole inspections, smoke testing, dye testing and building inspections as appropriate to identify major source of I/I.

SSES Investigations

We have assumed that the following units of field investigations and SSES activities will be completed:

- Flow isolation: 317,000 LF, representing 25% of the collection system
- Pipeline cleaning and CCTV: 76,000 LF, representing 6% of the collection system
  - We propose to analyze this quantity of CCTV video, plus an additional 76,000 LF of CCTV video to be obtained under your separate, annually CCTV contract
  - The total linear footage of CCTV to be analyzed will be approximately 152,000 LF, representing 12% of the collection system.
  - We have also assumed a mix of large and small diameter pipes, and some light and some heavy cleaning, based on past experience.
- Manhole inspections: 956 manholes, representing 15% of the collection system
- Smoke testing: 126,700 LF, representing 10% of the collection system
- Dye testing: 10 days
- Large building inspections: 45 buildings
- Large building dye testing: 15 days

Percentages are based on the entire (presumed) 240 miles of sewers and 6,375 manholes in your collection system, which includes both combined and separated sewers.

CCTV Inspections: The CCTV inspection work will be accomplished with a combination jet vacuum truck and mobile television studio truck with two operators. All observations, pipe defects and I/I sources will be recorded in an electronic database with digital pictures and digital movie clips for each line segment. Digital video files on DVDs will be provided after the conclusion of the inspection work. Two hard copies of the reports will also be provided.

We understand that the City will budget separately from this contract for costs associated with water supply, sewer cleaning debris disposal, access to private property or easements and police details, as needed.

The CCTV inspection database will be delivered to the City in Pipeline Assessment and Certification Program (PACP) format and inspection video files will be provide in .mpg format.

Infiltration and inflow (I/I) will be estimated and rehabilitation recommendations will be made as described below.

Manhole Inspections: Manhole inspections will utilize Arcadis' or its subcontractor's Standard Manhole Inspection Form and will document the following information:

1. Manhole identification by number;
2. Manhole cover type, number of holes in cover, whether cover is subject to ponding;
3. Condition of manhole frame and number of manhole grade adjustments;
4. Cracks or breaks in the walls, shelf, or invert;
5. Infiltration, at any place, estimated in gallons per minute (GPM);
6. Integrity of joints between barrel sections;
7. Construction materials and condition;
8. Manhole depth;
9. High water mark;
10. Groundwater level at manhole, if monitored;
11. Condition of the corbel
12. Condition of steps; and
13. Digital photographs of each manhole.

The influent and effluent sewer lines connected to the manholes will also be inspected by lamping during internal manhole inspections. The following information will be recorded:

1. Length, size and type of pipe;
2. Offsets or misalignment of any part;
3. Protruding taps;
4. Root intrusion;

5. Visible infiltration/inflow sources estimated in gallons per minute (GPM);
6. Type and depth of debris in pipe;
7. Sluggish flow or wastewater backing up into manhole
8. Condition of pipe or corrosion; and
9. Digital photographs of each influent and effluent sewer.

The influent and effluent sewer lines connected to the manhole will be observed from the ground surface to document the relative direction of the sewer lines during surface manhole inspections. Pipe sizes and flow characteristics will be noted when possible.

Manhole inspection field data will be evaluated and summarized. Individual log sheets of each manhole inspected will be prepared. The summaries of the manhole inspection will include all observed infiltration contributed to the sanitary sewer system, all defects and other abnormalities, and potential extraneous flow sources. Sewer line configurations will be verified and information will be provided to the City for the City to update the Sewer GIS, as needed.

Condition Assessment and Rehabilitation Recommendations

ARCADIS will analyze all data collected by the field crews to isolate and identify sources of I/I in the system. Field data to be analyzed includes all information collected during SSES activities: CCTV and manhole inspections, flow isolation, smoke testing, building inspections and dye testing. All information will be collected, stored and submitted to the City in accordance with standard geodatabase format for the City to import into its GIS if desired.

The collection system condition assessment deliverable will include a listing of all sources of I/I identified during the SSES activities and recommendations for rehabilitating or replacing each deficient component of the sewer system contributing excessive I/I. For all SSES activities, I/I will be estimated and rehabilitation recommendations will be made. A schedule for implementing the recommended rehabilitation/replacement measures, including engineering design and construction, will be included.

Task 5 deliverables will include:

- CCTV inspection database in Pipeline Assessment and Certification Program (PACP) format and inspection video files in .mpg format
- Manhole inspections database and logs
- Field logs and databases for all other SSES activities: flow isolation, smoke testing, building inspection and dye testing results and recommendations

The above deliverables will be included in the final *Wastewater Collection System Analysis and Action Plan* Report described below under Task 6. The report will include recommendations,

budgetary cost estimates and an implementation plan developed from the analysis of the SSES findings.

Task 6: Wastewater Collection System Analysis and Action Plan

This task will consist of developing and presenting a report with recommendations for sewer system rehabilitation and renewal for I/I reduction to meet the requirements of the EPA Order for Compliance. This will include a short-term (2-5 year) and long term (10-year) I/I Mitigation Capital Improvement Plan, the development of which will be closely coordinated with the DPW.

Under this task, Arcadis will work with the City to determine strategies to reduce inflow and infiltration into the wastewater collection system, establish priorities for rehabilitation, repair and replacement projects, and prepare associated cost estimates and implementation plans.

The *Wastewater Collection System Analysis and Action Plan* Report will summarize all data, information, evaluations and findings and recommendations. The Report will include results from all phases of the project, and will include an Executive Summary and recommendations for I/I removal and sewer system rehabilitation.

Results of the flow monitoring program and SSES activities will be summarized, and all data, logs, videos and other field-collected data will be provided. Draft versions of the report outline and final report will be submitted for review and comment by the Portland DPW. We will prepare and deliver paper and electronic copies and present the Final Report to the appropriate officials.

Long-term Flow Monitoring: Under this Task, Arcadis will also evaluate the benefits of a long-term flow monitoring program. This will include consideration of such benefits as: comparison of pre- and post-rehabilitation flow data to track the effectiveness of I/I removal projects; continued compliance with the EPA Order and Corrective Action Plan; updates for your hydraulic model; and identification of new I/I issues which may arise as the collection system ages and other future changes impact the system.

The final *Wastewater Collection System Analysis and Action Plan* Report will include:

- A summary of our review of existing data and past and ongoing related studies and projects
- A clear explanation of our methodology for developing the flow monitoring and SSES strategies
- Maps and plans showing the selected meter areas and meter locations
- A detailed explanation of how metering data was analyzed, verified, and utilized to calculate the various flow components

- A description of how we used the Flow Monitoring Program results to prioritize meter areas for targeted follow-on SSES
- A summary of SSEES activities, findings and recommendations (see Task 5 deliverables)
- Cost estimates and a schedule for conducting cost- effective Sewer System Rehabilitation Contracts and other I/I removal activities
- Recommendations for a future permanent flow monitoring program (including recommended meter locations)

Task 6 deliverables will include:

- *Wastewater Collection System Analysis and Action Plan* Report
- Presentation of Final Report and recommendations to the City

Project Schedule

Attached to this Scope of Work is our proposed Project Schedule. We propose that data review and gap analysis tasks begin in the Spring of 2017 and that the first phase of flow monitoring begin in the Fall of 2017. As shown, we propose that the Flow Monitoring Program be implemented over two high-groundwater seasons, and that follow-on SSES activities follow each phase of flow monitoring. The proposed schedule has been developed with the goal of meeting the deadlines of the EPA Order of Compliance.

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 04/24/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Aon Risk Services South, Inc.
Franklin TN Office
501 Corporate Centre Drive
Suite 300
Franklin TN 37067 USA

CONTACT NAME:
PHONE (A/C. No. Ext): (866) 283-7122 FAX (A/C. No.): 800-363-0105
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	Greenwich Insurance Company	22322
INSURER B:	XL Specialty Insurance Co	37885
INSURER C:	XL Insurance America Inc	24554
INSURER D:		
INSURER E:		
INSURER F:		

INSURED
Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch CO 80129 USA

COVERAGES **CERTIFICATE NUMBER:** 570066198488 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X Contractual Liability GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:			GEC001076115 SIR applies per policy terms & conditions	01/01/2017	01/01/2018	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $1,000,000 $10,000 $1,000,000 $2,000,000 $2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY X Property Damage to SCHEDULED AUTOS NON-OWNED AUTOS ONLY			AEC001075815 AOS	01/01/2017	01/01/2018	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
B	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $10,000			UEC001075915	01/01/2017	01/01/2018	EACH OCCURRENCE AGGREGATE	$1,000,000 $1,000,000
C B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		RWD943516311 AOS RWR943516711 AK, WI	01/01/2017 01/01/2017	01/01/2018 01/01/2018	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	$1,000,000 $1,000,000 $1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Project Number: 66026980.0001. Town of Portland is included as Additional Insured in accordance with the policy provisions of the General Liability and Automobile Liability policies. A Waiver of Subrogation is granted in favor of City of Portland in accordance with the policy provisions of the Workers' Compensation policy.

CERTIFICATE HOLDER

City of Portland
Attn: Tiffany Mullen
389 Congress Street Room 211
Portland ME 04101 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Services South, Inc.

Holder Identifier : ABJFGHI

Certificate No : 570066198488

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ENDORSEMENT #

This endorsement, effective 12:01 a.m., 01-01-2017, forms a part of

Policy No. GEC0010761-15 issued to Arcadis U.S., Inc. and CallisonRTKL Inc.

by Greenwich Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location(s) Of Covered Operations
Any person or organization that you are required in a written contract or written agreement to include as an additional insured provided the "bodily injury" or "property damage" occurs subsequent to the execution of the written contract or written agreement.	Various
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or

2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or

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2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

All other terms and conditions of this policy remain unchanged.

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ENDORSEMENT #

This endorsement, effective 12:01 a.m., 01-01-2017, forms a part of

Policy No. GEC0010761-15 issued to Arcadis U.S., Inc. and CallisonRTKL Inc.

by Greenwich Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location And Description Of Completed Operations
Any person or organization that you are required in a written contract or written agreement to include as an additional insured provided the "bodily injury" or "property damage" occurs subsequent to the execution of the written contract or written agreement.	Various
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

All other terms and conditions of this policy remain unchanged.

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ENDORSEMENT #

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. AEC001075815 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by XL Specialty Insurance Company - US.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

AUTOMATIC ADDITIONAL INSURED

This endorsement modifies insurance provided under the following:

BUSINESS AUTO COVERAGE FORM
MOTOR CARRIER COVERAGE FORM
AUTO DEALERS COVERAGE FORM

A. **COVERED AUTOS LIABILITY COVERAGE, Who Is An Insured,** is amended to include as an "insured" any person or organization you are required in a written contract to name as an additional insured, but only for "bodily injury" or "property damage" otherwise covered under this policy caused, in whole or in part, by the negligent acts or omissions of:

1. You, while using a covered "auto"; or

2. Any other person, except the additional insured or any employee or agent of the additional insured, operating a covered "auto" with your permission;

Provided that:

a. The written contract is in effect during the policy period of this policy;

b. The written contract was signed by you and executed prior to the "accident" causing "bodily injury" or "property damage" for which liability coverage is sought; and

c. Such person or organization is an "insured" solely to the extent required by the contract, but in no event if such person or organization is solely negligent.

B. The Limits of Insurance provided for the Additional Insured shall not be greater than those required by contract and, in no event shall the Limits of Insurance set forth in this policy be increased by the contract.

C. **General Conditions, Other Insurance** is amended as follows:

Any coverage provided hereunder shall be excess over any other valid and collectible insurance available to the additional insured whether such insurance is primary, excess, contingent or on any other basis unless the contract specifically requires that this policy be primary.

All terms, conditions, exclusions and limitations of this policy shall apply to the liability coverage provided to any additional insured, and in no event shall such coverage be enlarged or expanded by reason of the contract.

All other terms and conditions of this policy remain unchanged.

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ENDORSEMENT #046

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. GEC001076115 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by Greenwich Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

ENDORSEMENT #023

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. AEC001075815 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by XL Specialty Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

ENDORSEMENT #031

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. UEC001075915 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by XL Specialty Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

ENDORSEMENT #

This endorsement, effective 12:01 a.m., 01-01-2017 forms a part of

Policy No. RWD9435163-11 issued to Arcadis U.S., Inc.

by XL Insurance America, Inc.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

This endorsement modifies insurance provided under the following:

WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY INSURANCE POLICY

In the event coverage is cancelled for any statutorily permitted reason, other than nonpayment of premium, advanced written notice will be mailed or delivered to person(s) or entity(ies) according to the notification schedule shown below:

Name of Person(s) or Entity(ies)	Mailing Address:	Number of Days Advanced Notice of Cancellation:
When required in a written agreement, per the most current schedule maintained by Aon Risk Services South, Inc. for Arcadis U.S., Inc., CallisonRTKL, Inc. and their subsidiaries furnished to XL Catlin 45 days prior to the effective date of cancellation.	On File	30

All other terms and conditions of the Policy remain unchanged.

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective 01-01-2017 Policy No. RWD9435163-11 Endorsement No.
Insured Arcadis U.S., Inc. Premium Included

Insurance Company
XL Insurance America, Inc. Countersigned by _____

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ENDORSEMENT

This endorsement, effective 12:01 a.m., 01-01-2017 forms a part of

Policy No. RWD9435163-11 issued to Arcadis U.S., Inc.

by XL Insurance America, Inc.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

This endorsement modifies insurance provided under the following:

WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY INSURANCE POLICY

In the event coverage is cancelled for any statutorily permitted reason, other than nonpayment of premium, advanced written notice will be mailed or delivered to person(s) or entity(ies) according to the notification schedule shown below:

Name of Person(s) or Entity(ies)	Mailing Address:	Number of Days Advanced Notice of Cancellation:
When required in a written agreement, per the most current schedule maintained by Aon Risk Services South, Inc. for Arcadis U.S., Inc., CallisonRTKL, Inc. and their subsidiaries furnished to XL Catlin 45 days prior to the effective date of cancellation.	On File	30

All other terms and conditions of the Policy remain unchanged.

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective 01-01-2017 Policy No. RWD9435163-11 Endorsement No.
Insured Arcadis U.S., Inc. Premium Included

Insurance Company
XL Insurance America, Inc.

Countersigned by _____

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ENDORSEMENT #031

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. UEC001075915 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by XL Specialty Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

ENDORSEMENT #023

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. AEC001075815 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by XL Specialty Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

ENDORSEMENT #046

This endorsement, effective 12:01 a.m., January 1, 2017 forms a part of Policy No. GEC001076115 issued to ARCADIS U.S., INC. AND CALLISONRTKL INC. by Greenwich Insurance Company.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CANCELLATION NOTIFICATION TO OTHERS ENDORSEMENT

Advanced written notice will be mailed or delivered to person(s) or entity(ies) shown in the Schedule below at least:

a. 10 days before the effective date of cancellation if we cancel for nonpayment of premium; or

b. 30 days before the effective date of cancellation if we cancel for any other reason

Schedule	
Name of Person(s) or Entity(ies)	Mailing Address:
AS PER SCHEDULE ON FILE WITH COMPANY	AS PER SCHEDULE ON FILE WITH COMPANY

All other terms and conditions of the Policy remain unchanged.

Appendix B – Sanitary Sewer Overflow Reports

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland, Maine

Date of Incident/Exceedence: February 21, 2018

Verbal Notification Date: 2/22/2018 **To Whom:** Stuart Rose / Alex Rosenberg

Caller: John Emerson **Phone #:** 207-318-0239

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Combined sewage. No volumetric calculations. No testing.

Specific Location and Duration of Release/Exceedence:

Revere Street at 129. The cellar of 129 Revere Street experienced 3" to 6" of flooding.

Observed Environmental Effects:

No release of sewage to the environment. All of the back up was confined to the collection system and the cellar of 129 Revere Street.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

On call operators were contacted regarding a flooding cellar at 129 Revere Street. The call came in at 16:45 on 2/21/2018. On call personnel responded and found the city sewer main surcharged on Woodfords Street at Highland Avenue. Hydraulic jetting equipment was used to unblock the main sewer and relieve the surcharge. Subsequent TV work revealed a sag in the lined 8" sewer. Additionally, the downstream manhole was observed to have a resin oriented liner lip that was causing solids and debris to collect at the offset. It appears that this solids collection built to a point resulted in full blockage of the sewer main.

Remedial Actions Taken and Times When Taken:

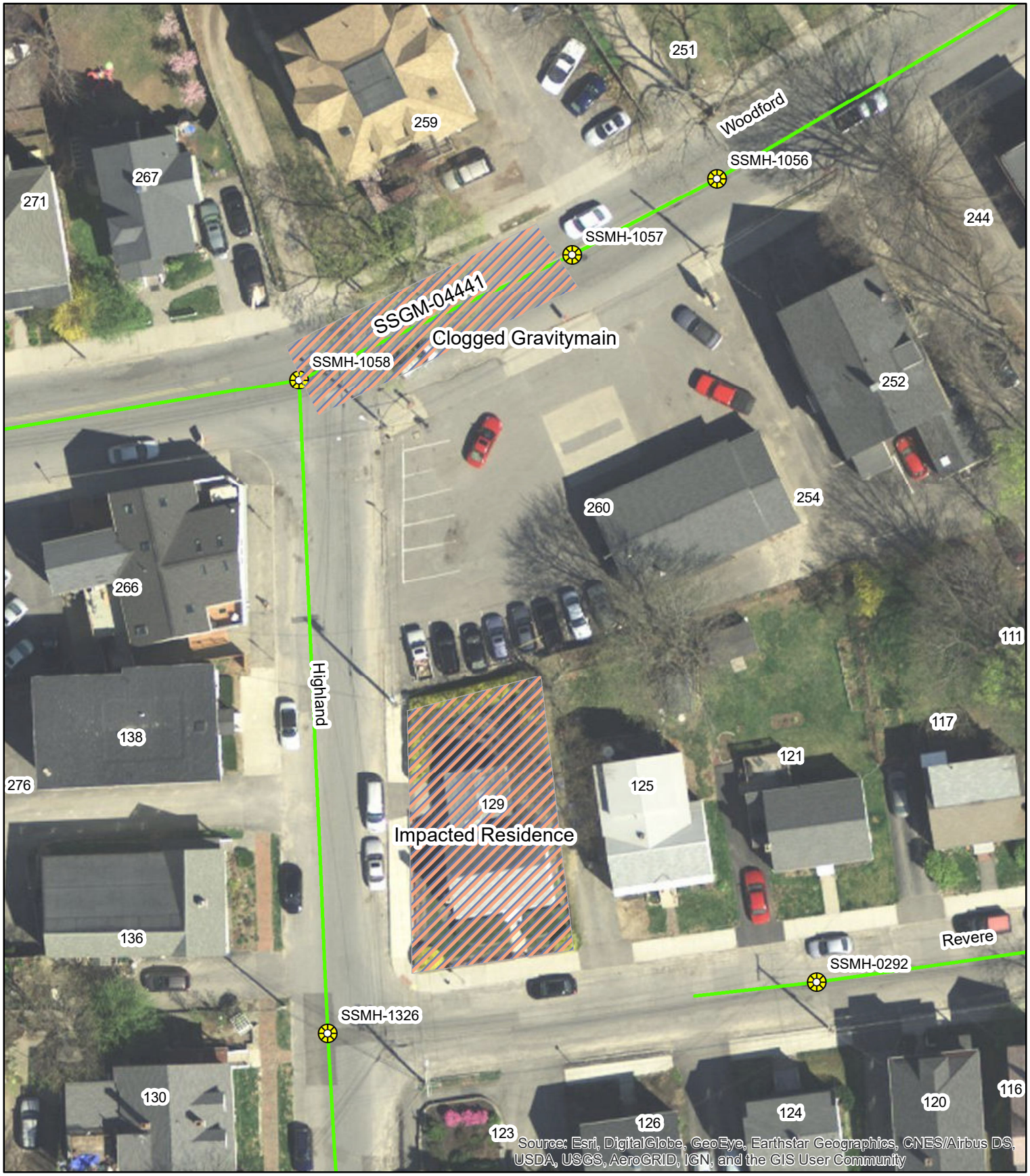
Water Resources Vactor unit was mobilized and used to clean the main and relieve the surcharge.

Specific Measures Needed to Prevent Recurrence:

The main segment will be reevaluated to determine if full replacement (rather than the existing resin liner) is in order. The main segment will be put on a monthly inspection and a Smart Cover level monitoring system will be installed help with predictive system surcharge notification.

Implementation Schedule:

Action Item Description	Projected Completion Date
Reshape manhole invert to eliminate resin lip	3/2/18
Assess the main segment and recommend potential improvements	4/1/18
Install Smart Cover monitoring system Woodfords at Highland	4/1/18
Prepared By: John Emerson	**Date:** 2/26/18



N

60 30 0 60 Feet

Gravity Sewer Backup at 129 Revere St

Legend

- Located Issues
- Manholes
- Gravity
- Roads

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Sewer Collection System **Municipality:** Portland

Date of Incident/Exceedence: April 16, 2018

Verbal Notification Date: 4/17/2018 **To Whom:** S. Rose/S. Pastrana-Del Valle

Caller: John Emerson **Phone #:** 207-318-0239

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Sanitary sewage. No estimate on quantity. Two residential cellars partially flooded. 18 Brookview Terrace and 6 Brookview Terrace.

Specific Location and Duration of Release/Exceedence:

Sewage was found partially flooding the cellars of 6 and 18 Brookview Terrace. Cellars had been flooded for two to three hours prior to the initial flooding report. Both resident's sewer laterals connect to the sewer main in Brookview which, in turn , connects to the sewer in Sunset Lane.

Observed Environmental Effects:

No damage to the environment. Flooding was confined to the cellars of 6 and 18 Brookview Terrace. Photos were taken of each cellar with residents advised to file claim with City of Portland

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

A number of years ago an 8" catch basin lateral was removed from the Sunset Lane sewer system. Brick and mortar was used to plug the discontinued lateral and it appears that the mortared brick was not allowed to set up prior to backfill. As a result, the brick and mortar sloughed off in to the 12" main and, over time, solids caught on the sloughed of material resulting in the plugged sewer.

Remedial Actions Taken and Times When Taken:

The line was jet cleaned with a Vactor combination unit within one hour of the reported backup. The 12" sewer line in Sunset Lane was televised the following day (4/18/18). Televising revealed the concrete and brick blockage.

Specific Measures Needed to Prevent Recurrence:

The blocked portion of sewer main in Sunset Lane was marked for Dig Safe. The blockage will be excavated, removed and the main repaired. Excavation will be performed before 4/30/18 and, until the 30th, the main segment in question will be inspected on a twice weekly basis.

Implementation Schedule:

Action Item Description	Projected Completion Date
Inspect Sunset Lane sewer line twice weekly through 4/30/18	4/30/18
Excavate, remove solid blockage and repair the main segment	4/30/18
Prepared By: John Emerson	**Date:** 4/23/18

Tools | Legend | Selection | Locate | Printing | Bookmarks | Base Maps | Data View | Editor

BLOCKAGE

CITY OF PORTLAND

SSGM - Spot Repair

66 Sunset Ln

66 Sunset Ln

WORKORDER NUMBER 48948

	DATE	PERSON
REQUEST:	4/17/2018 3:41:17PM	KELTON, RONALD J
ASSIGNMENT:	4/17/2018 3:41:17PM	EMERSON, JOHN W
INSPECTION:	4/17/2018 10:00:00AM	
START:		
COMPLETED:	5/17/2018 11:30:00AM	

Dig Safe	Issue Date

INSTRUCTIONS

Partial blockage of main

COMMENTS

EQUIPMENT

DESCRIPTION	HOURS

PERSONNEL

NAME	START TIME	REG HOURS	OT HOURS

1/10/2019

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland

Date of Incident/Exceedence: 6/18/2018

Verbal Notification Date: 6/19/2018 **To Whom:** Stuart Rose/Solanch Pastrana-Del Valle via email

Caller: John Emerson **Phone #:** 874-8468

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Combined sewage. No quantity or concentration data.

Specific Location and Duration of Release/Exceedence:

Overflows occurred at the manholes High at York Street and York at Park Street. The duration of the overflow event was less than 60 minutes as a rainfall event of short duration and high intensity hit the area around the 18:00 hour. The cover was replaced just after.

Observed Environmental Effects:

Overflow ran down York and High Streets and found its way its way to the flooded area of Commercial at Maple Street. Several downstream catch basins collected most of the flow. The quick high flow rainfall overwhelmed the system's carrying capacity. No floatables or debris were observed.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The intense rainfall event surcharged the upstream system and caused the covers to pop at High and York Streets.

Remedial Actions Taken and Times When Taken:

Covers were replaced and the downstream system was inspected for in pipe restrictions. No restrictions were evidenced.

Specific Measures Needed to Prevent Recurrence:

The upcoming I/I study will assist in identifying sources of extraneous flow. Once identified, potential mitigating measures can be crafted. The recent High Street separation project may need to be extended up York Street toward Park Street to pick up additional storm related flow. I/I analysis will provide data for a more comprehensive look at solutions.

Implementation Schedule:

Action Item Description	Projected Completion Date
I/I analysis program results and recommendations	In progress

Prepared By: John Emerson **Date:** 6/25/18

Portland ME

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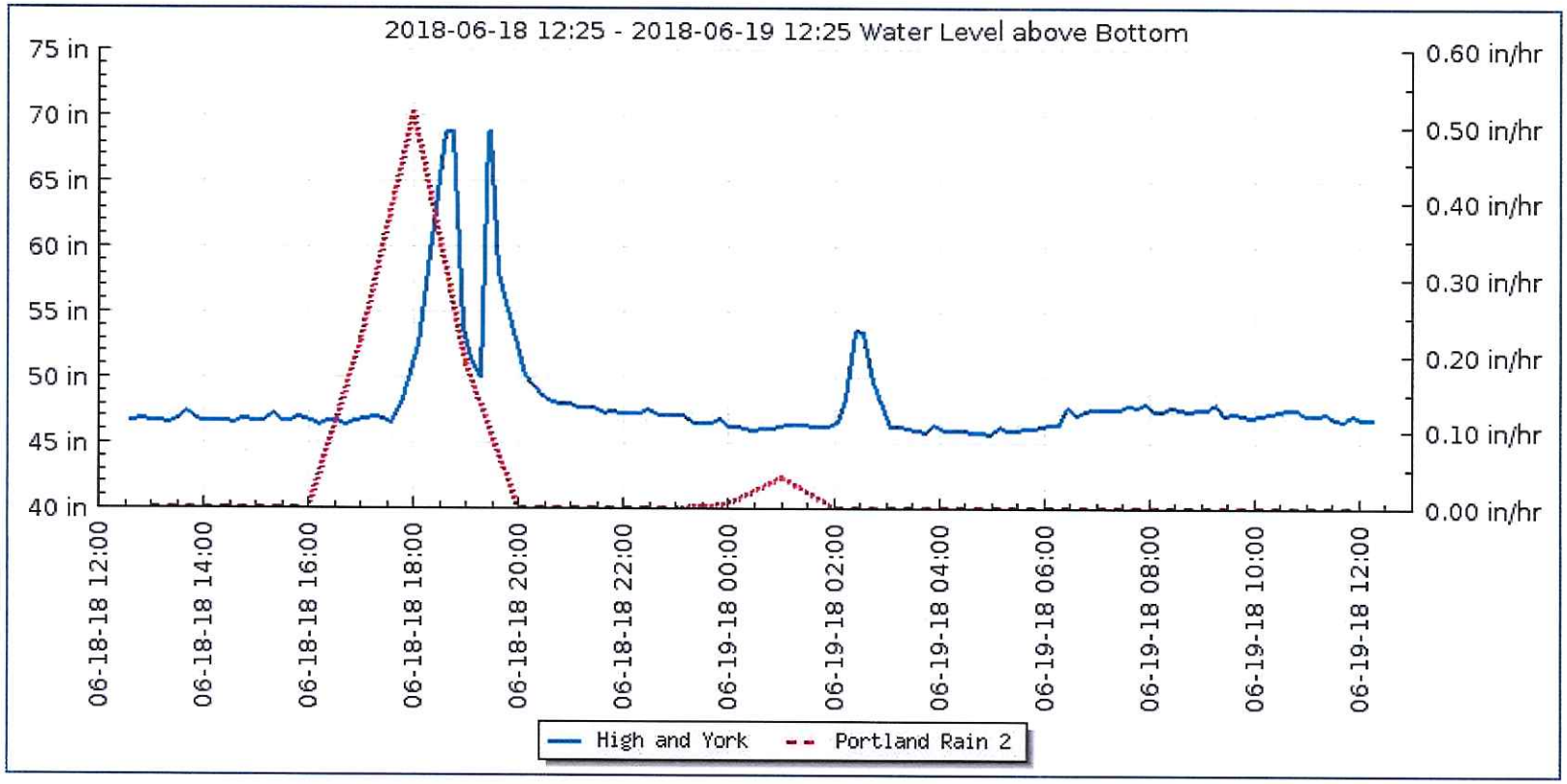
Map SmartTrend® Alarms and Alerts System Operations Multi Graphs Super Admin Support Contact



- (•) Level / Rain / Tide
- ( ) PowerPack Voltage
- ( ) Signal Strength
- ( ) Signal Quality

Time Period: Last Week

From: 2018-06-18 12:25

To: 2018-06-19 12:25

Change Graph

Adjust Scale - Reset

Max Y: 72.0

Min Y: 40.6

Download Data

Long Filter
- ( ) Gaps
- ( ) Fill Gaps
- (•) No Filter

Locations

High and York

[RAIN] Portland Rain 2

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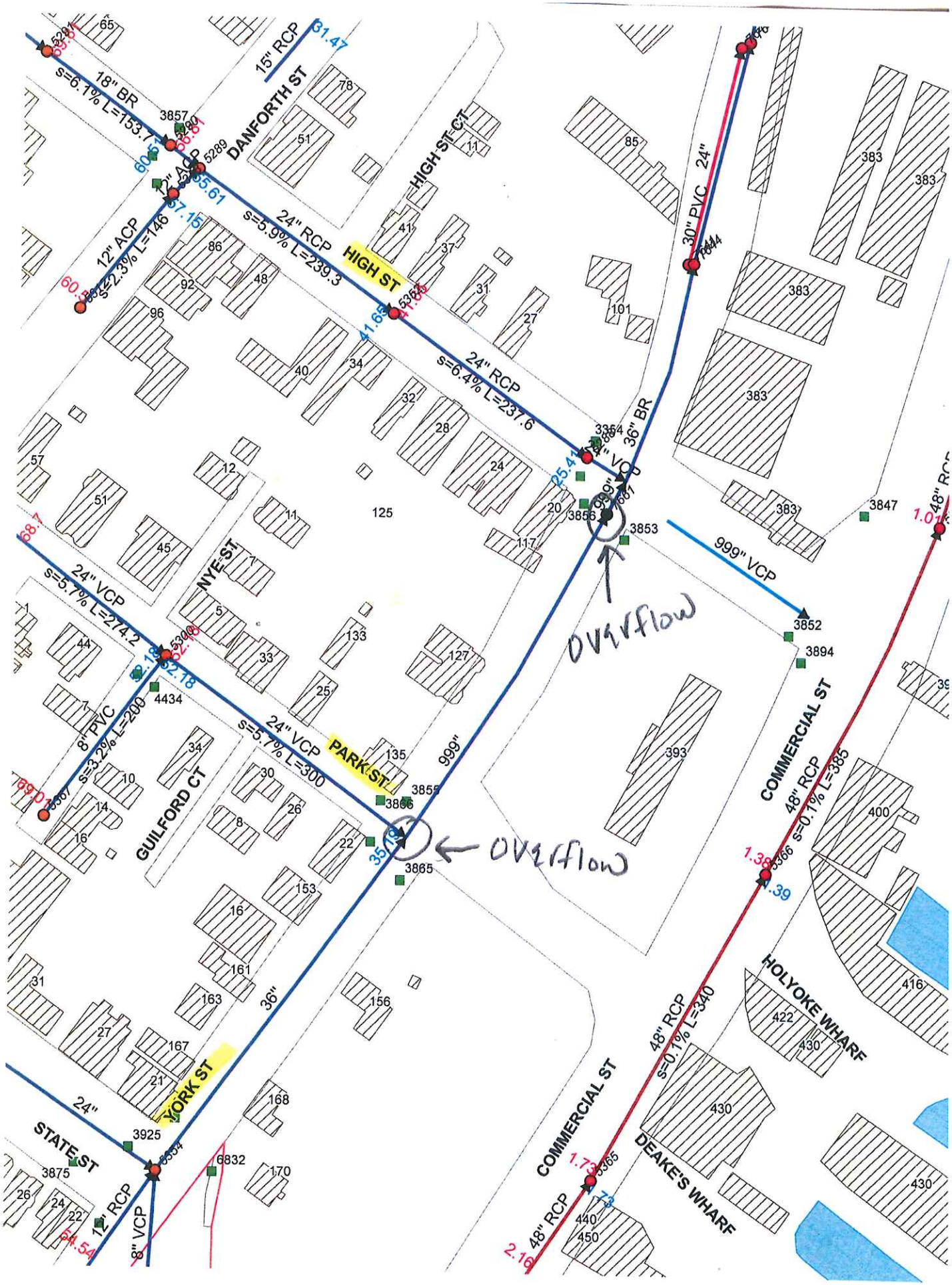
DANFORTH ST
HIGH ST CT
HIGH ST
NYE ST
GUILFORD CT
PARK ST
YORK ST
STATE ST
COMMERCIAL ST
HOLYOKE WHARF
DEAKE'S WHARF
18" BR
s=6.1% L=153.7
15" RCP
12" ACP
s=2.3% L=146
24" RCP
s=5.9% L=239.3
24" RCP
s=6.4% L=237.6
30" PVC
24"
36" BR
24" VCP
s=5.7% L=274.2
8" PVC
s=3.2% L=200
24" VCP
s=5.7% L=300
999"
999" VCP
36"
24"
12" RCP
8" VCP
48" RCP
s=0.1% L=385
48" RCP
s=0.1% L=340
48" RCP
overflow
overflow

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland

Date of Incident/Exceedence: 6/26/2018

Verbal Notification Date: 6/27/2018 **To Whom:** Stuart Rose/Solanch Pastrana-Del Valle Alex Rosenberg via email

Caller: John Emerson **Phone #:** 874-8468 or 207-318-0239

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Separate. No quantity or concentration data.

Specific Location and Duration of Release/Exceedence:

17 Grafton Street. Resident called as soon as they observed sewage backing up in to their cellar. Duration was relatively short. Attached map shows the location.

Observed Environmental Effects:

Sewage in the basement of #17 Grafton. Resident at #17 Grafton requested that we not enter the premises to inspect or photograph.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The 12 " vitrified clay sewer main in Grafton Street was obstructed by a large root mass .

Remedial Actions Taken and Times When Taken:

The Grafton sewer main was rodded within one hour of the back up call. The Grafton sewer was then cleaned and televised (6/27/18) verifying the presence of the root mass.

Specific Measures Needed to Prevent Recurrence:

The Grafton Street system will be inspected on a weekly basis. TV film will be analyzed and recommendations of lining or replacing the main will be forthcoming

Implementation Schedule:

Action Item Description	Projected Completion Date
Weekly Grafton Street sewer inspection	In progress
Analysis and repair options reviewed	July 13, 2018
Lining or main replacement	November 30, 2018
Prepared By: John Emerson	**Date:** 7/3/18

N

100 50 0 100 Feet

Gravity Sewer Backup at 17 Grafton st

Legend

- Located Issues
- Manholes
- Gravity
- Roads

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland

Date of Incident/Exceedence: 7/172018

Verbal Notification Date: 7/19/2018 **To Whom:** Stuart Rose/Solanch Pastrana-Del Valle/Alex Rosenberg via email

Caller: John Emerson **Phone #:** 874-8468

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Combined sewage. No quantity or concentration data.

Specific Location and Duration of Release/Exceedence:

Overflows occurred at the manholes Maple at Commercial, High at York Street (2) and York at Park Street. The duration of the overflow event was less than 15 minutes as a rainfall event of short duration and high intensity hit the area around the 14:00 hour. The covers were replaced by Water Resources crews immediately after the event. Overflow locations are highlighted in yellow on the attached pdf maps. SSMH-4158, SSNS-0086, SSNS-0087 and SSNS-0152.

Observed Environmental Effects:

Overflow ran down Maple, York and High Streets and found its way its way to the flooded area of Commercial at Maple Street. Several downstream catch basins collected most of the flow. The quick high flow rainfall overwhelmed the system's carrying capacity. No floatables or debris were observed.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The intense rainfall event surcharged the upstream system and caused the covers to pop at Maple, High and York Streets.

The attached Smart Cover graphic indicated the rapidity at which the system responded to the rainfall event. Sensing devices are located York at Park, High at York and Maple at Commercial.

Remedial Actions Taken and Times When Taken:

Covers were replaced and the downstream system was inspected for in pipe restrictions. No restrictions were evidenced.

Specific Measures Needed to Prevent Recurrence:

The in progress I/I study will assist in identifying sources of extraneous flow. Once identified, potential mitigating measures can be crafted. The recent High Street separation project may need to be extended up York Street toward Park Street to pick up additional storm related flow. I/I analysis will provide data for a more comprehensive look at solutions.

Implementation Schedule:

Action Item Description	Projected Completion Date
I/I analysis program results and recommendations	In progress

Prepared By: John Emerson **Date:** 7/24/18

Portland ME

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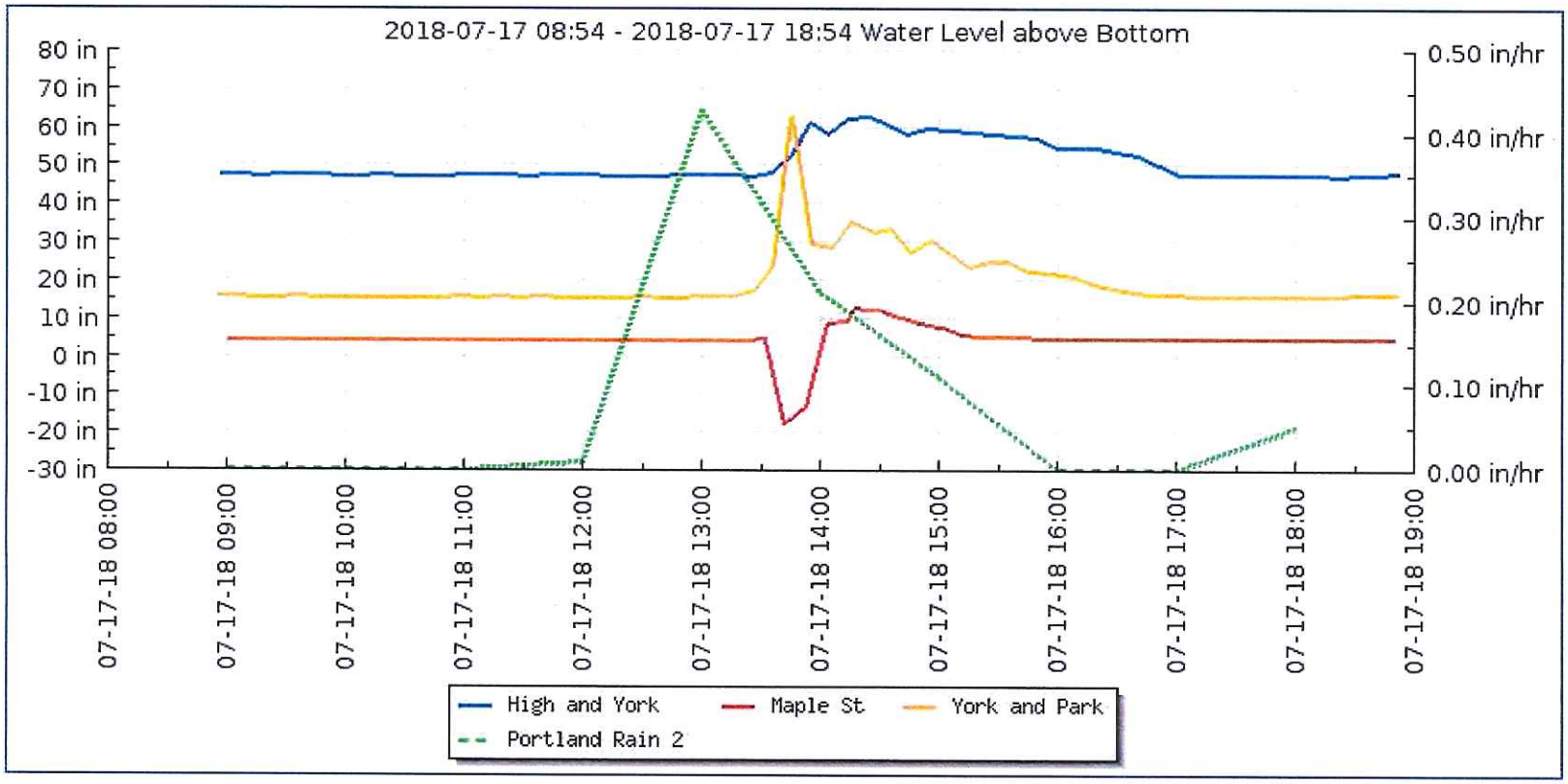
Map SmartTrend® Alarms and Alerts System Operations Multi Graphs Super Admin Support Contact



- (•) Level / Rain / Tide
- ( ) PowerPack Voltage
- ( ) Signal Strength
- ( ) Signal Quality

Time Period: Last Week

From: 2018-07-17 08:54

To: 2018-07-17 18:54

Change Graph

Adjust Scale - Reset

Max Y: 72.0

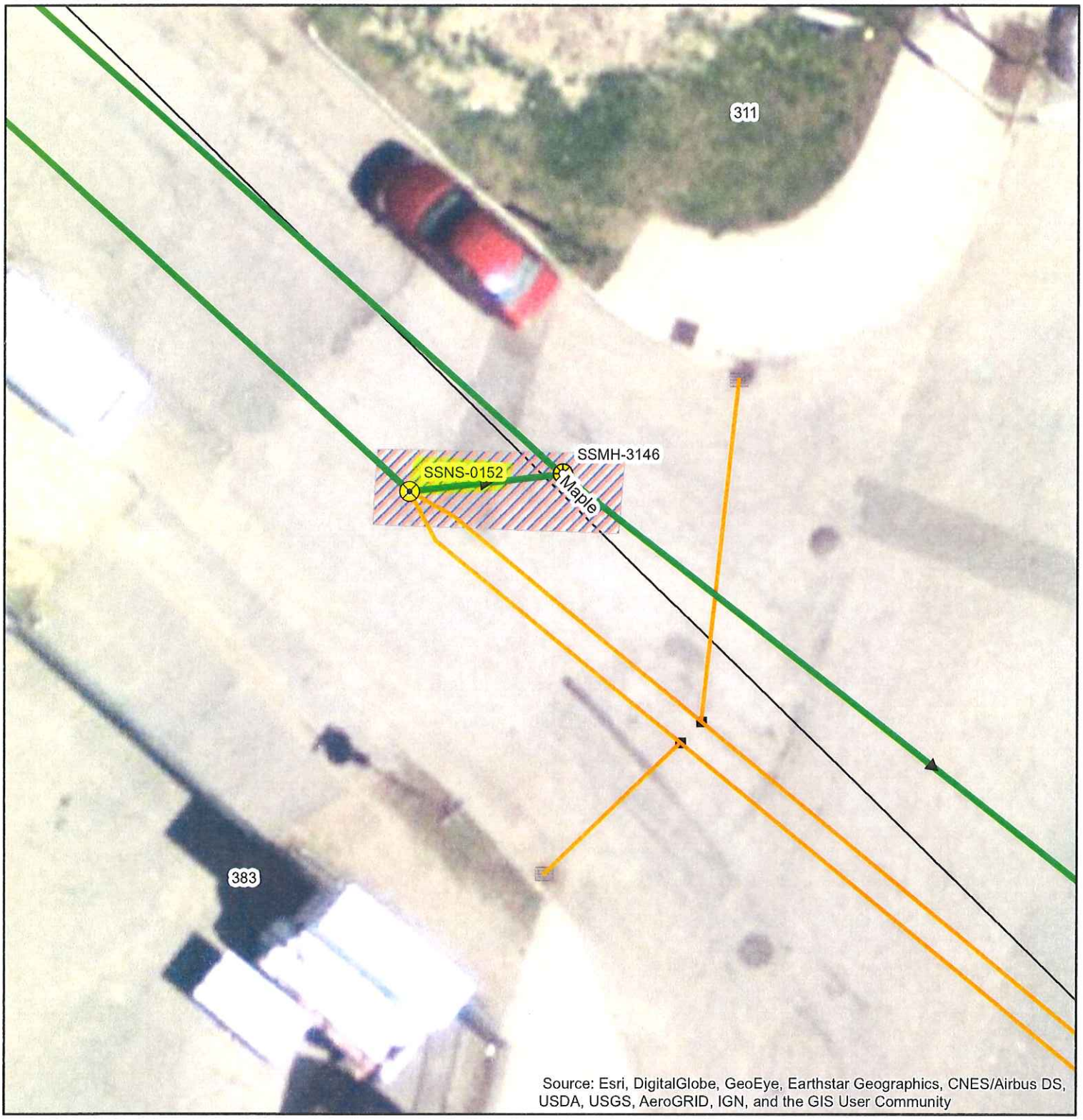
Min Y: -22.8

Download Data

Long Filter
- ( ) Gaps
- ( ) Fill Gaps
- (•) No Filter

Locations

- Maple St
- York and Park
- High and York
- [RAIN] Portland Rain 2



10 5 0 10 Feet

N

Sewer Network Structure and Manhole Backups

Legend

- SewerNetworkStructure
- Manholes
- Gravity
- Storm Gravity
- Located Issues
- Storm Manholes

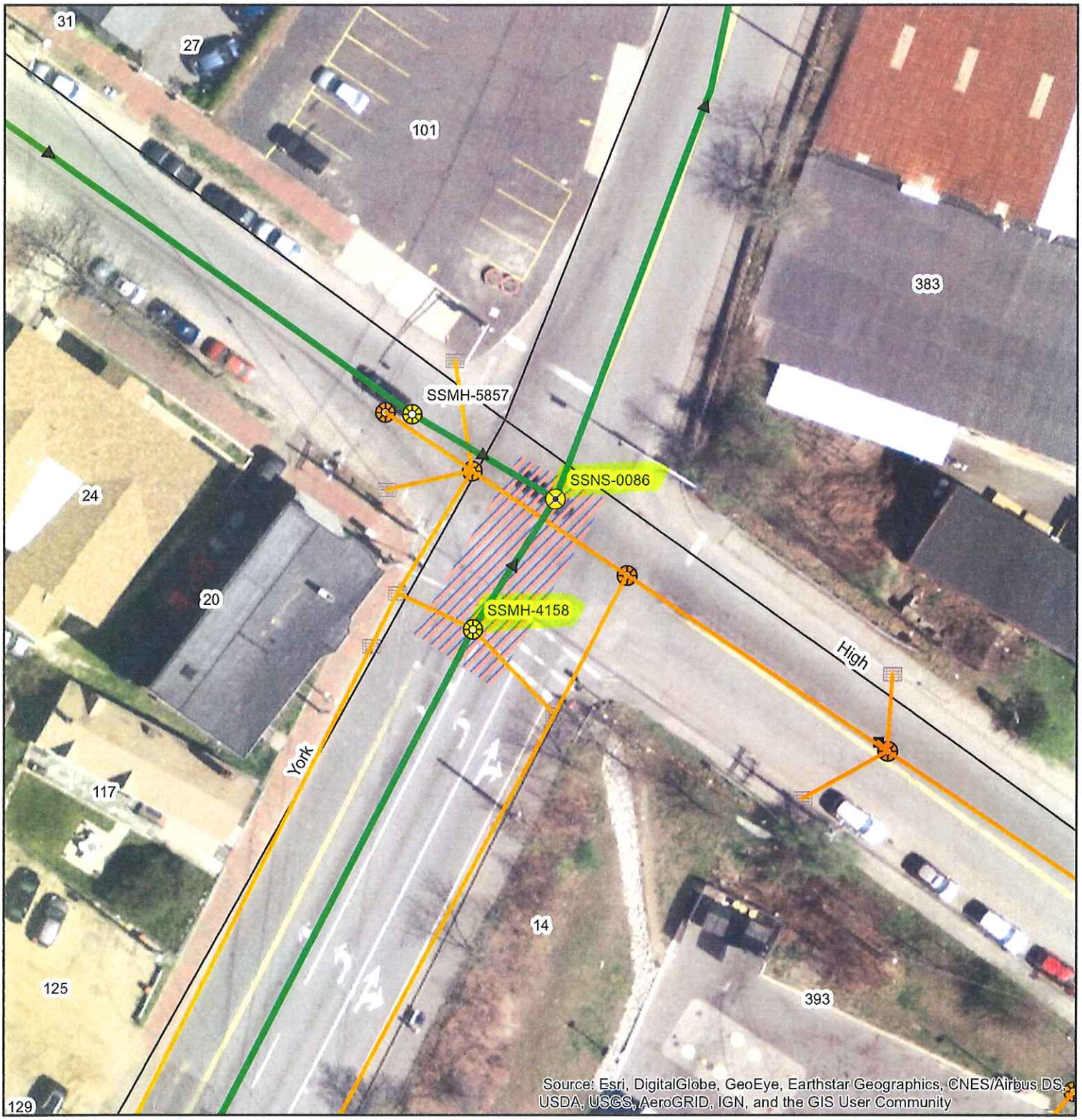
N

40 20 0 40 Feet

Sewer Network Structure Backup

Legend

- SewerNetworkStructure
- Located Issues
- Manholes
- Gravity
- Roads



60 30 0 60 Feet

N

Sewer Network Structure and Manhole Backups

Legend

- SewerNetworkStructure
- Manholes
- Gravity
- Storm Gravity
- Located Issues
- Storm Manholes

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland

Date of Incident/Exceedence: 8/22/2018

Verbal Notification Date: 8/22/2018 **To Whom:** Stuart Rose/Solanch Pastrana-Del Valle/Alex Rosenberg via email

Caller: John Emerson **Phone #:** 874-8468

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Combined sewage. No quantity or concentration data.

Specific Location and Duration of Release/Exceedence:

Overflows occurred at the manholes Maple at Commercial, High at York Street. The duration of the overflow event was less than 15 minutes as a rainfall event of short duration and high intensity hit the area around the 12:00 hour. The covers were replaced by Water Resources crews immediately after the event. Overflow locations are highlighted in yellow on the attached pdf maps. SSMH-4158 and SSNS-0152.

Observed Environmental Effects:

Overflow ran down Maple, York and High Streets and found its way its way to the flooded area of Commercial at Maple Street. Several downstream catch basins collected most of the flow. The quick high flow rainfall overwhelmed the system's carrying capacity. No floatables or debris were observed.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The intense rainfall event surcharged the upstream system and caused the covers to pop at Maple Street and High at York Street.
The attached Smart Cover graphic indicates the rapidity at which the system responded to the rainfall event. Sensing devices are located High at York and Maple at Commercial. I've enclosed maps and graphics indicating location of the SSO's and system response to the rainfall event. The sudden drop in the Maple Street graphic is due to the fact that the sensor was blown out of the manhole and therefore not seeing level.

Remedial Actions Taken and Times When Taken:

Covers were replaced and the downstream system was inspected for in pipe restrictions. No restrictions were evidenced.

Specific Measures Needed to Prevent Recurrence:

The in progress I/I study will assist in identifying sources of extraneous flow. Once identified, potential mitigating measures can be crafted. The recent High Street separation project may need to be extended up York Street toward Park Street to pick up additional storm related flow. I/I analysis will provide data for a more comprehensive look at solutions.

Implementation Schedule:

Action Item Description	Projected Completion Date
I/I analysis program results and recommendations	In progress

Prepared By: John Emerson **Date:** 8/24/18

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Combined sewer system **Municipality:** Portland

Date of Incident/Exceedence: 9/6/2018

Verbal Notification Date: 9/7/2018 **To Whom:** Stuart Rose/Solanch Pastrana-Del Valle/Alex Rosenberg via email

Caller: John Emerson **Phone #:** 874-8468

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Combined sewage. No quantity or concentration data.

Specific Location and Duration of Release/Exceedence:

Overflows occurred at the manholes Maple at Commercial, High at York Street and York at High. The duration of the overflow event was less than 30 minutes as a rainfall event of short duration and high intensity hit the area around the 12:00 hour. The covers were replaced by Water Resources crews immediately after the event. Overflow locations are highlighted in yellow on the attached pdf maps. SSMH-4158, SSNS-0152 and SSNS-0086.

Observed Environmental Effects:

Overflow ran down Maple, York and High Streets and found its way its way to the flooded area of Commercial at Maple Street. Several downstream catch basins collected most of the flow. The quick high flow rainfall overwhelmed the system's carrying capacity. No floatables or debris were observed.

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The intense rainfall event surcharged the upstream system and caused the covers to pop at Maple Street, High at York Street and York at High Street.
The attached Smart Cover graphic indicates the rapidity at which the system responded to the rainfall event. Sensing devices are located High at York and Maple at Commercial. I've enclosed maps and graphics indicating location of the SSO's and system response to the rainfall event. The sudden drop in the Maple Street graphic is due to the fact that the sensor was blown out of the manhole and therefore not seeing level.

Remedial Actions Taken and Times When Taken:

Covers were replaced and the downstream system was inspected for in pipe restrictions. No restrictions were evidenced.

Specific Measures Needed to Prevent Recurrence:

The in progress I/I study will assist in identifying sources of extraneous flow. Once identified, potential mitigating measures can be crafted. The recent High Street separation project may need to be extended up York Street toward Park Street to pick up additional storm related flow. I/I analysis will provide data for a more comprehensive look at solutions.

Implementation Schedule:

Action Item Description	Projected Completion Date
I/I analysis program results and recommendations	In progress

Prepared By: John Emerson **Date:** 9/11/18

Portland ME

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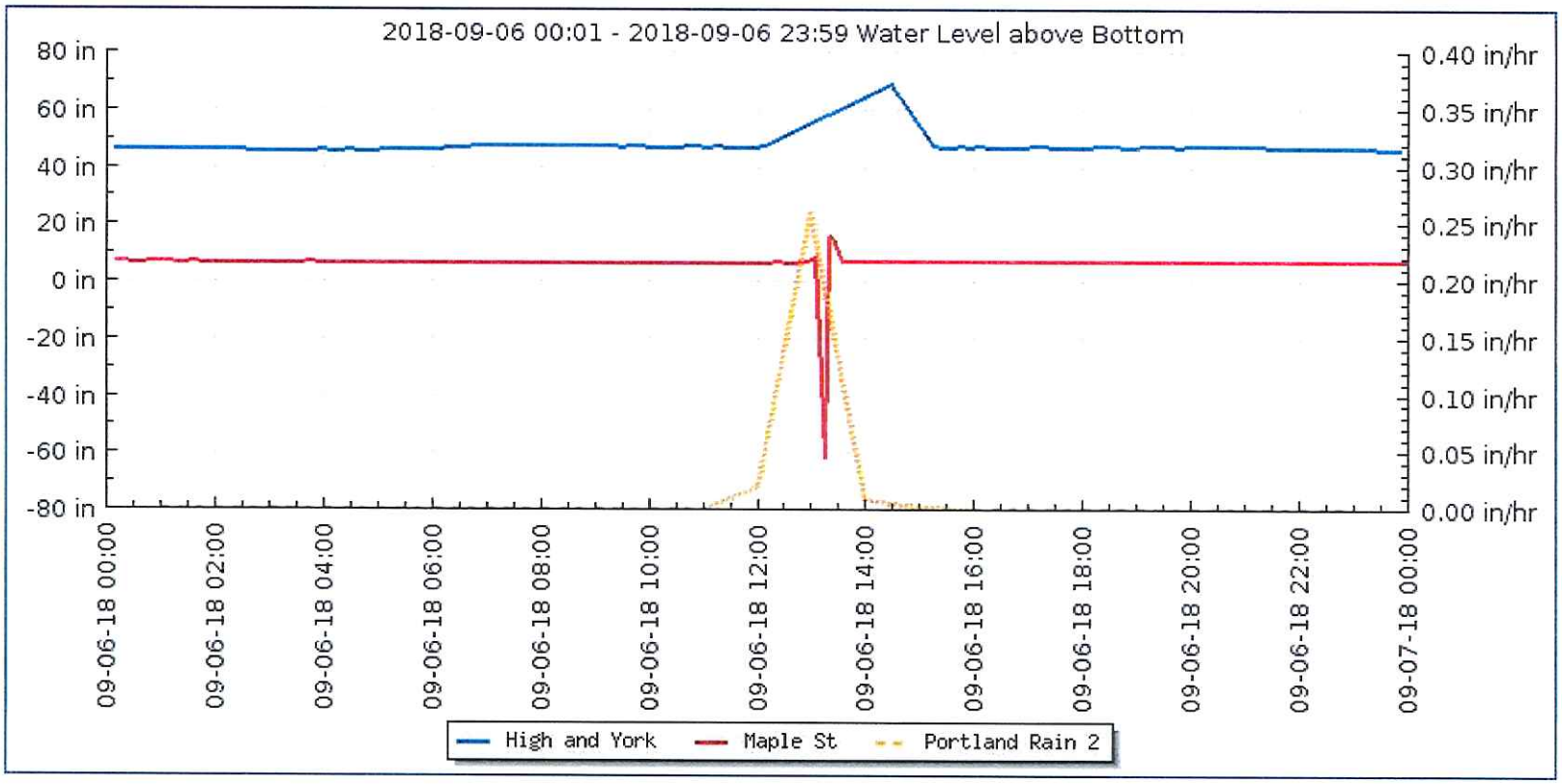
Map SmartTrend® Alarms and Alerts System Operations Multi Graphs Super Admin Support Contact



- (•) Level / Rain / Tide
- ( ) PowerPack Voltage
- ( ) Signal Strength
- ( ) Signal Quality

Time Period: Last Week

From: 2018-09-06 00:01

To: 2018-09-06 23:59

Change Graph

Adjust Scale - Reset

Max Y: 72.0

Min Y: -66.8

Download Data

Long Filter
- ( ) Gaps
- ( ) Fill Gaps
- (•) No Filter

Locations

- Maple St
- [RAIN] Portland Rain 2
- High and York

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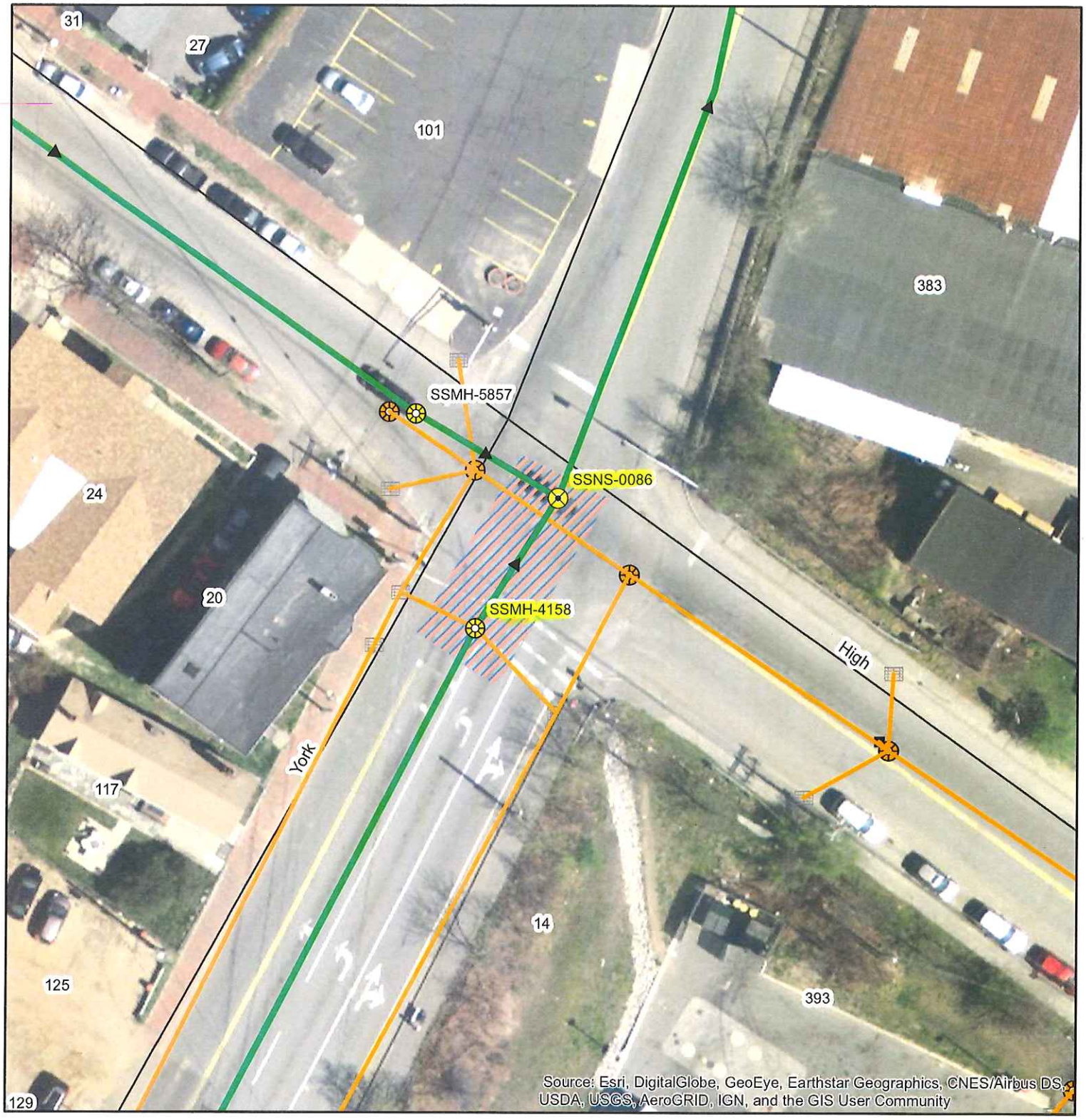


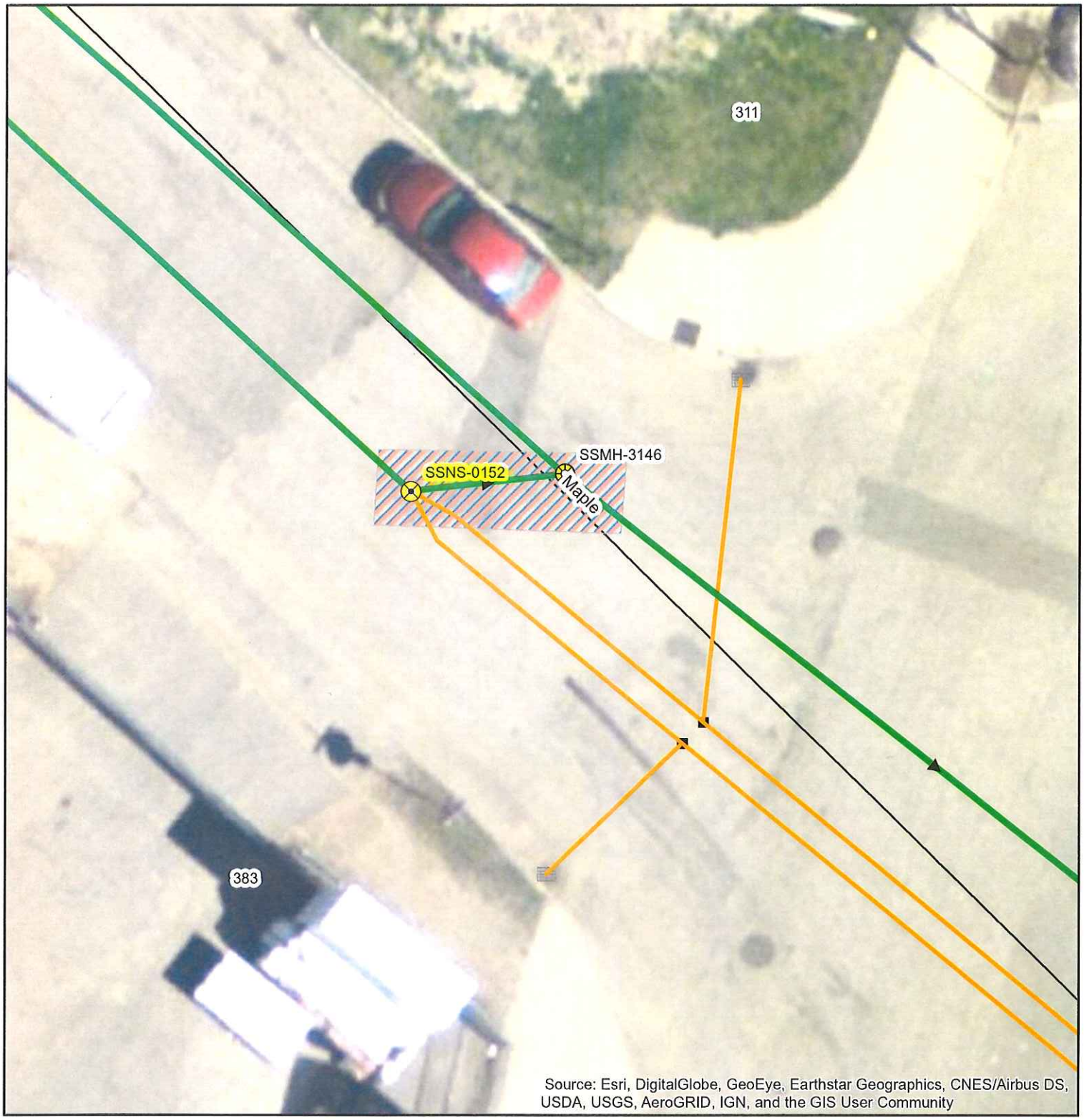
60 30 0 60 Feet

N

Sewer Network Structure and Manhole Backups

Legend

- SewerNetworkStructure
- Manholes
- Gravity
- Storm Gravity
- Located Issues
- Storm Manholes



10 5 0 10 Feet

N

Sewer Network Structure and Manhole Backups

Legend

- SewerNetworkStructure
- Manholes
- Gravity
- Storm Gravity
- Located Issues
- Storm Manholes

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Sewer Collection System **Municipality:** Portland

Date of Incident/Exceedence: October 8, 2018

Verbal Notification Date: 10/9/2018 **To Whom:** S. Rose/S. Pastrana-Del Valle

Caller: John Emerson **Phone #:** 207-318-0239

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Sanitary sewage. No estimate on quantity. Two residential cellars partially flooded. 83 Illsley Street and 84 Illsley Street.

Specific Location and Duration of Release/Exceedence:

Sewage was reportedly partially flooding the cellars of 83 and 86 Illsley Street. Cellars had been flooded for two to three hours prior to the initial flooding report. Both resident's sewer laterals connect to the sewer main in Illsley Street. Neither of the impacted residents would permit Water Resources crews to inspect the flooding damage in the cellars.

Observed Environmental Effects:

No damage to the environment. Flooding was confined to the cellars of 83 and 86 Illsley Street (as far as we know).

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

The Illsley Street and Presumpscot Street sewers were found to be root intruded. These root clusters eventually blocked the sewer system resulting in the system back up and cellar flooding.

Remedial Actions Taken and Times When Taken:

The Illsley Street and Presumpscot sewer lines were jet cleaned with a Vactor combination unit within one hour of the reported backup. Both systems were televised the following day to confirm the root intrusion problem. Root cutting was also performed 10/9/18.

Specific Measures Needed to Prevent Recurrence:

Illsley and Presumpscot Streets will be inspected on a monthly basis. A Smart Cover system will be installed to assist with predictive maintenance. Both streets will be evaluated for sewer relining or replacement as necessary.

Implementation Schedule:

Action Item Description	Projected Completion Date
Inspect Illsley and Presumpscot Streets monthly	Immediately
Install Smart Cover Monitoring System in the collector	11/15/18
Reline or replace impacted main segments as necessary	10/1/19
Prepared By: John Emerson	**Date:** 10/12/18

Maine Department of Environmental Protection

NON-COMPLIANCE/DISCHARGE INCIDENT REPORT

Facility: Sewer Collection System **Municipality:** Portland

Date of Incident/Exceedence: December 26, 2018

Verbal Notification Date: 12/26/2018 **To Whom:** S. Rose/Alex Rosenberg via e mail

Caller: John Emerson **Phone #:** 207-318-0239

Parameter/Pollutant Quantity and Concentration of Release/Exceedence (include test results):

Sanitary sewage. No estimate on quantity. Two residential cellars partially flooded73 Inverness and 77 Inverness Streets

Specific Location and Duration of Release/Exceedence:

Sewage was reportedly partially flooding the cellars of 73 and 77 Inverness Street. Cellars had been flooded for several hours prior to the initial flooding report. Both resident's sewer laterals connect to the sewer main in Inverness Street. Neither of the impacted residents would permit Water Resources crews to inspect the flooding damage in the cellars.

Observed Environmental Effects:

No damage to the environment. Flooding was confined to the cellars of 73 and 77 Inverness Street (as far as we know).

Describe specifically what happened, when, and why (include all details, and use additional pages if needed, including maps, diagrams as necessary):

A large root mass was discovered just downstream from #73 Inverness Street. The vitrified clay sewer main appeared to be cracked and, as such, roots grew in to the main segment and eventually blocked the sewer line. The resident at #77 Inverness Street reported sewage being pumped out on to the back lawn of #73 Inverness. The report was channeled through Public Works reception and then forwarded to the Water Resources group for investigation.

Remedial Actions Taken and Times When Taken:

The Inverness Street sewer line was jet cleaned with a Vactor combination unit within one hour of the reported backup. The system was cleaned and televised the following day to confirm the root intrusion problem. Root cutting was also performed 12/27/18.

Specific Measures Needed to Prevent Recurrence:

Inverness Street will be inspected on a monthly basis. A Smart Cover system will be installed to assist with predictive maintenance. Inverness Street will be evaluated for sewer relining or replacement as necessary.

Implementation Schedule:

Action Item Description	Projected Completion Date
Inspect Inverness Street monthly	Immediately
Install Smart Cover Monitoring System in the collector	2/1/19
Reline or replace impacted main segments as necessary	10/1/19
Prepared By: John Emerson	**Date:** 12/31/18

N

75 37.5 0 75 Feet

Gravity Sewer Backup at 73 Inverness St

Legend

- Located Issues
- Manholes
- Gravity
- Roads

Non-compliance/Discharge Incident Report Form

The Discharge Incident Report Form can be used by treatment facility personnel to notify the Department when any licensed parameter has been exceeded or when reporting combined sewer overflow related dry weather overflows (DWO's), bypasses, sanitary sewer overflows (SSO's), spills from facility premises to surface waters, or other incidents which violate license conditions as per Chapter 523 Rules regarding "Waste Discharge License Conditions." This form is not mandatory, but if you choose not to use it, be sure that the form or letter you do use includes all the information that this one does.

As per Chapter 523 "Waste Discharge License Conditions," the permittee shall report any non-compliance which may endanger health or the environment orally within 24 hours followed up by a written submission within 5 days of the time the permittee became aware of the circumstances. The following shall also be included as information which must be reported within 24 hours:

- any unanticipated bypass which exceeds any effluent limitation in the permit [including sanitary sewer overflows (SSO's) and dry weather overflows (DWO's) from CSO discharge points]
- any upset which exceeds any effluent limitation in the permit
- violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit

Appendix C – Municipal Budget Documents

Sewer Fund

The principal function of the Sewer Fund Enterprise is to account for the sewer services provided to City residents and business establishments. The Portland Water District (not a city department) owns and operates the wastewater treatment plant for which the Sewer Fund pays a monthly fee. The City owns and maintains the infrastructure sewer lines and is responsible for the costs of maintenance, improvements, and expansion.

All users of the system pay monthly or quarterly fees, based upon water volume, to support the expenses of the fund.

The Sewer Fund expenditures increased $1,561,646, or 6.3%. These increases are mainly attributed to the FY19 Sewer Debt Service, Portland Water District (PWD) assessment fees, payroll and benefits, and sewer flow monitoring costs.

Department Summary

Department: Public Works **Account:** 570

		FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown							
Payroll		1,960,909	1,870,284	2,130,270	2,130,270	2,130,270	2,130,270
Benefits		891,075	852,868	942,066	984,419	984,419	984,419
Administrative Services		12,678,669	12,563,743	13,013,757	13,100,852	13,100,852	13,100,852
Contractual Services		1,160,476	1,169,336	1,476,659	1,476,659	1,476,659	1,476,659
Maintenance and Repairs		504,695	503,139	520,778	520,778	520,778	520,778
Rentals		58,116	57,431	68,116	68,116	68,116	68,116
Insurance		30,862	8,321	30,795	30,795	30,795	30,795
Supplies		255,497	254,477	273,742	273,742	273,742	273,742
Minor Capital Items		12,000	11,478	0	0	0	0
Utilities		110,484	103,936	120,828	120,828	120,828	120,828
Capital Outlay		12,000	12,000	35,000	35,000	35,000	35,000
Debt Service		7,085,098	7,207,139	7,645,122	7,580,068	7,580,068	7,580,068
Total		24,759,881	24,614,152	26,257,133	26,321,527	26,321,527	26,321,527
Summary by Division							
Sewer Finance	(15-03)	91,337	121,224	134,810	134,810	134,810	134,810
Sewer Public Works Administration	(31-01)	807,783	760,413	780,653	780,653	780,653	780,653
Sewer Districting	(31-12)	2,850,513	2,727,466	3,019,206	3,019,206	3,019,206	3,019,206
Sewer Communications	(31-15)	64,056	61,014	67,687	67,687	67,687	67,687
Sewer Engineering	(31-37)	353,808	365,844	618,211	618,211	618,211	618,211
Sewer Debt Service	(31-55)	7,095,098	7,268,413	7,810,122	7,745,068	7,745,068	7,745,068
Sewer Fringe Benefits	(31-56)	1,347,424	1,264,580	1,363,672	1,493,120	1,493,120	1,493,120
PWD Assessment	(31-58)	12,149,862	12,045,198	12,462,772	12,462,772	12,462,772	12,462,772
Total		24,759,881	24,614,152	26,257,133	26,321,527	26,321,527	26,321,527
Less Revenues		(24,759,881)	(24,614,152)	(26,257,133)	(26,321,527)	(26,321,527)	(26,321,527)
Net Department Total		0	0	0	0	0	0

Sewer Finance

This division's services are provided by the City's Finance Department. Finance provides billing and collection services, as well as lien processing for delinquent accounts. The Finance Department also maintains the financial records for the Sewer Fund and the computer network system.

The FY19 Sewer Finance division's increase of $43,473, or 47.6%, is predominately related to the FY19 implementation cost of a new city-wide public sector software system.

Division Summary

Department: Finance **Division:** Sewer Finance **Account:** 570-15-03

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	71,604	60,385	73,057	73,057	73,057	73,057
Administrative Services	5,433	4,747	5,433	5,433	5,433	5,433
Contractual Services	12,500	54,292	53,620	53,620	53,620	53,620
Supplies	1,800	1,800	2,700	2,700	2,700	2,700
Total	91,337	121,224	134,810	134,810	134,810	134,810

Personnel Services Detail

Department: Finance **Division:** Sewer Finance Administration **Account:** 570-15-03

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Finance - Budget/Accounting	100		31,026		31,461		31,461		31,461		31,461
Finance - Treasury	100		40,578		41,596		41,596		41,596		41,596
Gross Personnel Services			71,604		73,057		73,057		73,057		73,057
Net Personnel Services			71,604		73,057		73,057		73,057		73,057

Sewer Public Works Administration

This division accounts for the associated costs incurred by the Department of Public Works administrative staff for sewer related activities.

The FY19 Administration expenditures show a decrease of $27,130, or 3.4%, largely due to a reduction in contractual services. Other budget changes include the transfer of one position from the Stormwater Fund.

Division Summary

Department: Public Works **Division:** Sewer Public Works Administration **Account:** 570-31-01

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	553,268	512,540	609,312	609,312	609,312	609,312
Benefits	4,980	4,566	5,580	5,580	5,580	5,580
Administrative Services	27,527	26,050	31,520	31,520	31,520	31,520
Contractual Services	133,550	129,678	48,450	48,450	48,450	48,450
Maintenance and Repairs	50,000	50,000	63,583	63,583	63,583	63,583
Rentals	1,008	1,020	1,008	1,008	1,008	1,008
Supplies	25,450	25,081	21,200	21,200	21,200	21,200
Minor Capital Items	12,000	11,478	0	0	0	0
Total	807,783	760,413	780,653	780,653	780,653	780,653

Personnel Services Detail

Department: Public Works **Division:** Sewer Public Works Administration **Account:** 570-31-01

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Water Resources Manager	100	1.0	93,854	1.0	95,725	1.0	95,725	1.0	95,725	1.0	95,725
Compliance Section Coordinator	100	1.0	67,322	1.0	77,002	1.0	77,002	1.0	77,002	1.0	77,002
Asset Manager	100	1.0	64,457	1.0	66,680	1.0	66,680	1.0	66,680	1.0	66,680
(1) Water Quality Technician	100	1.0	51,556	2.0	98,338	2.0	98,338	2.0	98,338	2.0	98,338
Senior Water Resouces Tech	100	1.0	49,103	1.0	48,648	1.0	48,648	1.0	48,648	1.0	48,648
Asset Management Tech	100	2.0	94,735	2.0	99,620	2.0	99,620	2.0	99,620	2.0	99,620
(2) Water Resources Support Svc S	100	0.0	0	1.0	41,866	1.0	41,866	1.0	41,866	1.0	41,866
(3) Call Center Specialist	100	1.0	41,048	0.0	0	0.0	0	0.0	0	0.0	0
Charges from Admin (GF)	100		76,422		78,652		78,652		78,652		78,652
Overtime	100		14,771		2,781		2,781		2,781		2,781
Gross Personnel Services		8.0	553,268	9.0	609,312	9.0	609,312	9.0	609,312	9.0	609,312
Net Personnel Services		8.0	553,268	9.0	609,312	9.0	609,312	9.0	609,312	9.0	609,312

Notes:

(1) 1 Position Transferred from Stormwater Fund (571-3140) during FY18

(2) 1 Position Title Change from Call Center Specialist during FY18

(3) (1) Position Title Change to WR Support Svc Specialist during FY18

Sewer Districting

The Sewer Districting division is responsible for the maintenance and repair of the City's sanitary sewer and stormwater systems including pump station operations and maintenance, catch basin cleaning, right of way inspections and maintenance, and sewer inspections and investigations.

Division expenditures have increased $168,692, or 5.9%. The majority of this increase is due to the restructuring of staff between the Sewer and Stormwater funds; this division includes the transfer of two positions from the Stormwater Fund.

Division Summary

Department: Public Works **Division:** Sewer Districting **Account:** 570-31-12

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	944,240	915,392	1,048,645	1,048,645	1,048,645	1,048,645
Benefits	14,485	13,090	22,741	22,741	22,741	22,741
Administrative Services	63,720	56,158	61,545	61,545	61,545	61,545
Contractual Services	984,276	907,027	977,039	977,039	977,039	977,039
Maintenance and Repairs	454,000	452,369	456,500	456,500	456,500	456,500
Rentals	54,608	54,661	64,608	64,608	64,608	64,608
Supplies	212,700	212,833	232,300	232,300	232,300	232,300
Utilities	110,484	103,936	120,828	120,828	120,828	120,828
Capital Outlay	12,000	12,000	35,000	35,000	35,000	35,000
Total	2,850,513	2,727,466	3,019,206	3,019,206	3,019,206	3,019,206

Personnel Services Detail

Department: Public Works **Division:** Sewer Districting **Account:** 570-31-12

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Wastewater Facilites Coord	100	1.0	73,554	1.0	75,036	1.0	75,036	1.0	75,036	1.0	75,036
(1) Water Resources Supervisor	100	0.0	0	3.0	161,678	3.0	161,678	3.0	161,678	3.0	161,678
(2) Sr Public Works Supervisor	100	3.0	149,323	0.0	0	0.0	0	0.0	0	0.0	0
(3) Sewer Inspector	100	3.0	161,928	0.0	0	0.0	0	0.0	0	0.0	0
(4) Sewer Facilities Technician	100	1.0	44,325	0.0	0	0.0	0	0.0	0	0.0	0
(5) Water Resources Maint Wkr III	100	0.0	0	6.0	330,346	6.0	330,346	6.0	330,346	6.0	330,346
(6) Water Resources Maint Wkr II	100	0.0	0	6.0	271,315	6.0	271,315	6.0	271,315	6.0	271,315
(7) Maintenance Worker III	100	9.0	398,923	0.0	0	0.0	0	0.0	0	0.0	0
(8) Water Resources Maint Wkr I	100	0.0	0	3.0	118,267	3.0	118,267	3.0	118,267	3.0	118,267
Meal Allow/Standby Pay	100		27,206		26,779		26,779		26,779		26,779
Winter Stipends	100		0		9,720		9,720		9,720		9,720
Temporary Help	100		40,000		0		0		0		0
Overtime	100		48,981		55,504		55,504		55,504		55,504
Gross Personnel Services		17.0	944,240	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645
Net Personnel Services		17.0	944,240	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645

Notes:

(1) 3 Position Title Changes from Sr Public Svcs Supervisor during FY18
(2) (3) Position Title Changes to WR Supervisor during FY18
(3) (3) Position Title Changes to WR MW III during FY18
(4) (1) Position Title Change to WR MW II during FY18
(5) 3 Title Changes from Sewer Inspector during FY18; 3 Upgrades from MW III during FY18
(6) 3 Title Chgs from MW III, 1 Title Chg from Sewer Fac Tech & 2 Tfrs from Stormwater (571) during FY18
(7) (3) Title Chg. to WR MW II, (3) Reclasses to WR MW I & (3) Upgrade to WR MW III during FY18
(8) 3 Position Reclasses from MW III during FY18

Sewer Communications

The Public Works Sewer Communications division accounts for the associated costs incurred for sewer related functions including service requests, street flooding and Dig Safe requests.

The FY19 division's expenditures increased slightly by $3,631, or 5.7%.

Division Summary

Department: Public Works **Division:** Sewer Communications **Account:** 570-31-15

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	58,799	57,314	62,430	62,430	62,430	62,430
Benefits	615	200	615	615	615	615
Administrative Services	100	0	100	100	100	100
Rentals	1,500	1,000	1,500	1,500	1,500	1,500
Supplies	3,042	2,500	3,042	3,042	3,042	3,042
Total	64,056	61,014	67,687	67,687	67,687	67,687

Personnel Services Detail

Department: Public Works **Division:** Sewer Communications **Account:** 570-31-15

Position	Funding Source City	Fed	Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Senior Operations Dispatcher	100			1.0	52,832	1.0	55,973	1.0	55,973	1.0	55,973	1.0	55,973
Meal Allow/Standby Pay	100				100		240		240		240		240
Overtime	100				5,867		6,217		6,217		6,217		6,217
Gross Personnel Services				1.0	58,799	1.0	62,430	1.0	62,430	1.0	62,430	1.0	62,430
Net Personnel Services				1.0	58,799	1.0	62,430	1.0	62,430	1.0	62,430	1.0	62,430

Sewer Engineering

The environmental engineering component of the Engineering division concentrates on sewer and storm water systems and compliance programs. Services include sanitary sewer and storm water system construction and rehabilitation, separation of sewage and storm water systems, investigation of drainage complaints and system failures, various environmental permitting, and enforcement of City ordinances and technical standards for sewage, stormwater and industrial waste discharge. This group is also responsible for the implementation of the Combined Sewer Overflow (CSO) abatement program and the industrial pretreatment program, both federally mandated by the Clean Water Act.

This divisional budget reflects an increase of $264,403, or 74.7%, most of which is attributed to the FY19 flow assessment / sewer flow monitoring expenses.

Division Summary

Department: Public Works **Division:** Sewer Engineering **Account:** 570-31-37

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	307,998	324,653	336,826	336,826	336,826	336,826
Benefits	4,060	3,380	4,880	4,880	4,880	4,880
Administrative Services	7,400	6,963	27,760	27,760	27,760	27,760
Contractual Services	20,150	17,065	232,550	232,550	232,550	232,550
Maintenance and Repairs	695	770	695	695	695	695
Rentals	1,000	750	1,000	1,000	1,000	1,000
Supplies	12,505	12,263	14,500	14,500	14,500	14,500
Total	353,808	365,844	618,211	618,211	618,211	618,211

Personnel Services Detail

Department: Public Works **Division:** Sewer Engineering **Account:** 570-31-37

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Senior Engineer	100	1.0	77,967	1.0	86,731	1.0	86,731	1.0	86,731	1.0	86,731
Project Engineer	100	2.0	124,447	2.0	147,088	2.0	147,088	2.0	147,088	2.0	147,088
(1) Water Resources Engineer	100	0.0	0	1.0	54,669	1.0	54,669	1.0	54,669	1.0	54,669
(2) Associate Engineer	100	1.0	47,317	0.0	0	0.0	0	0.0	0	0.0	0
Charges from Eng (GF)	100		49,256		41,911		41,911		41,911		41,911
Overtime	100		9,011		6,427		6,427		6,427		6,427
Gross Personnel Services		4.0	307,998	4.0	336,826	4.0	336,826	4.0	336,826	4.0	336,826
Net Personnel Services		4.0	307,998	4.0	336,826	4.0	336,826	4.0	336,826	4.0	336,826

Notes:

(1) 1 Position Upgrade from Associate Engineer during FY18

(2) (1) Position Upgrade to Water Resources Engineer Approved during FY18

Sewer Debt Service

The Debt Service account provides for the sewer fund's portion of the principal and interest on the City's outstanding general obligation bonds.

Division Summary

Department: Public Works **Division:** Sewer Debt Service **Account:** 570-31-55

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Contractual Services	10,000	61,274	165,000	165,000	165,000	165,000
Debt Service	7,085,098	7,207,139	7,645,122	7,580,068	7,580,068	7,580,068
Total	7,095,098	7,268,413	7,810,122	7,745,068	7,745,068	7,745,068

Sewer Fringe Benefits

The Fringe Benefits account provides for the sewer fund's portion of the employees' fringe benefit costs as well as its share of the administrative services provided by the City's staff departments.

Division Summary

Department: Public Works **Division:** Sewer Fringe Benefits **Account:** 570-31-56

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Payroll	25,000	0	0	0	0	0
Benefits	866,935	831,632	908,250	950,603	950,603	950,603
Administrative Services	424,627	424,627	424,627	511,722	511,722	511,722
Insurance	30,862	8,321	30,795	30,795	30,795	30,795
Total	1,347,424	1,264,580	1,363,672	1,493,120	1,493,120	1,493,120

PWD Assessment

The Assessment account provides for the monthly assessment from the Portland Water District (PWD) for the filtration plant operations.

Division Summary

Department: Public Works **Division:** PWD Assessment **Account:** 570-31-58

	FY18 Approp.	FY18 Projected Expend.	FY19 Department Submission	FY19 Manager's Recomm.	FY19 Finance Comm.	FY19 Final Allowance
Classification Breakdown						
Administrative Services	12,149,862	12,045,198	12,462,772	12,462,772	12,462,772	12,462,772
Total	12,149,862	12,045,198	12,462,772	12,462,772	12,462,772	12,462,772

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
				$17,900
570-3100-321.04-00		**Licenses and Permits / Street Occupancy / Sewer Connects**		
	1	PUBLIC WORKS ESTIMATE:	0	
	2	.	0	
	3	A) PROJECTED SEWER CONNECTIONS:	0	
	4	(1) CITYWIDE SEWER CONNECTS: 4 * $1,000**	4,000	
	5	(2) CITYWIDE SEWER CONNECTS: 5 * $2,000	10,000	
	6	* ORDINANCE FEE CHAPTER 24-19 (B) & (C)	0	
	7	** BEFORE 11/15/81	0	
	8	.	0	
	9	B) SEWER PERMITS:	0	
	10	(1) PERMITS: 23 * $50*	1,150	
	11	(2) COMBO PERMITS: 55 * $50*	2,750	
	12	* ORDINANCE FEE CHAPTER 24-39	0	
	13	-LAST REVISION: ORDER # 261-01/02 (FY03)	0	
	14	.	0	
	15	LINE HISTORY (ALL FEES):	0	
	16	FY18: EST $17,695	0	
	17	FY17: ACT $16,167	0	
	18	FY16: ACT $15,642 (+ APPROX $4,000 IN 327-00-00)	0	
	19	.	0	
	20	FY19 CALCULATED USING A THREE YEAR AVERAGE	0	
				$4,950
570-3100-327.00-00		**Licenses and Permits / Miscellaneous**		
	1	PUBLIC WORKS:	0	
	2	1) INDUSTRIAL PRE-TREATMENT PERMITS: 16 * $300	4,800	
	3	.	0	
	4	* ORD FEE CHAPTER 24-50; ORDER # 263-96, 05/20/96	0	
	5	.	0	
	6	* HAVE APPROXIMATELY 32 COMPANIES THAT REQUIRE	0	
	7	IPT PERMITS (PERMITS ARE GENERALLY FOR 3 YRS)	0	
	8	.	0	
	9	2) SEALED HOUSE DRAIN PERMITS: 3 * $50	150	
	10	* NO LONGER DO THE WORK, BUT ONLY SUPPLY	0	
	11	INSPECTION SERVICES. FY09 FEE HAS BEEN LOWERED	0	
	12	LOWERED FROM $250 TO $50 TO REFLECT THIS CHANGE	0	
	13	.	0	
	14	LINE HISTORY (ALL):	0	
	15	FY18 EST $5,100	0	
	16	FY17 ACT $9,400	0	
	17	FY16 ACT $6,450	0	
	18	.	0	
				$5,000
570-3100-341.00-00		**Charges for Services / Miscellaneous**		
	1	PUBLIC WORKS ESTIMATE:	0	
	2	SUBMETER PROGRAM: 50 * $100	5,000	
	3	.	0	
	4	FY19 NOTE: WE HAVE GONE FROM CHARGING $360 TO	0	
	5	$100 SINCE THE DEVICE IS NOW SOLD BY	0	
	6	PWD AND WE CHARGE ONLY FOR INSPECTION	0	
	7	.	0	
	8	UPDATED PMH 12/13/17	0	
				$10,000
570-3100-341.70-00		**Charges for Services / Miscellaneous / Lien and Foreclosure Cost**		
	1	FINANCE ENTRY: FY19: $10K	10,000	
	2	EST BASED ON HISTORICAL TRENDS	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
	3	.	0	
	4	HISTORY:	0	
	5	FY17: $8,946	0	
	6	FY16: $11,529	0	
	7	FY15: $19,784	0	
	8	FY14: $11,156	0	
	9	FY13: $14,165	0	
	10	FY12: $10,746	0	
	11	.	0	
				$14,360,496
570-3100-344.10-00		**Charges for Services / User Fees / Residential Sewer Fees**		
	1	*** FY19 FEE INCREASE ***	0	
	2	.	0	
	3	FY19 ORDINANCE FEE CO #217-17/18:	0	
	4	(A) SEWER USER: $9.65 HCF TO $9.95 HCF	0	
	5	.	0	
	6	FY19 RESIDENTIAL SEWER FEES:	0	
	7	$9.95/HCF * 1,443,266 HCF = $14,360,496	14,360,496	
	8	*BASED ON 2017 USAGE; $0.30 = +$432,980	0	
	9	.	0	
	10	*TOTAL UNITS (344-1000 THRU 344-4000): 2,516,830	0	
	11	.	0	
	12	(FINANCE ENTRY)	0	
	13	.	0	
	14	MISC. NOTES:	0	
	15	1) ORD FEE CHAPTER 24-72 (C)	0	
	16	2) NOTE: MINIMUM 2/HCF CHARGE	0	
	17	.	0	
	18	----------	0	
	19	.	0	
	20	RATE INCREASE HISTORY:	0	
	21	FY19 (EFF. 07/01/18): $9.95 (CO #217-17/18)	0	
	22	FY18 (EFF. 07/01/17): $9.65 (CO #245-16/17)	0	
	23	FY17 (EFF. 01/01/17): $9.35/HCF (CO #253-15/16)	0	
	24	FY16 2 TIER RATE:	0	
	25	(A) 07/01/15-$9.70/HCF (CO #250-14/15)	0	
	26	(B) 01/01/16-$8.20/HCF (CO #250-14/15)	0	
	27	FY15: 07/01/14-$8.81/HCF (CO #239-13/14): 5.5% INC	0	
	28	FY14: 07/01/13-$8.35/HCF (CO #222-12/13): 3.0% INC	0	
	29	FY13: 07/01/12-$8.11/HCF	0	
	30	FY12: 07/01/11-$8.11/HCF (CO #227-10/11)	0	
	31	FY11: 07/01/10-$7.87/HCF	0	
	32	FY10: 07/01/09-$7.64/HCF	0	
	33	FY09: 07/01/08-$7.35/HCF	0	
	34	----------	0	
	35	.	0	
	36	CALENDAR YEAR USAGE HISTORY:	0	
	37	2017: 1,443,266 HCF	0	
	38	2016: 1,472,521 HCF	0	
	39	2015: 1,509,212 HCF	0	
	40	2014: 1,535,099 HCF	0	
	41	2013: 1,595,319 HCF	0	
	42	2012: 1,597,711 HCF	0	
	43	.	0	
	44	==========	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
				$8,490,504
570-3100-344.20-00		**Charges for Services / User Fees / Commercial Sewer Fees**		
	1	*** FY19 FEE INCREASE ***	0	
	2	.	0	
	3	FY19 ORDINANCE FEE CO #217-17/18:	0	
	4	(A) SEWER USER: $9.65 HCF TO $9.95 HCF	0	
	5	.	0	
	6	FY19 COMMERCIAL SEWER FEES:	0	
	7	$9.95/HCF * 853,317 HCF = $8,490,504	8,490,504	
	8	*BASED ON 2017 USAGE; $0.30 = +$255,995	0	
	9	.	0	
	10	(FINANCE ENTRY)	0	
	11	.	0	
	12	----------	0	
	13	FEE HISTORY:	0	
	14	*FY19 RATE (07/01/18): $9.95/HCF (CO #217-17/18)	0	
	15	*FY18 RATE (07/01/17): $9.65/HCF (CO #245-16/17)	0	
	16	*FY17 RATE (01/01/17): $9.35/HCF (CO #253-15/16)	0	
	17	*FY16 RATE (01/01/16-12/30/16): $8.20 HCF	0	
	18	(CO #250-14/15)	0	
	19	.	0	
	20	*BASED ON USAGE DATA	0	
	21	----------	0	
	22	.	0	
	23	CALENDAR YEAR USAGE HISTORY:	0	
	24	2017: 853,317 HCF	0	
	25	2016: 819,224 HCF	0	
	26	2015: 810,888 HCF	0	
	27	2014: 777,349 HCF	0	
	28	2013: 776,504 HCF	0	
	29	2012: 798,746 HCF	0	
	30	.	0	
	31	==========	0	
				$1,677,962
570-3100-344.30-00		**Charges for Services / User Fees / Industrial Sewer Fees**		
	1	*** FY19 FEE INCREASE ***	0	
	2	.	0	
	3	FY19 ORDINANCE FEE CO #217-17/18:	0	
	4	(A) SEWER USER: $9.65 HCF TO $9.95 HCF	0	
	5	.	0	
	6	A) FY19 INDUSTRIAL SEWER FEES:	0	
	7	$9.95/HCF * 128,921 HCF = $1,282,764	1,282,764	
	8	*BASED ON 2017 USAGE; $0.30 = +$38,676	0	
	9	.	0	
	10	(FINANCE ENTRY)	0	
	11	.	0	
	12	----------	0	
	13	FEE HISTORY:	0	
	14	*FY19 RATE (07/01/18): $9.95/HCF (CO #217-17/18)	0	
	15	*FY18 RATE (07/01/17): $9.65/HCF (CO #245-16/17)	0	
	16	*FY17 RATE (01/01/17): $9.35/HCF (CO #253-15/16)	0	
	17	*FY16 RATE: $8.20 HCF (CO #250-14/15)	0	
	18	.	0	
	19	BASED ON USAGE DATA	0	
	20	----------	0	
	21	.	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
	22	CALENDAR YEAR USAGE HISTORY:	0	
	23	2017: 128,921 HCF	0	
	24	2016: 128,774 HCF	0	
	25	2015: 133,851 HCF	0	
	26	2014: 132,878 HCF	0	
	27	2013: 136,841 HCF	0	
	28	2012: 155,852 HCF	0	
	29	.	0	
	30	B) FY19 CITY BILLINGS (SEWER ONLY): $395,198	395,198	
	31	*BASED ON FY17 BILLINGS	0	
	32	*LANDFILLS: $ BASED ON YRLY SNOWPILE & RAINFALL	0	
	33	1)*ECOMAINE (MR): $371,599	0	
	34	2)*KIMBERLY CLARK (MR): $21,928	0	
	35	3) INLAND TECHNOLOGIES: $4,086	0	
	36	4) DRUMMAC,: $584	0	
	37	.	0	
	38		0	
				$908,694
570-3100-344.40-00		**Charges for Services / User Fees / Governmental Sewer Fees**		
	1	*** FY19 FEE INCREASE ***	0	
	2	.	0	
	3	FY19 ORDINANCE FEE CO #217-17/18:	0	
	4	(A) SEWER USER: $9.65 HCF TO $9.95 HCF	0	
	5	.	0	
	6	FY19 GOV'T SEWER FEES:	0	
	7	$9.95/HCF * 91,326 HCF = $908,694	908,694	
	8	*BASED ON 2017 USAGE; $0.30 = +$27,398	0	
	9	.	0	
	10	(FINANCE ENTRY)	0	
	11	.	0	
	12	----------	0	
	13	FEE HISTORY:	0	
	14	*FY19 RATE (07/01/18): $9.95/HCF (CO #217-17/18)	0	
	15	*FY18 RATE (07/01/17) $9.65/HCF (CO #245-16/17)	0	
	16	*FY17 RATE (01/01/17): $9.35/HCF (CO #253-15/16)	0	
	17	*FY16 RATE: $8.20 HCF (CO #250-14/15)	0	
	18	.	0	
	19	BASED ON USAGE DATA	0	
	20	----------	0	
	21	.	0	
	22	CALENDAR YEAR HISTORY:	0	
	23	2017: 91,326 HCF	0	
	24	2016: 91,769 HCF	0	
	25	2015: 96,838 HCF	0	
	26	2014: 91,821 HCF	0	
	27	2013: 92,090 HCF	0	
	28	2012: 96,002 HCF	0	
	29	.	0	
	30		0	
	31	.	0	
				$100,400
570-3100-344.50-00		**Charges for Services / User Fees / Commercial Surcharge Inc.**		
	1	FY19 BASED ON FY18 EST. ACTIVITY: $100,400	100,400	
	2	(FINANCE ENTRY)	0	
	3	.	0	
	4	CALENDAR YEAR (PWD) HISTORY:	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
	5	2017: $145,103	0	
	6	2016: $201,891	0	
	7	2015: $160,697	0	
	8	2014: $109,609	0	
	9	2013: $108,694	0	
	10	2012: $133,038	0	
	11	.	0	
				$300,000
570-3100-344.60-00		**Charges for Services / User Fees / Industrial Surcharge Inc.**		
	1	INDUSTRIAL USER SURCHARGE: $300,000	300,000	
	2	(FINANCE ENTRY)	0	
	3	.	0	
	4	CALENDAR YEAR HISTORY:	0	
	5	2017: $311,378	0	
	6	2016: $315,366	0	
	7	2015: $260,850	0	
	8	2014: $244,940	0	
	9	2013: $294,034	0	
	10	2012: $334,253	0	
	11	.	0	
	12	* ORDINANCE CHAPTER 24-73	0	
	13	.	0	
	14	OLD NOTE:	0	
	15	BASED ON APPROX 19 COMPANIES:	0	
	16	VARIABLE RATE BASED ON WATER QUALITY RESULTS	0	
	17	(IE ORGANIC MATERIAL FOUND): BOD & TSS	0	
	18	.	0	
				$50,000
570-3100-361.00-00		**Uses of Money & Property / Interest Income**		
	1	BASED ON MARKET AND CASH BALANCES: $50,000	50,000	
	2	(FINANCE ENTRY)	0	
	3	.	0	
	4	HISTORY:	0	
	5	FY17: $48,414	0	
	6	FY16: $36,275	0	
	7	FY15: $34,822	0	
	8	FY14: $28,237	0	
	9	FY13: $26,208	0	
	10	.	0	
				$5,000
570-3100-361.30-00		**Uses of Money & Property / Interest Income / Intrst/Pnlt-Delinquencies**		
	1	BASED ON HISTORICAL ACTIVITY: $5,000	5,000	
	2	(FINANCE ENTRY)	0	
	3	.	0	
	4	HISTORY:	0	
	5	FY17: $9,941	0	
	6	FY16: $13,529	0	
	7	FY15: $34,072	0	
	8	FY14: $32,315	0	
	9	FY13: $22,941	0	
	10	.	0	
				$54,254
570-3100-391.00-00		**Other Financing Resources / Operating Transfers In**		
	1	WINTER (GF) REGULAR HOURS WAGE REIMB: $54,254	0	
	2	(PUBLIC WORKS ENTRY)	0	
	3	.	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
	4	1) 15 EE * 8HRS * 16HRS *$23.07 AVG HRLY RATE	44,294	
	5	2) WINTER STIPEND (3112)	9,720	
	6	3) WINTER STIPEND (3115)	240	
	7	.	0	
	8	UPDATED PMH 1/19/18	0	
				$29,399
570-3100-394.00-00		**Other Financing Resources / Fund Bal. Appropriation**		
	1	FY19 SEWER FUND ESTIMATED FUND SURPLUS (-)/ USE+	29,399	
	2	(04/08/18):	0	
	3	FY19 REVENUES: ($26,292,128)	0	
	4	FY19 EXPENSES: $26,321,527	0	
	5	═══════════════	0	
	6	FY19 FUND BAL (SURPLUS)/+USE: $29,399	0	
	7	.	0	
	8	CM LVL CHANGES:	0	
	9	A) HEALTH INSUR. EXP INCR (03/15/18): +$42,353	0	
	10	B) DEBT SVC EXP DECR (03/15/18): (-$65,054)	0	
	11	C) INDRIECTS (04/08/18): +$87,095	0	
	12	.	0	
				$238,931
570-3100-395.00-00		**Other Financing Resources / Enterprise Fund Charges**		
	1	FY19 STORMWATER (FUND 571) REIMB	0	
	2	(PUBLIC WORKS ENTRY):	0	
	3	.	0	
	4	A) FROM STORMWATER (571-3140-500): T-$195,565	195,565	
	5	(1) WATER RES MGR: $95,725 * 50% = $47,862	0	
	6	(2) COMPL SECT COORD: $77,002 * 50% = $38,501	0	
	7	(3) ASSET MGR $66,680 * 50% = $33,340	0	
	8	(4) 1 ASSET MGR TECH (AF)$50,408 * 50% = $25,204	0	
	9	(5) SR WATER RSCS TECH: $48,648 * 50% = $23,334	0	
	10	(6) WATER QUALITY TECH: $52,669 * 50% = $26,334	0	
	11	.	0	
	12	B) STORMWATER WAGE REIMB: T-$43,366	43,366	
	13	1) SR ENGINEER (BR): $86,731 * 50% = $43,366	0	
	14	.	0	
	15	*ALSO SEE STORMWATER FRINGE REIMB (398-0100)	0	
	16	.	0	
				$68,037
570-3100-398.01-00		**Other Financing Resources / Reimbursements / Fringe Benefits**		
	1	1) FY19 STORMWATER FRINGE REIMB: $68,037	68,037	
	2	.	0	
	3	(PUBLIC WORKS ENTRY)	0	
	4	.	0	
	5	FY19 STORMWATER WAGE REIMB: $230,869	0	
	6	*BASED ON 570-3100-395-0000	0	
	7	.	0	
	8	FY18 FRINGE: T-68,037	0	
	9	A) MEDICARE/FICA: 1.45% * $230,869 = $3,348	0	
	10	B) PENSION: 9.6% (FY18) * $230,869 = 22,163	0	
	11	C)*HEALTH INSURANCE: 18.42% * $230,869 = $42,526	0	
	12	.	0	
	13	*ALSO SEE STORMWATER WAGE REIMB (395-0000)	0	
	14	.	0	
	15	NEED TO UPDATE WHEN PRELIM WAGE IS AVAILABLE	0	
	16	.	0	

FY19 FA Revenue Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 00		*Sewer Utility*		
		Division Total: 31 00 Public Works		$26,321,527
		Department Total: 31 Public Works		$26,321,527

Personnel Services Detail

Department: Public Works **Division:** Sewer Public Works Administration **Account:** 570-31-01

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Water Resources Manager	100	1.0	93,854	1.0	95,725	1.0	95,725	1.0	95,725	1	95,725
Compliance Section Coordinator	100	1.0	67,322	1.0	77,002	1.0	77,002	1.0	77,002	1	77,002
Asset Manager	100	1.0	64,457	1.0	66,680	1.0	66,680	1.0	66,680	1	66,680
(1) Water Quality Technician	100	1.0	51,556	2.0	98,338	2.0	98,338	2.0	98,338	2	98,338
Senior Water Resouces Tech	100	1.0	49,103	1.0	48,648	1.0	48,648	1.0	48,648	1	48,648
Asset Management Tech	100	2.0	94,735	2.0	99,620	2.0	99,620	2.0	99,620	2	99,620
(2) Water Resources Support Svc S	100	0.0	0	1.0	41,866	1.0	41,866	1.0	41,866	1	41,866
(3) Call Center Specialist	100	1.0	41,048	0.0	0	0.0	0	0.0	0	0	0
Charges from Admin (GF)	100		76,422		78,652		78,652		78,652		78,652
Overtime	100		14,771		2,781		2,781		2,781		2,781
Gross Personnel Services		8.0	553,268	9.0	609,312	9.0	609,312	9.0	609,312	9.0	609,312
Net Personnel Services		8.0	553,268	9.0	609,312	9.0	609,312	9.0	609,312	9.0	609,312

Notes:

(1) 1 Position Transferred from Stormwater Fund (571-3140) during FY18

(2) 1 Position Title Change from Call Center Specialist during FY18

(3) (1) Position Title Change to WR Support Svc Specialist during FY18

FY19 DIVISION LINE ITEM SUMMARY
REPORT: FA-LINE

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31 Public Works							
DIV 01 Administration							
570-3101-500.01-10	Salaries and Wages	538,497	506,400	606,531	606,531	606,531	606,531
570-3101-500.01-30	Temporary Help	0	3,203	0	0	0	0
570-3101-500.01-40	Overtime Payments	14,771	2,937	2,781	2,781	2,781	2,781
*	Payroll	553,268	512,540	609,312	609,312	609,312	609,312
570-3101-500.02-71	Wearing Apparel	1,740	1,430	1,260	1,260	1,260	1,260
570-3101-500.02-74	Cellular Phones	3,240	3,136	4,320	4,320	4,320	4,320
*	Benefits	4,980	4,566	5,580	5,580	5,580	5,580
570-3101-500.20-00	Administrative Services	2,085	2,038	1,675	1,675	1,675	1,675
570-3101-500.20-10	Postage and Freight	300	103	150	150	150	150
570-3101-500.20-20	Travel/Training/Meetings	18,842	15,571	22,095	22,095	22,095	22,095
570-3101-500.20-40	Taxes & Licenses	6,300	8,338	7,600	7,600	7,600	7,600
*	Administrative Services	27,527	26,050	31,520	31,520	31,520	31,520
570-3101-500.35-00	Contractual Services	125,100	123,969	40,000	40,000	40,000	40,000
570-3101-500.35-10	Advertising	2,000	2,000	2,000	2,000	2,000	2,000
570-3101-500.35-50	Lab and Medical Services	6,250	3,509	6,250	6,250	6,250	6,250
57[illegible]01-500.35-60	Printing	200	200	200	200	200	200
*	Contractual Services	133,550	129,678	48,450	48,450	48,450	48,450
570-3101-500.40-15	Computer Equipment	48,500	48,500	62,333	62,333	62,333	62,333
570-3101-500.40-20	Other Equipment	1,500	1,500	1,250	1,250	1,250	1,250
*	Maintenance and Repairs	50,000	50,000	63,583	63,583	63,583	63,583
570-3101-500.45-30	Office Equipment Rental	1,008	1,020	1,008	1,008	1,008	1,008
*	Rentals	1,008	1,020	1,008	1,008	1,008	1,008
570-3101-500.55-60	Minor Equipment	15,000	15,242	2,700	2,700	2,700	2,700
570-3101-500.55-65	Computers & Technology	8,450	7,863	17,250	17,250	17,250	17,250
570-3101-500.55-70	Office Supplies	2,000	1,976	1,250	1,250	1,250	1,250
*	Supplies	25,450	25,081	21,200	21,200	21,200	21,200
570-3101-500.56-00	Minor Capital Items	12,000	11,478	0	0	0	0
*	Minor Capital Items	12,000	11,478	0	0	0	0

AC T NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31	Public Works						
DIV 01	Administration						
**	Administration	807,783	760,413	780,653	780,653	780,653	780,653

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57 31 01		*Sewer Utility Administration*		
				$606,531
570-3101-500.01-10		**Payroll / Salaries and Wages**		
	1	1) FY19 9.0 FTE COUNT	527,879	
	2	.	0	
	3	FY19 POSITION NOTES:	0	
	4	1 WATER QUALITY TECH TRANSFERRED FROM 571	0	
	5	DURING FY18	0	
	6	1 POSITION TITLE CHANGE FROM CALL CENTER	0	
	7	SPECIALIST TO WR SUPPORT SERVICE SPECIALIST	0	
	8	DURING FY18	0	
	9	.	0	
	10	2) OTHER WAGES	0	
	11	A) INCLUDES CHARGES FROM GF ADMIN: T-$78,652	0	
	12	(1) DIR (FROM 31-01): $121,192 * 25% = $30,298	30,298	
	13	(2) PAO II (FROM 31-01): $78,977 * 25% = $19,744	19,744	
	14	(3) FA (FROM 31-01): $773,626 * 25% = $18,407	18,407	
	15	(4) ACCT (FROM 31-01): $40,814 * 25% = $10,203	10,203	
	16	(*BOOKED AS REVENUE TO 100-3101-395-0000)	0	
	17	.	0	
	18	B) INCLUDES CHARGES TO STORMWATER: T- $195,565	0	
	19	(1) WATER RES MGR: $95,725 * 50% = $47,862	0	
	20	(2) COMPL SECT COORD: $77,002 * 50% = $38,501	0	
	21	(3) ASSET MGR: $66,680 * 50% = $33,340	0	
	22	(4) 1 ASSET MGR TECH:(AF)$50,408 * 50% = $25,204	0	
	23	(5) SR WATER RSCS TECH: $48,648 * 50% = $24,324	0	
	24	(6) 1WATER QUALITY TECH: $52,699 * 50% = $26,334	0	
	25	(*BOOKED AS REVENUE BUDGETED 570-3100-395-0000)	0	
	26	.	0	
	27	UPDATED PMH 1/19/18	0	
				$2,781
570-3101-500.01-40		**Payroll / Overtime Payments**		
	1	A) SEWER ADMIN OT:	0	
	2	1) CUSTOMER SERVICE: 10 HRS * $21.47 * 1.5X	322	
	3	2) ASSET MANAGEMENT: 20 HRS * $28.63 * 1.5X	859	
	4	3) SANITARY SEWER PROG ENF: 40 HRS * $40.00	1,600	
	5	.	0	
	6	UPDATED PMH 1/11/18	0	
				$1,260
570-3101-500.02-71		**Benefits / Wearing Apparel**		
	1	1) CONTRACTUAL CLOTHING:	0	
	2	BOOT ALLOWANCE (AF, JH, MM, VAC, BP, JG)	960	
	3	2) GLOVES, HATS, REFLECTIVE GEAR ETC	300	
	4	.	0	
				$4,320
570-3101-500.02-74		**Benefits / Cellular Phones**		
	1	1) WATER RESOURCES MGR (NG): $30 * 12 MOS	360	
	2	2) SR WATER RESOURCES TECH (VAC): $30 * 12 MOS	360	
	3	3) DATA PLANS: 6 * $50 MO * 12 MOS	3,600	
	4	.	0	
				$1,675
3101-500.20-00		**Administrative Services**		
	1	1) REFERENCE BOOKS	100	
	2	2) WEF/NEWEA DUES (NG)(JG)(BP)(AF)(JH) $185	925	
	3	3) ASCE DUES (BP)	245	
	4	4) MEWEA DUES (NG,JG,BP,AF,JH,CM,VAC,CE)	245	
	5	5) APWA DUES (NG)	160	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 01		*Sewer Utility Administration*		
	6	.	0	
570-3101-500.20-10		**Administrative Services / Postage and Freight**		**$150**
	1	MINIMAL AMOUNT BUDGETED FOR EPA MAILINGS ETC	75	
	2	SEWER UTILITY ADMIN MAILINGS (DEP/EPA/INDUSTRY)	75	
570-3101-500.20-20		**Administrative Services / Travel/Training/Meetings**		**$22,095**
	1	1) EMPL APPRECIATION FUNCTIONS (25% SF / 75% GF):	0	
	2	A) AWARDS CELEBRATION : $2,800 * 25%	700	
	3	B) HOLIDAY MEAL: $2,800 * 25%	700	
	4	2) MEETINGS/LUNCHEONS	300	
	5	3) LICENSE RENEWAL (NG)	200	
	6	4) WEF CONFERENCE (NG)	3,000	
	7	5) STORMWATER OR UTILITY MGT CONFERENCE (NG)	2,000	
	8	6) EPA REGION 1 IPP CONF (CM, VAC, BP)	300	
	9	7) ENVIRONMENTAL:	0	
	10	A) EPA/DEP SEMINARS: 2 * $300	600	
	11	B) MEWEA COURSES: 4 * $300	1,200	
	12	8) NEARC FALL CONF (JG OR JH) (THREE DAY)	1,250	
	13	9) NEWEA CONG (BP) 1 DAY	345	
	14	10) NEWEA CONF (AF,JH,JG)	4,000	
	15	11) ASSET MGT/GIS TRAINING (JG,AF,JH)	2,000	
	16	12) ASCE TECHNICAL SEMINAR (BP)	200	
	17	13) MEWEA SPRING CONF (VAC,CM,BP,JG,AF,JH)	750	
	18	14) MEWAE FALL CONF (VAC,CM,BP,JG,AF,JH)	1,250	
	19	15) ESRI WATER (JG)	3,000	
	20	16) OSHA REFRESHER (CM)	300	
	21	.	0	
570-3101-500.20-40		**Administrative Services / Taxes & Licenses**		**$7,600**
	1	1) WASTE DISCHARGE LIC CSO (MEPDES) (FROM 3137)	1,200	
	2	2) WATER QUALITY IMPROV FUND (DEP) (FROM 3137)	6,400	
	3	.	0	
570-3101-500.35-00		**Contractual Services**		**$40,000**
	1	1) BUSINESS LICENSING FOG INSPECTOR CHG	40,000	
	2	.	0	
	3	FY19 FOG REVENUE: 100-2504-395-0000: $40,000	0	
	4	(02/14/18)	0	
	5	.	0	
570-3101-500.35-10		**Contractual Services / Advertising**		**$2,000**
	1	1) NEWSPAPER/PROFESSIONAL JOURNALS FOR POSITION	1,500	
	2	OPENINGS	0	
	3	2) IPT ASSOC NEWSPAPER ADVERTISING	500	
	4	.	0	
570-3101-500.35-50		**Contractual Services / Lab and Medical Services**		**$6,250**
	1	1) RESPIRATOR FIT TESTING & MEDICAL SERVICES:	0	
	2	A) QUESTIONNAIRES: 20 * $10	200	
	3	B) FIT TEST SUPPLIES (PURCHASED BY CITY HALL)	300	
	4	C) ADDITIONAL MEDICAL TESTING	1,200	
	5	.	0	
	6	2) PRE-EMPLOYMENT PHYSICALS: 3 * $100	300	
	7	.	0	
	8	3) HEPATITIS SHOTS FOR NEW EMPLOYEES:	0	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
5 31 01		*Sewer Utility Administration*		
	9	3 EMPL * $250 PER SERIES	750	
	10	.	0	
	11	4) MEDICAL EVALUATION: FIT FOR DUTY	3,500	
	12	.	0	
570-3101-500.35-60		**Contractual Services / Printing**		**$200**
	1	OUTSIDE PRINTING SERVICES	200	
	2	.	0	
570-3101-500.40-15		**Maintenance and Repairs / Computer Equipment**		**$62,333**
	1	1) CITIWORKS MAINTENANCE (EXCL STORMWATER):	47,333	
	2	2/3% SEWER & 1/3% GENERAL ADMIN ($71,000 / 3)	0	
	3	2) IT PIPES ANNUAL LICENSE	1,800	
	4	3) CITYWORKS INSIGHTS LICENSE	6,000	
	5	4) LINKO RENEWAL	5,500	
	6	5) COMPUTER SOFTWARE UPGRADE MS OFFICE (JH, AF)	700	
	7	6) COMPUTER SOFTWARE CRYSTAL REPORTS (JH, AF)	1,000	
	8	.	0	
570-3101-500.40-20		**Maintenance and Repairs / Other Equipment**		**$1,250**
	1	1) COMPUTER,FAX MACHINE,COLOR PRINTER REPAIRS	250	
	2	2) ANNUAL MAINTENANCE & REPAIR OF:	500	
	3	SAMPLERS, FLOWMETERS, AIRBLOWERS & GAS DETECTORS	0	
	4	3) 2 WAY RADIO REPAIR	500	
5 101-500.45-30		**Rentals / Office Equipment Rental**		**$1,008**
	1	OFFICER COPIER RENTAL	1,008	
570-3101-500.55-60		**Supplies / Minor Equipment**		**$2,700**
	1	1) EMPLOYEE AWARDS/PLAQUES	700	
	2	2) MISC MINOR EQUIPMENT: (INCLUDING NEW STAFF)	2,000	
	3	ERGONOMIC CHAIRS, ETC	0	
	4	.	0	
570-3101-500.55-65		**Supplies / Computers & Technology**		**$17,250**
	1	1) COMPUTERS (2) REPLACEMENTS	4,500	
	2	2) IPAD (VAC)	800	
	3	3) 20 TB WINDOWS SERVER/DRIVE $20,000	10,000	
	4	(1/2 GR ENG/1/2 SEWER ADMIN)	0	
	5	4) COMPUTER UPGRADES/HARDWARE ETC	1,950	
570-3101-500.55-70		**Supplies / Office Supplies**		**$1,250**
	1	1) OFFICE SUPPLIES:	0	
	2	A) CALENDARS,BINDERS,GENERAL SUPPLIES	500	
	3	B) PAPER: 25 CASES * $30	750	
	4	.	0	
		Division Total: 31 01 Administration		**$780,653**

Personnel Services Detail

Department: Public Works | Division: Sewer Districting | Account: 570-31-12

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Wastewater Facilites Coord	100	1.0	73,554	1.0	75,036	1.0	75,036	1.0	75,036	1	75,036
(1) Water Resources Supervisor	100	0.0	0	3.0	161,678	3.0	161,678	3.0	161,678	3	161,678
(2) Sr Public Works Supervisor	100	3.0	149,323	0.0	0	0.0	0	0.0	0	0	0
(3) Sewer Inspector	100	3.0	161,928	0.0	0	0.0	0	0.0	0	0	0
(4) Sewer Facilities Technician	100	1.0	44,325	0.0	0	0.0	0	0.0	0	0	0
(5) Water Resources Maint Wkr III	100	0.0	0	6.0	330,346	6.0	330,346	6.0	330,346	6	330,346
(6) Water Resources Maint Wkr II	100	0.0	0	6.0	271,315	6.0	271,315	6.0	271,315	6	271,315
(7) Maintenance Worker III	100	9.0	398,923	0.0	0	0.0	0	0.0	0	0	0
(8) Water Resources Maint Wkr I	100	0.0	0	3.0	118,267	3.0	118,267	3.0	118,267	3	118,267
Meal Allow/Standby Pay	100		27,206		26,779		26,779		26,779		26,779
Winter Stipends	100		0		9,720		9,720		9,720		9,720
Temporary Help	100		40,000		0		0		0		0
Overtime	100		48,981		55,504		55,504		55,504		55,504
Gross Personnel Services		17.0	944,240	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645
Net Personnel Services		17.0	944,240	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645	19.0	1,048,645

Notes:

(1) 3 Position Title Changes from Sr Public Svcs Supervisor during FY18
(3) Position Title Changes to WR Supervisor during FY18
(3) (3) Position Title Changes to WR MW III during FY18
(4) (1) Position Title Change to WR MW II during FY18
(5) 3 Title Changes from Sewer Inspector during FY18; 3 Upgrades from MW III during FY18
(6) 3 Title Chgs from MW III, 1 Title Chg from Sewer Fac Tech & 2 Tfrs from Stormwater (571) during FY18
(7) (3) Title Chg. to WR MW II, (3) Reclasses to WR MW I & (3) Upgrade to WR MW III during FY18
(8) 3 Position Reclasses from MW III during FY18

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31	Public Works						
DIV 12	Districting						
570-3112-500.01-10	Salaries and Wages	855,259	855,541	993,141	993,141	993,141	993,141
570-3112-500.01-30	Temporary Help	40,000	0	0	0	0	0
570-3112-500.01-40	Overtime Payments	48,981	59,851	55,504	55,504	55,504	55,504
*	Payroll	944,240	915,392	1,048,645	1,048,645	1,048,645	1,048,645
570-3112-500.02-71	Wearing Apparel	13,765	11,586	17,305	17,305	17,305	17,305
570-3112-500.02-74	Cellular Phones	720	1,504	5,436	5,436	5,436	5,436
*	Benefits	14,485	13,090	22,741	22,741	22,741	22,741
570-3112-500.20-00	Administrative Services	2,160	1,829	1,485	1,485	1,485	1,485
570-3112-500.20-10	Postage and Freight	1,300	1,200	3,000	3,000	3,000	3,000
570-3112-500.20-20	Travel/Training/Meetings	21,760	17,016	11,560	11,560	11,560	11,560
570-3112-500.20-40	Taxes & Licenses	38,500	36,113	45,500	45,500	45,500	45,500
*	Administrative Services	63,720	56,158	61,545	61,545	61,545	61,545
570-3112-500.35-00	Contractual Services	981,776	905,579	974,539	974,539	974,539	974,539
570-3112-500.35-10	Advertising	500	418	500	500	500	500
3112-500.35-60	Printing	2,000	1,030	2,000	2,000	2,000	2,000
*	Contractual Services	984,276	907,027	977,039	977,039	977,039	977,039
570-3112-500.40-10	Buildings	222,500	221,530	270,000	270,000	270,000	270,000
570-3112-500.40-20	Other Equipment	196,500	195,683	154,500	154,500	154,500	154,500
570-3112-500.40-30	Vehicles	12,000	11,955	15,000	15,000	15,000	15,000
570-3112-500.40-31	Veh. Commercial Repairs	10,000	10,077	5,000	5,000	5,000	5,000
570-3112-500.40-32	Veh. Labor (Internal)	10,000	10,072	10,000	10,000	10,000	10,000
570-3112-500.40-33	Vehicle Tires	3,000	3,052	2,000	2,000	2,000	2,000
*	Maintenance and Repairs	454,000	452,369	456,500	456,500	456,500	456,500
570-3112-500.45-10	Land and Building Rentals	13,608	13,608	13,608	13,608	13,608	13,608
570-3112-500.45-20	Vehicle/Equipment Rental	41,000	41,053	51,000	51,000	51,000	51,000
*	Rentals	54,608	54,661	64,608	64,608	64,608	64,608
570-3112-500.55-10	Agricultural Supplies	10,000	9,961	19,000	19,000	19,000	19,000
570-3112-500.55-20	Supplies - All Other	23,700	23,631	23,700	23,700	23,700	23,700
570-3112-500.55-30	Construction Supplies	117,100	117,080	117,100	117,100	117,100	117,100
570-3112-500.55-35	Cleaning Supplies	5,000	5,002	5,000	5,000	5,000	5,000
570-3112-500.55-40	Fuel - Vehicles	20,200	20,131	25,800	25,800	25,800	25,800
570-3112-500.55-60	Minor Equipment	24,000	24,320	24,000	24,000	24,000	24,000
570-3112-500.55-65	Computers & Technology	6,000	6,047	9,000	9,000	9,000	9,000

A IT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31 Public Works							
DIV 12 Districting							
570-3112-500.55-70	Office Supplies	6,700	6,661	8,700	8,700	8,700	8,700
*	Supplies	212,700	212,833	232,300	232,300	232,300	232,300
570-3112-500.63-10	Gas Service	0	267	0	0	0	0
570-3112-500.63-15	Heating Fuel	17,405	23,970	25,105	25,105	25,105	25,105
570-3112-500.63-20	Electricity	54,265	49,411	54,265	54,265	54,265	54,265
570-3112-500.63-30	Water and Sewer Charges	7,300	253	7,300	7,300	7,300	7,300
570-3112-500.63-35	Stormwater charges	18,674	18,000	18,674	18,674	18,674	18,674
570-3112-500.63-40	Telephone	12,840	12,035	15,484	15,484	15,484	15,484
*	Utilities	110,484	103,936	120,828	120,828	120,828	120,828
570-3112-500.70-40	Other Equipment	12,000	12,000	35,000	35,000	35,000	35,000
*	Capital Outlay	12,000	12,000	35,000	35,000	35,000	35,000
**	Districting	2,850,513	2,727,466	3,019,206	3,019,206	3,019,206	3,019,206

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57	.1 12	*Sewer Utility Districting*		
				$993,141
570-3112-500.01-10		**Payroll / Salaries and Wages**		
	1	1) FY19 WAGES: 19.0 FTE	956,642	
	2	.	0	
	3	FY19 DR POSITION NOTES:	0	
	4	A) 3 SR PUBLIC WORKS SUPERVISORS TITLE CHG TO	0	
	5	WR SUPERVISOR DURING FY18	0	
	6	B) 3 SEWER INSPECTOR TITLE CHANGE TO WR MW III	0	
	7	DURING FY18	0	
	8	C) 1 SEWER FACILITIES TECH TITLE CHANGE TO	0	
	9	WR MW II DURING FY18	0	
	10	D) 3 MW III TITLE CHG TO WR MW II DURING FY18	0	
	11	E) 3 MW III UPGRADED TO WR MW III DURING FY18	0	
	12	F) 3 MW III RECLASSED TO WR MW I DURING FY18	0	
	13	G) 2 WR MW II TRANS FROM STRMWTR (571) IN FY18	0	
	14	.	100	
	15	2) MEAL ALLOWANCE:	0	
	16	10 MISC OFF SEASON * $10	0	
	17	.	0	
	18	3) WINTER STIPEND: T-$9,720	8,160	
	19	A) 17 EE * $.60 * 40 HRS * 20 WKS	960	
	20	B) 4 EE * $.30 * 40 HRS * 20 WKS	600	
	21	C) 1 SUPV 2ND SFT $.75 * 40 HRS * 20 WKS	0	
	22	NOTE: ALL WINTER STIPENDS TO BE REIMBURSED	0	
	23	BY WINTER BUDGET 100-3138-430-0110	0	
	24	.	0	
	25	4) STANDBY PAY: T-$26,679	0	
	26	A) SEWER PRIMARY BEEPER (19M HOURLY RATE):	6,740	
	27	(1) 249 DAYS * $27.07	4,711	
	28	(2) 116 DAYS * $40.61 ($27.07*1.5)	0	
	29	B) SEWER SECONDARY BEEPER (MW III):	4,482	
	30	(1) 249 DAYS * $18.00	3,132	
	31	(2) 116 DAYS * $27.00	0	
	32	C) PUMP STATIONS:	4,482	
	33	(1) 249 DAYS * $18.00	3,132	
	34	(2) 116 DAYS * $27.00	0	
	35	.	0	
	36	UPDATED PMH 1/11/18		
				$55,504
570-3112-500.01-40		**Payroll / Overtime Payments**		
	1	1) WEEKEND INSPECTIONS:	0	
	2	WW INSPCTR: 180 HRS * $34.23 ($22.82 * 1.5X)	6,161	
	3	2) PUMPING STATIONS AND SEWER EMERGENCIES:	0	
	4	A) SEWER FAC TECH: 100 HRS*$34.23 ($22.82*1.5X)	3,423	
	5	B) WW COORD: 100 HRS * $38.48	3,848	
	6	3) INSPECTIONS (DIGSAFES, SEWER EMERGENCIES):	0	
	7	A) SW INSP: 3 EE*130 HRS * $34.23 ($22.82*1.5X)	13,350	
	8	4) SEWER/STREET INFRASTRUCTURE CLEANING (MW III):	0	
	9	A) NIGHTS: 2 EE*155 HRS* $34.23 ($22.82 * 1.5X)	10,611	
	10	B) BACKUPS: 2 EMPL * 155 HRS * $34.23	10,611	
	11	5) SUPERVISOR MISC: $37.50 * 200 HRS	7,500	
	12	.	0	
	13	OT HISTORY (INCLUDING CALLBACK):	0	
	14	FY17: $55,579	0	
	15	FY16: $35,444	0	
	16	FY15: $41,438	0	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57 1 12		*Sewer Utility Districting*		
	17	FY14: $35,189	0	
	18	.	0	
570-3112-500.02-71		**Benefits / Wearing Apparel**		$17,305
	1	1) CONTRACTUAL CLOTHING: 19 EE * $375	7,125	
	2	.	0	
	3	2) NON-CONTRACTUAL CLOTHING:	0	
	4	A) SAFETY CLOTHING (TYVEK SUITS, GLOVES, ETC):	2,850	
	5	19 EMPL * $150	0	
	6	B) EMERGENCY UNIFORM REPLACEMENTS	1,000	
	7	C) FOUL WEATHER GEAR	1,200	
	8	.	0	
	9	3) SAFETY STIPEND FOR L&T, SUPV:	3,960	
	10	A) 15 EE * $200 = $3,000	0	
	11	B) 4 EE * $240 = $960	0	
	12	.	0	
	13	4) L&T PPE: 18 * $65	1,170	
	14	.	0	
570-3112-500.02-74		**Benefits / Cellular Phones**		$5,436
	1	1) CELL PHONE REIMBURSEMENT PLAN (JE, RK, GJ):	1,080	
	2	3 EE * $30 * 12 MOS	0	
	3	.	0	
	4	2) VERIZON WIRELESS AIRCARD: 6 EE * 30/MO * 12 MOS	2,160	
	5	A) 272-0601 CL TRUCK	0	
	6	B) 650-1492 JS LAPTOP/TRUCK	0	
	7	C) 317-1561 JM TRUCK	0	
	8	D) 650-2117 FR LAPTOP	0	
	9	E) 272-0152 JE LAPTOP	0	
	10	F) 232-5036 RK	0	
	11	.	0	
	12	3) VERIZON ACCOUNTS OTHER: 6 EE * $10.50 * 12 MOS	756	
	13	A) 233-0251	0	
	14	B) 233-1958	0	
	15	C) 650-6624 DPS127 PUMP STATION	0	
	16	D) 650-7372 DPS128 CATCH BASIN	0	
	17	E) 650-7832 DPS129 VACTOR OPERATION	0	
	18	F) 650-8068 FIELD INSPECTION	0	
	19	.	0	
	20	4) VERIZON CITY CELL PHONES: 4 EE * $30 * 12 MOS	1,440	
	21	A) 232-8732 RG	0	
	22	B) 650-5379 JS	0	
	23	C) 653-2932 FR	0	
	24	D) 653-4961 CL	0	
	25	.	0	
570-3112-500.20-00		**Administrative Services**		$1,485
	1	1) WATER ENVIRONMENT FEDERATION	400	
	2	2) MAINE WASTEWATER CONTROL ASSOC: 10 * $60	600	
	3	(JS, FR, CL, JE, RG, GJ, RK, DD, WG, PG)	0	
	4	3) APWA (JE)	200	
	5	4) MEWEA: 19 * $15	285	
	6	.	0	
570-3112-500.20-10		**Administrative Services / Postage and Freight**		$3,000
	1	1) FREIGHT FOR SEWER EQUIPMENT REPAIRS	1,000	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
5 31 12		*Sewer Utility Districting*		
	2	IE: GAS DETECTORS AND WINCH RECERTS	0	
	3	.	0	
	4	2) FREIGHT FOR SEWER CAMERA REPAIRS	2,000	
	5	.	0	
570-3112-500.20-20		**Administrative Services / Travel/Training/Meetings**		**$11,560**
	1	1) OSHA HAZ WASTE REFRESHER: 6 * $200 (WR MW III)	1,200	
	2	2) RECERTIFICATION FOR WASTEWATER LICENSES	2,860	
	3	THROUGH JETCC : 11 * $260	0	
	4	**INCLUDES 4 WR MW II IS STORMWATER	0	
	5	3) NASSCO TRAINING/RECERT (PIPELINE ASSMT):	4,500	
	6	3 SUPV/6 WR MW III = 2 * $2,250	0	
	7	4) NEWEA CONFERENCE (JE)	1,000	
	8	5) MANAGEMENT CANDIDATE SCHOOL: 2 * $1,000 (RK+1)	2,000	
	9	.	0	
570-3112-500.20-40		**Administrative Services / Taxes & Licenses**		**$45,500**
	1	PERMANENT STREET OPENING REPAIRS:	45,500	
	2	700 SQ YD * $65	0	
	3	.	0	
570-3112-500.35-00		**Contractual Services**		**$974,539**
	1	1) SEWER DISTRICTING 100% CHARGES:	0	
	2	A) RAT CONTROL (EMPHASIS ON PENINSULA)	8,000	
	3	B) ELECTRICAL SYSTEM REPAIRS (CONTRACTED OUT)	20,000	
	4	FOR CODE VIOLATIONS	0	
	5	C) SCADA MONITORING CONTRACT: 12 MO * $1,100	30,000	
	6	D) GAS DETECTION DEVICE MONITORING:	7,200	
	7	SET IN CRADLES,CHECKED THROUGH INTERNET	0	
	8	.	0	
	9	2) % SPLIT WITH STORMWATER (571-3140-500-3500):	0	
	10	TOTAL DR COST: $74,152	0	
	11	(A) FUND 570 DR COST:	0	
	12	(B) FUND 571 DR COST: $25,076	0	
	13	A) VACTOR TRUCK DISPOSAL COSTS (ECOMAINE):	48,000	
	14	400 TONS * $120	0	
	15	-LESS STORMWATER (25%): $48,000 * 25%	-12,000	
	16	-SEWER DISTRICTING (75%) $36,000	0	
	17	B) DIG SAFE: 12 * $1,769.83	21,238	
	18	-LESS STORMWATER (50%): $21,238 * 50%	-10,619	
	19	-SEWER DISTRICTING (50%): $10,619	0	
	20	C) ANSWERING SERVICE (STERICYCLE)	4,200	
	21	-LESS STORMWATER (50%): $4,200 * 50%	-2,100	
	22	-SEWER DISTRICTING (50%): $2100	0	
	23	.	0	
	24	3) CONTRACTED MANHOLE STRUCTURE ADJUSTMENTS:	150,000	
	25	75 * $2,000	0	
	26	4) CONFINED SPACE RESCUE OSHA MANDATED-PFD	70,000	
	27	FLAT FEE TO FIRE DEPT RESCUE TEAM	0	
	28	5) RIGHT-OF-WAY SURVEY	10,000	
	29	6) DEFECTIVE SEWER LATERAL INVESTIGATION	7,500	
	30	OUTSIDE HIRED PLUMBING SERVICES:	0	
	31	15 LATERALS * $500 HOUSE	0	
	32	7) COLLAPSE SEWER REPAIRS	340,000	
	33	8) SEWER INSPECTIONS	250,000	
	34	9) SOLAR FEASIBILITY STUDY	30,000	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
5 31 12		*Sewer Utility Districting*		
	35	10) FLOOR MAT SERVICES (CINTAS): $60 * 52 WKS	3,120	
	36	.	0	
				$500
570-3112-500.35-10		**Contractual Services / Advertising**		
	1	RFP'S & RFQ'S	500	
	2	.	0	
				$2,000
570-3112-500.35-60		**Contractual Services / Printing**		
	1	1) MAILINGS & DOOR HANGERS/NOTICES	900	
	2	2) BUSINESS CARDS	200	
	3	3) OTHER	900	
				$270,000
570-3112-500.40-10		**Maintenance and Repairs / Buildings**		
	1	1) PUMPING STATIONS: (9 STATIONS)	0	
	2	A) SECURITY FENCE AT CASTINE	15,000	
	3	B) ELECTRICAL RPRS & LOCAL ALARM SYSTEMS	15,000	
	4	2) STRUCTURAL STEEL	50,000	
	5	NOTE: DRAINAGE SWPP IMPROV AT 109	0	
	6	3) WASH BAY AT 109	150,000	
	7	NOTE: FIRE/SOLID WASTE...	0	
	8	4) HEAT PUMPS AT BLDG 2 109	20,000	
	9	5) SHELVING AND STORAGE ADDITIONS 109	20,000	
	10	.	0	
				$154,500
3112-500.40-20		**Maintenance and Repairs / Other Equipment**		
	1	1) PUMPING STATIONS:	0	
	2	A) CONTROLS,RELAYS,PLC I/O CARDS (SCADA SYSTEM)	10,000	
	3	SCADA UPGRADES REPLACEMENT SOFTWARE	0	
	4	B) REPLACEMENT PUMP PARTS (MOTOR,VFD,SHAFT,	35,000	
	5	IMPELLER,ETC) 3 REBUILDS	0	
	6	2) CONFINED SPACE AIR BLOWERS/SAFETY EQUIPMENT	9,000	
	7	3) PORTABLE PUMP & GENERATOR REPLACEMENTS	10,000	
	8	4) DISTRICTING VACTOR: T_$20,000	0	
	9	ANNUAL FACTORY SERVICE (CN WOOD)	15,000	
	10	SPLIT 75/25 WITH STORMWATER 571-3140-500-35-00	0	
	11	5) CONDUIT MAINTENANCE	50,000	
	12	6) RECERTIFICATION & REHABILIATION OF CONFINED	6,000	
	13	ENTRY MAN LIFT	0	
	14	7) ROOT CUTTER RECERT & INSPECTION	2,000	
	15	8) CHAIN, CABLE & LIFTING DEVICE	5,000	
	16	RECERTIFICATION (BOL REQUIREMENT)	0	
	17	9) SMALL ENGINE PARTS, EQUIP	1,500	
	18	10) PORTABLE PUMP REPAIR	2,000	
	19	11) GENERATOR REPAIRS:	0	
	20	A) CAT GENERATOR RIVERSIDE ST	1,500	
	21	B) CAT GENERATOR FRANKLIN ST	1,500	
	22	C) CAT GENERATOR HOPE LANE	1,500	
	23	D) ONAN GENERATOR CLAPBOARD RD	1,500	
	24	E) CAT GENERATOR CASTINE	1,500	
	25	F) GENERATOR AT BNC CONTROL BLDG	1,500	
	26	.	0	
				$15,000
570-3112-500.40-30		**Maintenance and Repairs / Vehicles**		
	1	1) FLEET SERVICE CHARGES: PARTS*	15,000	
	2	*VM REVENUE OFFSET: 100-3145-395-0000	0	
	3	.	0	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
5	31 12	*Sewer Utility Districting*		
570-3112-500.40-31		**Maintenance and Repairs / Veh. Commercial Repairs**		**$5,000**
	1	1) FLEET SERVICES CHARGES:	0	
	2	*VM REVENUE OFFSET: 100-3145-395-0000	0	
	3	A) DISTRICTING COMMERCIAL REPAIRS: T-$10,000	0	
	4	1) GENERAL COMMERCIAL REPAIRS	10,000	
	5	2) LESS SPLIT WITH STORMWATER 50%	-5,000	
	6	.	0	
570-3112-500.40-32		**Maintenance and Repairs / Veh. Labor (Internal)**		**$10,000**
	1	1) FLEET SERVICES CHARGES: LABOR	10,000	
	2	*VM REVENUE OFFSET: 100-3145-395-0000	0	
	3	.	0	
570-3112-500.40-33		**Maintenance and Repairs / Vehicle Tires**		**$2,000**
	1	FLEET SERVICE CHARGES: TIRES	2,000	
	2	*VM REVENUE OFFSET: 100-3145-395-0000	0	
	3	.	0	
570-3112-500.45-10		**Rentals / Land and Building Rentals**		**$13,608**
	1	1) JETPORT LAND LEASE (OUTER CONGRESS STREET)	13,608	
	2	*DATA COMES FROM JETPORT (RM)	0	
	3	.	0	
112-500.45-20		**Rentals / Vehicle/Equipment Rental**		**$51,000**
	1	1) TOOLS,PUMPS,OXYGEN & ACETYLENE TANK RENTALS	1,000	
	2	2) MOWERS & BACKHOE RENTALS-RIGHT OF WAY MAINT,	30,000	
	3	EXCAVATOR, TRAILER, CHIPPER,FORKLIFT.	0	
	4	3) SHORING RENTALS FOR CONSTRUCTION ACTIVITY	20,000	
	5	.	0	
570-3112-500.55-10		**Supplies / Agricultural Supplies**		**$19,000**
	1	1) GRASS SEED, SOD,FERTILIZER, LOAM	7,000	
	2	(ROW RESTORATION SOD)	0	
	3	2) EROSION CONTROL MATS (ROW REPAIR BMP'S):	12,000	
	4	24 MATS * $500	0	
570-3112-500.55-20		**Supplies / Supplies - All Other**		**$23,700**
	1	1) SEWER GREASE REMOVER: 100 GAL * $80	8,000	
	2	2) ACETYLENE, OXYGEN, NITROGEN	1,500	
	3	3) TRACING DYE, TESTING CHEMICALS	300	
	4	4) INDUSTRIAL DETERGENT & VEHICLE WASH	1,200	
	5	5) OIL PADS	1,200	
	6	6) 4 MAGNETIC COVER LIFTING DEVICES	4,000	
	7	7) SEWER INSPECTOR MARKING PAINT	2,000	
	8	8) STEAM CLEANER SUPPLIES	1,500	
	9	9) BARRICADES, GRADE STAKES, LUMBER	4,000	
570-3112-500.55-30		**Supplies / Construction Supplies**		**$117,100**
	1	1) DRIVEWAY REPAIRS & SEALER - PUMPING STATIONS	500	
	2	2) HOT TOP: 115 TONS * $75	8,625	
	3	3) COLD PATCH: 35 TONS * $125	4,375	
	4	4) MORTAR & CEMENT: 50 BAGS * $10	500	
	5	5) MORTAR SAND: 50 YDS * $10	500	
	6	6) CRUSHED STONE: 150 YDS * $16	4,800	
	7	7) GRAVEL: 150 YDS * $14	2,100	

Acct	Line #	Description	Detail $	FA Request
570 31 12		*Sewer Utility Districting*		
	8	.	0	
	9	% SPLIT WITH STORMWATER (571-3140-500-5530):	0	
	10	(FY16 STORMWATER FUND CHANGE: 570 TO 571)	0	
	11	1) PRECAST TUBS & CONES:	10,000	
	12	-LESS STORMWATER (40%): $4,000	-4,000	
	13	-SEWER DISTRICTING (60%): $6,000	0	
	14	2) MANHOLE & CATCH BASIN FRAMES/COVERS:	0	
	15	A) REPLACEMENT COVERS: 50 * $150	7,500	
	16	B) FRAME & COVERS: 30 * $900	27,000	
	17	-LESS STORMWATER (40%): $13,800	-13,800	
	18	-SEWER DISTRICTING (60%): $20,700	0	
	19	3) CASCO TRAPS: 300 * $350 = $105,000	105,000	
	20	-LESS STORMWATER (40%): $42,000	-42,000	
	21	-SEWER DISTRICTING (60%): $63,000	0	
	22	4) LOAM 200 YARDS	6,000	
570-3112-500.55-35		**Supplies / Cleaning Supplies**		**$5,000**
	1	JANITORIAL SUPPLIES (3 BUILDINGS)	5,000	
	2	.	0	
570-3112-500.55-40		**Supplies / Fuel - Vehicles**		**$25,800**
	1	1) FUEL CHARGES FROM FLEET:	0	
	2	*VM REVENUE OFFSET: 100-3145-395-0000	0	
	3	A) DIESEL: 4,000 GAL * $2.45/GAL	9,800	
	4	B) UNLEADED: 8,000 GAL * $2.00/GAL	16,000	
	5	.	0	
570-3112-500.55-60		**Supplies / Minor Equipment**		**$24,000**
	1	1) OTHER MINOR EQUIPMENT:	0	
	2	A) RODDING & JETTING EQUIP:	10,000	
	3	REPLACEMENT HOSES/ASSORTED CLEANING NOZZLES	0	
	4	B) REFLECTIVE CONES & SIGNS	2,000	
	5	.	0	
	6	2) % SPLIT WITH STORMWATER (571-3140-500-5560):	0	
	7	(FY16 STORMWATER FUND CHANGE: 570 TO 571)	0	
	8	A) VARIOUS HAND TOOLS, MASON TOOLS $6,000	6,000	
	9	-LESS STORMWATER (40%): $2,400	-2,400	
	10	-SEWER DISTRICTING (60%): $3,600	0	
	11	B) JACK HAMMER HOSES AND EQUIPMENT: $1,500	1,500	
	12	-LESS STORMWATER (40%): $600	-600	
	13	-SEWER DISTRICTING (60%): $900	0	
	14	C) REPLACE VACTOR HOSE/BOOM PIPING (12,500)	12,500	
	15	-LESS STORMWATER (40%): $5,000	-5,000	
	16	-SEWER DISTRICTING (60%) $7,500	0	
	17	.	0	
570-3112-500.55-65		**Supplies / Computers & Technology**		**$9,000**
	1	1) 3 LAPTOPS WITH TRUCK MOUNTS	6,000	
	2	2) 5 TABLETS (RG,GJ, JE, PG, FR)	3,000	
570-3112-500.55-70		**Supplies / Office Supplies**		**$8,700**
	1	1) PENS,PENCILS,PAPER FOR LARGE FORMAT PRINTER	1,000	
	2	2) COMPUTER SUPPLIES	1,700	
	3	3) THUMB DRIVES	400	
	4	4) PLASTIC SAMPLING BOTTLES	100	
	5	5) SEWER INSPECTOR FIELD BOOKS & MAP BOOKS	500	

Acct	Line #	Description	Detail $	FA Request
570 31 12		*Sewer Utility Districting*		
	6	6) PRINTER SUPPLIES/COLOR PRINTER INK SETS	3,000	
	7	7) MUTCD WORK ZONE SOFTWARE	2,000	
570-3112-500.63-15		**Utilities / Heating Fuel**		**$25,105**
	1	1) GENERATORS:	0	
	2	A) FRANKLIN ST PUMP STATION GENERATOR & HEATING:	2,000	
	3	NO 2 FUEL OIL: 800 GAL * $3.35	0	
	4	B) HOPE LANE EMERGENCY GENERATOR:	335	
	5	DIESEL: 100 GAL * $3.35/GAL	0	
	6	C) FRANKLIN ST EMERGENCY GENERATOR:	335	
	7	DIESEL: 100 GAL * $3.35/GAL	0	
	8	D) PORTABLE 40KW EMERGENCY GENERATOR SET:	335	
	9	DIESEL: 100 GAL * $3.35/GAL	0	
	10	E) BCN CONTROL GENERATOR DIESEL	500	
	11	.	0	
	12	2) NATURAL GAS:	0	
	13	UNITIL #5120189-5034712	1,200	
	14	12 MO * $100/MO	0	
	15	1222 RIVERSIDE ST 04103 (PORTLAND CITY OF)	0	
	16	.	0	
	17	3) PROPANE	0	
	18	A) CURTIS ROAD PUMP STATION	1,200	
	19	USA ACCT # 13425L	0	
	20	12 MO * $100/MO	0	
	21	B) CASTINE (12MOS * 100/MO)	1,200	
	22	.	0	
	23	4) DISTRICT RD PROPANE	18,000	
	24	.	0	
570-3112-500.63-20		**Utilities / Electricity**		**$54,265**
	1	BUDGET SUMMARY BILL #211-0457012-001:	0	
	2	INCLUDES FOLLOWING PUMP STATIONS:	0	
	3	.	0	
	4	MEDIUM ACCTS:	0	
	5	1) 441-143-8768-011 FRANKLIN/MARGINAL WAY(MED)	26,400	
	6	SUP $11,946,C $1,819(207,761 KWH); DEL $12,278	0	
	7	2) 441-143-9986-011 RIVERSIDE STREET (MED)	20,200	
	8	SUP $8,832,C $1,215 (153,600 KWH); DEL $9,931	0	
	9	3) CONDUIT BACK COVE	1,000	
	10	.	0	
	11	SMALL ACCTS:	0	
	12	1) 441-143-9897-011 CASTINE AVE	740	
	13	SUPPLY $211,C $30 (3,867 KWH); DEL $446	0	
	14	2) 441-144-0101-011 CLAPBOARD LANE (CURTIS RD)	2,900	
	15	SUPPLY $1,108,C $84 (19,262 KWH); DEL $1,288	0	
	16	3) 441-144-0666-011 PARTRIDGE ROAD	290	
	17	SUPPLY $26,C $4 (451 KWH); DEL $163	0	
	18	4) 441-159-9088-001 LINDEN ST	275	
	19	SUPPLY $30,C $3 (514 KWH); DEL $167	0	
	20	5) 441-167-9713-001 PENNELL AVE	700	
	21	SUPPLY $223,C $13 (3,881 KWH); DEL $369	0	
	22	6) 441-171-5456-001 HOPE LANE	1,460	
	23	SUPPLY $576,C $41 (10,013 KWH); DEL $735	0	
	24	7) 441-183-8996-001 GOWEN RD	300	
	25	SUPPLY $42, CAP $3 (724 KWH); DEL $180	0	
	26	.	0	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57^ 31 12		*Sewer Utility Districting*		
	27	**USAGE IS BASED ON RAINFALL AND VARIES YEARLY**	0	
	28	NOT FEASIBLE TO DO A PERCENTAGE INCREASE	0	
	29	.	0	
	30	ACTUALS:	0	
	31	FY17: $59,733	0	
	32	FY16: $53,126	0	
	33	FY15: $48,558	0	
	34	FY14: $49,716	0	
	35	.	0	
570-3112-500.63-30		Utilities / Water and Sewer Charges		$7,300
	1	WATER CHARGES:	0	
	2	.	0	
	3	1) 126552-01 1222 RIVERSIDE ST PUMP STN:	0	
	4	$500 * 12 MO	6,000	
	5	2) 145856-01 335 FRANKLIN ST PUMP STN:	300	
	6	$25 * 12 MO	0	
	7	3) 109 DISTRICT RD	1,000	
	8	** NO SEWER CHARGES**	0	
	9	.	0	
	10	FY17 ACTUAL: $3,117	0	
	11	FY16 ACTUAL: $5,705	0	
	12	FY15 ACTUAL $6,671	0	
	13	FY14 ACTUAL: $4,723	0	
	14	FY13 ACTUAL: $4,628	0	
	15	.	0	
570-3112-500.63-35		Utilities / Stormwater charges		$18,674
	1	CONGRESS ST SLUDGE STORAGE	18,674	
	2	103 BLUEBERRY RD	0	
	3	.	0	
570-3112-500.63-40		Utilities / Telephone		$15,484
	1	1) MONTHLY TIME WARNER CHARGE $320 * 12 MOS	3,840	
	2	2) FAIRPOINT COMMUNICATION $50 * 12 MOS	600	
	3	3) FAIRPOINT DARK FIBER:	0	
	4	A) NON REOCCURING CHARGE	2,500	
	5	B) MONTHLY CHARGES: $712 * 12 MOS	8,544	
	6	.	0	
570-3112-500.70-40		Capital Outlay / Other Equipment		$35,000
	1	1) FLAIL MOWER	15,000	
	2	2) PLATING MACHINE	20,000	
	3	.	0	
		Division Total: 31 12 Districting		$3,019,206

Personnel Services Detail

Department: Public Works | Division: Sewer Communications | Account: 570-31-15

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Senior Operations Dispatcher	100	1.0	52,832	1.0	55,973	1.0	55,973	1.0	55,973	1	55,973
Meal Allow/Standby Pay	100		100		240		240		240		240
Overtime	100		5,867		6,217		6,217		6,217		6,217
Gross Personnel Services		1.0	58,799	1.0	62,430	1.0	62,430	1.0	62,430	1.0	62,430
Net Personnel Services		1.0	58,799	1.0	62,430	1.0	62,430	1.0	62,430	1.0	62,430

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31 Public Works							
DIV 15 Communications							
570-3115-500.01-10	Salaries and Wages	52,932	53,830	56,213	56,213	56,213	56,213
570-3115-500.01-40	Overtime Payments	5,867	3,484	6,217	6,217	6,217	6,217
*	Payroll	58,799	57,314	62,430	62,430	62,430	62,430
570-3115-500.02-71	Wearing Apparel	615	200	615	615	615	615
*	Benefits	615	200	615	615	615	615
570-3115-500.20-20	Travel/Training/Meetings	100	0	100	100	100	100
*	Administrative Services	100	0	100	100	100	100
570-3115-500.45-30	Office Equipment Rental	1,500	1,000	1,500	1,500	1,500	1,500
*	Rentals	1,500	1,000	1,500	1,500	1,500	1,500
570-3115-500.55-60	Minor Equipment	2,542	2,000	2,542	2,542	2,542	2,542
570-3115-500.55-70	Office Supplies	500	500	500	500	500	500
*	Supplies	3,042	2,500	3,042	3,042	3,042	3,042
**	Communications	64,056	61,014	67,687	67,687	67,687	67,687

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57	1 15	*Sewer Utility Communications*		
570-3115-500.01-10		**Payroll / Salaries and Wages**		$56,213
	1	1) FY19 WAGES: 1.0 FTE	55,973	
	2	2) WINTER STIPEND ($.30 * 40HRS * 20WKS)	240	
	3	.	0	
	4	UPDATED PMH 1/18/18	0	
570-3115-500.01-40		**Payroll / Overtime Payments**		$6,217
	1	DISPATCHER COVERAGE (FLOODS, SEWER BACK-UP, ETC):	0	
	2	1) 8 DAYS * 8 HRS * $40.37 ($26.91* 1.5X)	2,584	
	3	2) 30 WKS * 3 HRS * $40.37	3,633	
	4	.	0	
	5	FY17: $2,259	0	
	6	FY16: $1,835	0	
	7	FY15: $5,870	0	
	8	.	0	
570-3115-500.02-71		**Benefits / Wearing Apparel**		$615
	1	1) CONTRACTUAL CLOTHING:	0	
	2	UNIFORM: 1 EMPL * $375	375	
	3	.	0	
	4	2) SAFETY STIPEND FOR L&T BOOTS & SUPV PPE:	0	
	5	A) SEWER COMMUNICATIONS (3115): 1 EMPL * $240	240	
	6	.	0	
57[illegible]115-500.20-20		**Administrative Services / Travel/Training/Meetings**		$100
	1	STAFF MEETINGS/CUSTOMER SERVICE	100	
	2	.	0	
570-3115-500.45-30		**Rentals / Office Equipment Rental**		$1,500
	1	COPIER RENTAL: 12 MO * $125/MO	1,500	
	2	.	0	
570-3115-500.55-60		**Supplies / Minor Equipment**		$2,542
	1	1) PORTABLE RADIOS: 1 * $2,017	2,017	
	2	2) BATTERIES: 7 * $75	525	
	3	.	0	
570-3115-500.55-70		**Supplies / Office Supplies**		$500
	1	DISPATCH SUPPLIES	500	
	2	.	0	
		Division Total: 31 15 Communications		$67,687

Personnel Services Detail

De[illegible]ent: Public Works | Division: Sewer Engineering | Account: 570-31-37

Position	Funding Source City Fed Oth	FY18 Approved #	FY18 Approved Amount	FY19 Submission #	FY19 Submission Amount	FY19 Manager's Recommendation #	FY19 Manager's Recommendation Amount	FY19 Finance Committee #	FY19 Finance Committee Amount	FY19 Final Allowance #	FY19 Final Allowance Amount
Senior Engineer	100	1.0	77,967	1.0	86,731	1.0	86,731	1.0	86,731	1	86,731
Project Engineer	100	2.0	124,447	2.0	147,088	2.0	147,088	2.0	147,088	2	147,088
(1) Water Resources Engineer	100	0.0	0	1.0	54,669	1.0	54,669	1.0	54,669	1	54,669
(2) Associate Engineer	100	1.0	47,317	0.0	0	0.0	0	0.0	0	0	0
Charges from Eng (GF)	100		49,256		41,911		41,911		41,911		41,911
Overtime	100		9,011		6,427		6,427		6,427		6,427
Gross Personnel Services		4.0	307,998	4.0	336,826	4.0	336,826	4.0	336,826	4.0	336,826
Net Personnel Services		4.0	307,998	4.0	336,826	4.0	336,826	4.0	336,826	4.0	336,826

Notes:

(1) 1 Position Upgrade from Associate Engineer during FY18

(2) (1) Position Upgrade to Water Resources Engineer Approved during FY18

FY19 DIVISION LINE ITEM SUMMARY
REPORT: FA-LINE

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31 Public Works							
DIV 37 Engineering							
570-3137-500.01-10	Salaries and Wages	298,987	318,948	330,399	330,399	330,399	330,399
570-3137-500.01-40	Overtime Payments	9,011	5,705	6,427	6,427	6,427	6,427
*	Payroll	307,998	324,653	336,826	336,826	336,826	336,826
570-3137-500.02-71	Wearing Apparel	1,180	930	1,040	1,040	1,040	1,040
570-3137-500.02-74	Cellular Phones	2,880	2,450	3,840	3,840	3,840	3,840
*	Benefits	4,060	3,380	4,880	4,880	4,880	4,880
570-3137-500.20-00	Administrative Services	1,250	1,480	1,560	1,560	1,560	1,560
570-3137-500.20-10	Postage and Freight	100	152	300	300	300	300
570-3137-500.20-20	Travel/Training/Meetings	4,600	3,933	25,450	25,450	25,450	25,450
570-3137-500.20-40	Taxes & Licenses	1,450	1,398	450	450	450	450
*	Administrative Services	7,400	6,963	27,760	27,760	27,760	27,760
570-3137-500.35-00	Contractual Services	1,850	1,805	208,350	208,350	208,350	208,350
570-3137-500.35-10	Advertising	750	695	1,500	1,500	1,500	1,500
570-3137-500.35-20	Arch and Engineering	17,000	14,194	22,000	22,000	22,000	22,000
57[illegible]137-500.35-30	Auto Expense Reimbursed	200	20	200	200	200	200
57[illegible]137-500.35-60	Printing	350	351	500	500	500	500
*	Contractual Services	20,150	17,065	232,550	232,550	232,550	232,550
570-3137-500.40-30	Vehicles	300	6	300	300	300	300
570-3137-500.40-31	Veh. Commercial Repairs	100	564	0	0	0	0
570-3137-500.40-32	Veh. Labor (Internal)	295	0	395	395	395	395
570-3137-500.40-33	Vehicle Tires	0	200	0	0	0	0
*	Maintenance and Repairs	695	770	695	695	695	695
570-3137-500.45-30	Office Equipment Rental	1,000	750	1,000	1,000	1,000	1,000
*	Rentals	1,000	750	1,000	1,000	1,000	1,000
570-3137-500.55-20	Supplies - All Other	200	313	200	200	200	200
570-3137-500.55-40	Fuel - Vehicles	55	59	50	50	50	50
570-3137-500.55-50	Medical Supplies	200	171	200	200	200	200
570-3137-500.55-60	Minor Equipment	650	594	1,350	1,350	1,350	1,350
570-3137-500.55-65	Computers & Technology	3,300	3,268	6,000	6,000	6,000	6,000
570-3137-500.55-70	Office Supplies	8,100	7,858	6,700	6,700	6,700	6,700
*	Supplies	12,505	12,263	14,500	14,500	14,500	14,500

FY19 DIVISION LINE ITEM SUMMARY
REPORT: FA-LINE

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	FY18 REVISED APPRO	FY18 TOTAL PROJ	FY19 DEPT REQUEST	FY19 MGR RECOMM.	FY19 FINANCE COMM.	FY19 FINAL ALLOW
DEPT 31 Public Works							
DIV 37 Engineering							
**	Engineering	353,808	365,844	618,211	618,211	618,211	618,211
***	Public Works	4,076,160	3,914,737	4,485,757	4,485,757	4,485,757	4,485,757

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 37		*Sewer Utility Engineering*		
570-3137-500.01-10		**Payroll / Salaries and Wages**		$330,399
	1	FY19 WAGES: 4.0 FTE	288,488	
	2	.	0	
	3	FY19 DR POSTION NOTES:	0	
	4	ASSOC ENG RECLASSED TO WR ENGINEER	0	
	5	.	0	
	6	B) CHARGEBACKS FROM GF ENGINEERING: T- $41,911	41,911	
	7	1) ENG MGR (VAC): 2.5% * $88,530 = $2,212	0	
	8	2) SENIOR ENGINEERS (KG & VAC): T-$10,704	0	
	9	(A) SR ENG (KG): 7.5% * $77,088 = $5,782	0	
	10	(B) SR ENG (VAC): 7.5% * $65,626 = $4,922	0	
	11	3) CHIEF SURVEYOR (WS): 10% * $79,539 = $7,954	0	
	12	4) SURVEYOR (CA, LS, CW): T-$13,697	0	
	13	(A) LEAD SRVYR (CA): 7.5% * $63,125 = $4,734	0	
	14	(B) CAD SRVYR (LS): 7.5% * $60,797 = $4,560	0	
	15	(C) GIS SRVYR (CW): 7.5% * $58,708 = $4,403	0	
	16	5) GIS MAP'G SPEC (TY): 7.5% * $50,407 = $3,781	0	
	17	6) GIS MAP'G TECH (KD): 7.5% * $47,501 = $3,563	0	
	18	*REVENUE OFFSET 100-3137-395-0000	0	
	19	.	0	
	20	NOTE: CHARGEBACKS ARE BOOK AS JOURNAL TRANSFERS	0	
	21	BASED ON TIMESHEETS SUBMITTED.	0	
	22	.	0	
	23	**SEE REVENUE IN 570-3100-395-0000	0	
	24	.	0	
	25	FY19 DR POSITION NOTE:	0	
	26	A) STORMWATER WAGE REIMB:($43,366)	0	
	27	1) SR ENGINEER (BR): $86,731 * 50% = $43,366	0	
	28	***SEE REVENUE IN 570-3100-395-0000	0	
570-3137-500.01-40		**Payroll / Overtime Payments**		$6,427
	1	1) NON-PROJECT RELATED EMERGENCIES & SPECIAL	2,340	
	2	REQUESTS: 4 EE * 15 HR * $39.00	0	
	3	2) POLICE DEPT TRAFFIC CONTROL:	4,087	
	4	8 HRS * 12 MO * $42.57	0	
	5	*ONGOING PWD CSO MONITORING REQUIREMENT	0	
	6	.	0	
	7	FY18: $4,214 (EST)	0	
	8	FY17: $2,816	0	
	9	FY16: $ 772	0	
	10	FY15: $1,170	0	
	11	.	0	
570-3137-500.02-71		**Benefits / Wearing Apparel**		$1,040
	1	1) CONTRACTUAL CLOTHING:	640	
	2	A) BOOT ALLOWANCE: 4 EMPL * $160	0	
	3	2) NON-CONTRACTUAL CLOTHING:	400	
	4	VESTS-GLOVES-HARD HATS-RAIN GEAR	0	
	5	.	0	
5 137-500.02-74		**Benefits / Cellular Phones**		$3,840
	1	1) PHONE REIMBURSEMENTS: $30 * 12 MOS * 4 EE	1,440	
	2	2) 4 DATA PLANS FOR IPADS	2,400	
	3	.	0	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
57 31 37		*Sewer Utility Engineering*		
570-3137-500.20-00		**Administrative Services**		$1,560
	1	DUES & MEMBERSHIPS:	0	
	2	1) A.S.C.E. : 4 * $250	1,000	
	3	AMERICAN SOCIETY OF CIVIL ENGINEERS	0	
	4	2) MEWEA:	60	
	5	MAINE WATER ENVIRONMENT ASSOC (GROUP RATE)	0	
	6	3) CCTV RECERT (NS)	500	
570-3137-500.20-10		**Administrative Services / Postage and Freight**		$300
	1	SHIPPING CHARGES - EQUIPMENT REPAIRS-MONITORS,	300	
	2	SAMPLING	0	
	3	.	0	
570-3137-500.20-20		**Administrative Services / Travel/Training/Meetings**		$25,450
	1	PROFESSIONAL DEVELOPMENT:	0	
	2	1) EPA/DEP SEMINARS: 4 * $200	800	
	3	2) NATIONAL CONFERENCE: 4 * $4000	16,000	
	4	3) MEWEA COURSES: 4 * $300	1,200	
	5	4) OSHA HAZ. WASTE (BAR)	250	
	6	5) NEWEA: 4 * $350	1,400	
	7	6) STORMWATER CONFERENCE (OFF YEAR)	0	
	8	7) ASCE TECHNICAL SEMINAR: 4 * $200	800	
	9	8) AUTOCAD TRAINING	5,000	
5 37-500.20-40		**Administrative Services / Taxes & Licenses**		$450
	1	TAXES/LICENSES/INSURANCE:	0	
	2	.	0	
	3	1) PAN AM:	300	
	4	YEARLY LICENSE FEE FOR RAND ROAD DRAIN	0	
	5	2) SEWER AND DRAINAGE MAINE DOT	150	
	6	.	0	
570-3137-500.35-00		**Contractual Services**		$208,350
	1	1) LIM/SURVEY:	300	
	2	CUMB COUNTY REGISTRY OF DEEDS (RESEARCH/COPIES)	0	
	3	PHYSICAL RESEARCH BILLED BY REGISTER OF DEEDS	0	
	4	R.O.W. STORM & SANITARY SEWER RESEARCH	0	
	5	2) GENERAL: (SHARED 1/2 W/100-3137)	550	
	6	VAULT FIRE PROTECTION ANNUAL INSPECTION	0	
	7	3) FLOW ASSESSMENT - SEWER FLOW MONITORING	200,000	
	8	4) STORAGE ARRAY FOR CAD PROJECTS	7,500	
	9	(SPLIT WITH GF ENGINEERING 100-3137-430)	0	
	10	.	0	
570-3137-500.35-10		**Contractual Services / Advertising**		$1,500
	1	PUBLICATION OF PROJECTS	1,500	
	2	.	0	
570-3137-500.35-20		**Contractual Services / Arch and Engineering**		$22,000
	1	1) LIM MAPPING SERVICES:	17,000	
	2	*SPLIT COST W/ GF (100) & STORMWATER (571)	0	
	3	2) CONSULTANT SURVEY OF IN-HOUSE DESIGNED PROJECTS	5,000	
570-3137-500.35-30		**Contractual Services / Auto Expense Reimbursed**		$200
	1	PERSONAL VEHICLE USE	200	

FY19 FA Expenditure Explanatories

Acct	Line #	Description	Detail $	FA Request
570 31 37		*Sewer Utility Engineering*		
	2	.	0	
	3	IRS STANDARD MILEAGE RATE: $0.545 (EFF. 01/01/18)	0	
	4	.	0	
570-3137-500.35-60		**Contractual Services / Printing**		**$500**
	1	GENERAL BUSINESS CARDS, LETTERHEAD	500	
570-3137-500.40-30		**Maintenance and Repairs / Vehicles**		**$300**
	1	CHARGES FROM FLEET	300	
570-3137-500.40-32		**Maintenance and Repairs / Veh. Labor (Internal)**		**$395**
	1	CHARGES FROM FLEET	395	
570-3137-500.45-30		**Rentals / Office Equipment Rental**		**$1,000**
	1	55 PORTLAND SHARED COPIER	1,000	
	2	.	0	
570-3137-500.55-20		**Supplies / Supplies - All Other**		**$200**
	1	TRACING DYE, TESTING CHEMICALS	200	
	2	.	0	
570-3137-500.55-40		**Supplies / Fuel - Vehicles**		**$50**
	1	CHARGES FROM FLEET:	0	
	2	25 GALLONS UNLEADED * $2.00	50	
	3	.	0	
5 137-500.55-50		**Supplies / Medical Supplies**		**$200**
	1	FIRST AID KIT REFILLS	200	
	2	.	0	
570-3137-500.55-60		**Supplies / Minor Equipment**		**$1,350**
	1	1) VARIOUS HAND & MASON TOOLS, REFLECTIVE CONES &	750	
	2	SIGNS, PAINT, CLEANING SUPPLIES, LAB SUPPLIES	0	
	3	2) SURGE PROTECTORS (4)	600	
	4	.	0	
570-3137-500.55-65		**Supplies / Computers & Technology**		**$6,000**
	1	1) COMPUTER (BR)	3,500	
	2	2) IPAD (GR, KT)	2,000	
	3	3) LARGE MONITORS	500	
570-3137-500.55-70		**Supplies / Office Supplies**		**$6,700**
	1	1) GENERAL OFFICE SUPPLIES,STORAGE DVD'S,LABELS	1,200	
	2	2) NO PARKING SIGNS	500	
	3	3) NEW OFFICE SET-UP	5,000	
	4	.	0	
		Division Total: 31 37 Engineering		**$618,211**

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137000001 - CMOM Pump Station Rehab								
TOTALS for Project: 3137000001 - CMOM Pump Station Rehab				3,110,000.00	1,093,077.74	2,716,121.35	5,180.00	-704,379.09
Project: 3137009502 - Moody/Wilson Storm Drain								
TOTALS for Project: 3137009502 - Moody/Wilson Storm Drain				175,000.00	127,735.29	15,868.49	0.00	31,396.22
Project: 3137009505 - Somerset Sewer Elm/Hanover								
TOTALS for Project: 3137009505 - Somerset Sewer Elm/Hanover	0.00	0.00	0.00	160,000.00	0.00	0.00	0.00	160,000.00
Project: 3137009506 - Baxter Woods Detention Pond								
TOTALS for Project: 3137009506 - Baxter Woods Detention Pond				80,000.00	41,879.69	0.00	0.00	38,120.31
Project: 3137009507 - Penrith Road Erosion Rep								
TOTALS for Project: 3137009507 - Penrith Road Erosion Rep				60,000.00	54,846.37	6,564.42	0.00	-1,410.79
Project: 3137013501 - Deering St Wastewater (13)								
TOTALS for Project: 3137013501 - Deering St Wastewater (13)	0.00	0.00	0.00	865,000.00	117,929.53	0.00	0.00	747,070.47
Project: 3137013502 - Sewer Sys Assessment (13)								
TOTALS for Project: 3137013502 - Sewer Sys Assessment (13)	0.00	0.00	0.00	713,000.00	717,957.41	0.00	0.00	-4,957.41

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137013504 - Riverside Pump St (13)					
TOTALS for Project: 3137013504 - Riverside Pump St (13)	12,000.00	3,406.49	0.00	0.00	8,593.51
Project: 3137014503 - Sewer Re-lining (14)					
TOTALS for Project: 3137014503 - Sewer Re-lining (14)	1,000,000.00	956,256.67	0.00	0.00	43,743.33
Project: 3137014504 - Stormwater Outfall Rockland					
TOTALS for Project: 3137014504 - Stormwater Outfall Rockland	315,000.00	306,758.16	0.00	0.00	8,241.84
Project: 3137014505 - Culvert replace Washington					
TOTALS for Project: 3137014505 - Culvert replace Washington	200,000.00	29.08	0.00	0.00	199,970.92
Project: 3137015502 - Capisic Bk Storm Trtmt					
TOTALS for Project: 3137015502 - Capisic Bk Storm Trtmt	1,000,000.00	831,402.14	0.00	0.00	168,597.86
Project: 3137016502 - Capisic Pond Improv (16)					
TOTALS for Project: 3137016502 - Capisic Pond Improv (16)	0.00	243,393.27	0.00	0.00	-243,393.27
Project: 3137016503 - CMOM Sewer Sys Renewal (16)					
TOTALS for Project: 3137016503 - CMOM Sewer Sys Renewal (16)	1,100,000.00	642,654.99	230,646.22	51,000.00	175,698.79

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137016504 - CMOM Pump Station Rehab					
TOTALS for Project: 3137016504 - CMOM Pump Station Rehab	0.00	0.00	0.00	0.00	0.00
Project: 3137016505 - Rowe Ave Sewer Sep					
TOTALS for Project: 3137016505 - Rowe Ave Sewer Sep	326,514.00	269,771.73	0.00	-54.00	56,796.27
Project: 3137016507 - Gravel Wetland Capisic					
TOTALS for Project: 3137016507 - Gravel Wetland Capisic	175,000.00	8,250.00	0.00	0.00	166,750.00
Project: 3137017501 - CSO Comp Madison Walnut					
TOTALS for Project: 3137017501 - CSO Comp Madison Walnut	2,714,425.00	1,515,611.73	423,759.67	0.00	775,053.60
Project: 3137017502 - CSO Comp Marginal/Forest					
TOTALS for Project: 3137017502 - CSO Comp Marginal/Forest	4,200,000.00	6,194,318.58	562,971.28	0.00	-2,557,289.86
Project: 3137017503 - CSO Comp Deering Oaks					
TOTALS for Project: 3137017503 - CSO Comp Deering Oaks	300,000.00	438.05	0.00	0.00	299,561.95
Project: 3137017505 - CSO Backflow Prevention					
TOTALS for Project: 3137017505 - CSO Backflow Prevention	25,000.00	0.00	0.00	0.00	25,000.00

0.00 0.00 0.00

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137017506 - CMOM Sewer System Renewal					
TOTALS for Project: 3137017506 - CMOM Sewer System Renewal	1,100,000.00	0.00	0.00	0.00	1,100,000.00
0.00 0.00 0.00					
Project: 3137017507 - CMOM Pump Station Rehab FY17					
TOTALS for Project: 3137017507 - CMOM Pump Station Rehab FY17	1,100,000.00	0.00	0.00	0.00	1,100,000.00
0.00 0.00 0.00					
Project: 3137017508 - CMOM I&I FY17					
TOTALS for Project: 3137017508 - CMOM I&I FY17	750,000.00	512,393.50	237,606.50	0.00	0.00
Project: 3137017511 - Rand Rd Culvert Emery Drive					
TOTALS for Project: 3137017511 - Rand Rd Culvert Emery Drive	90,000.00	15,293.76	32,806.24	0.00	41,900.00
Project: 3137017512 - PACTS Danforth ST Paving					
TOTALS for Project: 3137017512 - PACTS Danforth ST Paving	14,000.00	7,599.88	0.00	0.00	6,400.12
0.00 0.00 0.00					
Project: 3137017513 - MDOT Art Pav Riverside					
TOTALS for Project: 3137017513 - MDOT Art Pav Riverside	41,000.00	6,086.82	0.00	0.00	34,913.18
Project: 3137018105 - CSO - SRF Ineligible (18)					
TOTALS for Project: 3137018105 - CSO - SRF Ineligible (18)	600,000.00	201,000.42	422,868.74	0.00	-23,869.16

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137018502 - CMOM FY18 Sewer System								
TOTALS for Project: 3137018502 - CMOM FY18 Sewer System	0.00	0.00	0.00	1,100,000.00	0.00	0.00	0.00	1,100,000.00
Project: 3137018504 - Engineering - Water Resources								
TOTALS for Project: 3137018504 - Engineering - Water Resources				300,000.00	47,070.30	24,727.35	14,000.00	214,202.35
Project: 3137018505 - Morrill's Corner Sewer								
TOTALS for Project: 3137018505 - Morrill's Corner Sewer	0.00	0.00	0.00	250,000.00	0.00	0.00	0.00	250,000.00
Project: 3137018506 - East Waterfront Extension								
TOTALS for Project: 3137018506 - East Waterfront Extension				154,850.00	24,826.76	55,057.43	111,868.00	-36,902.19
Project: 3137018507 - Intergrated Planning LTCP								
TOTALS for Project: 3137018507 - Intergrated Planning LTCP				1,000,000.00	597,894.93	402,158.55	0.00	-53.48
Project: 3137018511 - Peaks Isl Green Infrastructure								
TOTALS for Project: 3137018511 - Peaks Isl Green Infrastructure	0.00	0.00	0.00	50,000.00	0.00	0.00	0.00	50,000.00
Project: 3137018512 - Green Infrastructure (18)								
TOTALS for Project: 3137018512 - Green Infrastructure (18)	0.00	0.00	0.00	200,000.00	0.00	0.00	0.00	200,000.00

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137018513 - Smart Cover Sys								
TOTALS for Project: 3137018513 - Smart Cover Sys	0.00	0.00	0.00	45,000.00	40,271.00	9,490.00	0.00	-4,761.00
Project: 3137018514 - Pole Camera (18)								
TOTALS for Project: 3137018514 - Pole Camera (18)	0.00	0.00	0.00	20,000.00	0.00	0.00	0.00	20,000.00
Project: 3137018515 - Veranda Pav Ineligibles								
TOTALS for Project: 3137018515 - Veranda Pav Ineligibles	0.00	0.00	0.00	18,000.00	0.00	0.00	0.00	18,000.00
Project: 3137019201 - CSO SRF Ineligibles (19)								
TOTALS for Project: 3137019201 - CSO SRF Ineligibles (19)	0.00	0.00	0.00	600,000.00	0.00	0.00	532,000.00	68,000.00
Project: 3137019501 - Bedford St Sewer Sep								
TOTALS for Project: 3137019501 - Bedford St Sewer Sep	0.00	0.00	0.00	8,500,000.00	0.00	0.00	0.00	8,500,000.00
Project: 3137019503 - CMOM I & I Prog (19)								
TOTALS for Project: 3137019503 - CMOM I & I Prog (19)	0.00	0.00	0.00	790,000.00	0.00	790,000.00	0.00	0.00
Project: 3137019504 - CMOM Sewer Sys Renewal								
TOTALS for Project: 3137019504 - CMOM Sewer Sys Renewal	0.00	0.00	0.00	1,100,000.00	0.00	0.00	0.00	1,100,000.00

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137019505 - CSO - Close CSO #42								
TOTALS for Project: 3137019505 - CSO - Close CSO #42	0.00	0.00	0.00	100,000.00	0.00	0.00	0.00	100,000.00
Project: 3137019506 - Warren-Hicks/Hemingwy Sep (19)								
TOTALS for Project: 3137019506 - Warren-Hicks/Hemingwy Sep (19)	0.00	0.00	0.00	400,000.00	0.00	0.00	0.00	400,000.00
Project: 3137019507 - Forest-Avalon/Warren Sep								
TOTALS for Project: 3137019507 - Forest-Avalon/Warren Sep	0.00	0.00	0.00	250,000.00	0.00	0.00	0.00	250,000.00
Project: 3137019508 - Int Plan LTCP/Monitoring								
TOTALS for Project: 3137019508 - Int Plan LTCP/Monitoring	0.00	0.00	0.00	400,000.00	0.00	400,000.00	0.00	0.00
Project: 3137019509 - Brighton-Dorset/Lomond So								
TOTALS for Project: 3137019509 - Brighton-Dorset/Lomond So				1,000,000.00	3,647.20	0.00	944,400.00	51,952.80
Project: 3137019510 - Thames SW Outfall C19510								
TOTALS for Project: 3137019510 - Thames SW Outfall C19510	0.00	0.00	0.00	150,000.00	0.00	0.00	150,000.00	0.00
Project: 3137019511 - Thames SW/Sew ext C19511								
TOTALS for Project: 3137019511 - Thames SW/Sew ext C19511	0.00	0.00	0.00	225,000.00	0.00	0.00	225,000.00	0.00

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137019512 - Pavement Preservation Utility								
TOTALS for Project: 3137019512 - Pavement Preservation Utility								
0.00	0.00	0.00	200,000.00		0.00	0.00	0.00	200,000.00
Project: 3137019514 - Street Rehab Utility Cost								
TOTALS for Project: 3137019514 - Street Rehab Utility Cost								
0.00	0.00	0.00	800,000.00		0.00	0.00	0.00	800,000.00
Project: 3137019515 - PACTS Paving Ineligible Utilit								
TOTALS for Project: 3137019515 - PACTS Paving Ineligible Utilit								
0.00	0.00	0.00	30,000.00		0.00	0.00	0.00	30,000.00
Project: 3137019516 - Pump St 109 District Rd								
TOTALS for Project: 3137019516 - Pump St 109 District Rd								
0.00	0.00	0.00	120,000.00		0.00	0.00	0.00	120,000.00
Project: 3137019517 - Storm Retro - Riverside Street								
TOTALS for Project: 3137019517 - Storm Retro - Riverside Street								
0.00	0.00	0.00	185,000.00		0.00	0.00	0.00	185,000.00
Project: 3137019518 - Bell St Sewer Repl								
TOTALS for Project: 3137019518 - Bell St Sewer Repl								
			350,000.00		12,205.50	0.00	0.00	337,794.50
Project: 3137118508 - Stormwater Infrastructure (18)								
TOTALS for Project: 3137118508 - Stormwater Infrastructure (18)								
0.00	0.00	0.00	200,000.00		0.00	0.00	0.00	200,000.00

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137118510 - Franklin St Storm Drain					
TOTALS for Project: 3137118510 - Franklin St Storm Drain	300,000.00	187,626.31	27,639.45	0.00	84,734.24
Project: 3137119519 - Stormwater Infrastructure Impr					
TOTALS for Project: 3137119519 - Stormwater Infrastructure Impr	272,000.00	0.00	0.00	0.00	272,000.00
0.00	0.00	0.00			
Project: 3137517503 - CSO Comp Deering Oaks					
TOTALS for Project: 3137517503 - CSO Comp Deering Oaks	300,000.00	0.00	0.00	0.00	300,000.00
0.00	0.00	0.00			
Project: 3137517504 - CSO Comp Woodfords/Hershey					
TOTALS for Project: 3137517504 - CSO Comp Woodfords/Hershey	3,600,000.00	2,076,736.29	613,091.94	0.00	910,171.77
Project: 31375M1009 - CSO Prelim Eng (10)					
TOTALS for Project: 31375M1009 - CSO Prelim Eng (10)	0.00	790,717.20	59,844.14	0.00	-850,561.34
Project: 31375M1108 - CSO Prelim Eng MM1108					
TOTALS for Project: 31375M1108 - CSO Prelim Eng MM1108	-10,516.81	1,596,804.84	34,469.98	0.00	-1,641,791.63
Project: 31375M1205 - Prelim Engineering (MM12)					
TOTALS for Project: 31375M1205 - Prelim Engineering (MM12)	0.00	384,665.03	8,806.41	0.00	-393,471.44

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 31375M1301 - Back Cove So Storage					
TOTALS for Project: 31375M1301 - Back Cove So Storage	0.00	95,178.12	51,024.24	24,000,000.00	-24,146,202.36
Project: 31375M1302 - MM1302 Back Cove Storage					
TOTALS for Project: 31375M1302 - MM1302 Back Cove Storage 0.00 0.00 0.00	0.00	49,513.15	371,486.85	0.00	-421,000.00
Project: 31375M1307 - Morse St Sewer					
TOTALS for Project: 31375M1307 - Morse St Sewer	0.00	1,965,532.21	69,642.99	0.00	-2,035,175.20
Project: 31375M1308 - Anderson St Sewer					
TOTALS for Project: 31375M1308 - Anderson St Sewer	2,531,664.70	1,686,620.79	83,318.00	0.00	761,725.91
Project: 31375M1309 - Deering St Sewer					
TOTALS for Project: 31375M1309 - Deering St Sewer	1,650,000.00	1,072,222.53	23,737.44	0.00	554,040.03
Project: 31375M1310 - Bedford St Sewer					
TOTALS for Project: 31375M1310 - Bedford St Sewer	0.00	3,329,855.82	2,803,446.07	0.00	-6,133,301.89
Project: 31375M1311 - Preble St Sewer					
TOTALS for Project: 31375M1311 - Preble St Sewer	0.00	38,168.31	0.00	5,170,000.00	-5,208,168.31

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

				LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3137Y19513 - C19513								
TOTALS for Project: 3137Y19513 - C19513	0.00	0.00	0.00	127,050.00	0.00	14,000.00	0.00	113,050.00
TOTALS FOR EXPENSE STRINGS				47,533,986.89	27,867,647.59	10,491,153.75	31,203,394.00	-22,028,208.45
TOTALS				47,533,986.89	27,867,647.59	10,491,153.75	31,203,394.00	-22,028,208.45

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3157015501 - CMOM SS RENEWAL					
TOTALS for Project: 3157015501 - CMOM SS RENEWAL	923,453.92	1,070,592.52	29,407.48	37,000.00	-213,546.08
Project: 3157017514 - MPI Paving fy17 Sewer					
TOTALS for Project: 3157017514 - MPI Paving fy17 Sewer 0.00 0.00 0.00	51,750.00	0.00	0.00	0.00	51,750.00
Project: 3157018114 - CSO Inel fy13					
TOTALS for Project: 3157018114 - CSO Inel fy13	500,000.00	444,674.00	0.00	0.00	55,326.00
Project: 3157018570 - SEWER ENGINEER PAYROLL					
TOTALS for Project: 3157018570 - SEWER ENGINEER PAYROLL 0.00 0.00 0.00	0.00	1,596.22	0.00	0.00	-1,596.22
Project: 3157116506 - Stormwater Storage Sagamore					
TOTALS for Project: 3157116506 - Stormwater Storage Sagamore	120,000.00	25,083.50	17,216.50	10,000.00	67,700.00
Project: 3157117510 - SW Infra Failure repairs					
TOTALS for Project: 3157117510 - SW Infra Failure repairs	200,000.00	0.00	0.00	136,325.00	63,675.00
Project: 3157118571 - STORMWATER ENGINEER PAYRO					
TOTALS for Project: 3157118571 - STORMWATER ENGINEER PAYRO	0.00	188.76	0.00	0.00	-188.76

City of Portland, ME

FOR 01/01/2015 - 12/31/2020

	LTD Revised Budget	LTD Actual Expenditures	Encumbrances	Requisitions	LTD Available Budget
Project: 3157C18502 - CMOM FY18 SS Renew					
TOTALS for Project: 3157C18502 - CMOM FY18 SS Renew 0.00 0.00 0.00	0.00	0.00	0.00	0.00	0.00
TOTALS FOR EXPENSE STRINGS	1,795,203.92	1,542,135.00	46,623.98	183,325.00	23,119.94
TOTALS	1,795,203.92	1,542,135.00	46,623.98	183,325.00	23,119.94

Appendix D – Inflow and Infiltration Program Reports

TECHNICAL MEMO

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To:

Benjamin Pearson, PE
Compliance Coordinator
Department of Public Works
City of Portland, ME

Copies:

Scott Haynes, PE, Arcadis

From:

Amy Anderson, Arcadis

Date:

Tuesday, December 11, 2018

Arcadis Project No.:

26980001.0000

Subject:

City of Portland, Maine – Department of Public Works
Planning and Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System –Progress Report

---

This progress report summarizes the work completed to date on the Planning and Engineering Services for the Infiltration and Inflow Program of the Sanitary Sewer System for the City of Portland, Maine. This progress report also includes information on the project budget and schedule.

Overall, the project is on schedule and within budget. While the contract duration is approximately 50% expired, through October 2018, we have billed approximately 28% of the Total Contract Fee. This is expected, as a lot of the costs will be incurred over the coming months as we get into SSES field work of our subcontractors.

Task 1 – Project Management

Task 1 includes project management throughout the three-year contract duration and includes: coordination and meetings with the City of Portland and other City entities, stakeholders, staff and subcontractors, presentations to the City at the completion of each task or key milestone, scheduling and management of staff resources, quality assurance/quality control, budgeting, cost controls and monthly billing, progress reports and development and enforcement of a project-specific Health and Safety Plan. Task 1 deliverables include meeting agendas and meeting minutes, Health and Safety Plan, progress reports, schedules and budget updates, slide show presentation to the City annually or at the completion of key milestone tasks, and updates and suggested budgets for anticipated, related work and costs to be incurred as required to complete the services under the I/I program. ***Task 1 is ongoing and currently on***

schedule and on budget. Through October 2018, we have billed approximately 14% of this Task's original budget.

Task 2 – Kickoff Workshop, Data Gathering, Public Participation

Task 2 includes a Kickoff Workshop, data gathering and public participation meetings over the three-year contract term. Task 2 key deliverables include a meeting agenda and goals for the Kickoff Workshop, summary of Kickoff Workshop discussions, public participation agendas and sample public information notices and bulletins for the City to disseminate through the City website.

At the project Kickoff Workshop on May 16, 2017, all facets of the project were discussed, including establishment of project goals and schedule for initiation and completion of all tasks. Data gathering took place mostly over the first two months of the project and continues on an as needed basis. Public participation has not yet begun, but Arcadis is prepared to discuss with the City the best way to initiate public notification and involvement. ***Task 2 is ongoing and currently on schedule and on budget. Through October 2018, we have billed approximately 84% of this Task's original budget.***

Task 3 – Data Gap Analysis

Task 3 includes utilizing Arcadis Data Profiler to complete a gap analysis of the City's GIS and prepare a GIS Gap Analysis report for the City. Task 3 also includes an evaluation of the City's hydraulic model to determine if the modeled network should be expanded and if the model should be re-calibrated. ***Task 3 is essentially complete. Final versions of the "GIS Gap Analysis Report" and the "Hydraulic Model Gap Analysis Letter Report" were delivered to the City on November 5, 2018 and have been uploaded to the project Sharepoint website. Through October 2018, we have billed approximately 93% of this Task's original budget.***

Task 4 – Flow Monitoring Program

The scope of services under Task 4 includes the development and implementation of a flow monitoring program, including the installation, maintenance and monitoring of 40 flow meters (over a two-year program) for a period of 12 weeks; installation of one permanent groundwater gauge and one rain gauge; and monitoring of additional gauges which already exist within the City. Task 4 includes engineering analysis of flow data, including the calculation of average daily flow, peak daily flow and peak hourly flow for each meter area. Task 4 key deliverables include meeting with the City to discuss the flow monitoring program strategy and implementation; and a "Flow Monitoring Letter Report" with findings, results and SSES recommendations. ***Task 4 is ongoing and currently on schedule and on budget. Through October 2018, we have billed approximately 45% of this Task's original budget.***

The following is a summary of completed and upcoming activities below:

Completed in 2018:

- Development of 20 flow meter subareas throughout the City. This was done by Arcadis based with input from the City of Portland's engineering department and DPW.
- Installation, maintenance and monitoring of 20 flow meters by Flow Assessment Services. Flow meters were installed from March 7, 2018 – July 9, 2018 for a total of 16 weeks.
    - Meters were installed in sub-areas 1, 2, 3, 4, 5, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28 and 29.

- Two rain gauges were installed at the Fore River Pump Station and the Riverton Fire Station. Rain gauge data was supplemented with data from the Riverside Pump Station for the infiltration and inflow analysis.
- Two permanent groundwater gauges were installed. One groundwater gauge located at the intersection of Martin Street and Bartley Street and the other is located on Leland Street at Baxter Pines Trail Head.
- An Infiltration and inflow analysis was performed on the 16 weeks of flow data for each of the 20 meter areas. The analysis included calculation of average daily flow, peak daily flow, base infiltration, rainfall induced infiltration and inflow. Infiltration was calculated based on gallons per day per LF as well as gallons per day per inch-diameter mile.
- High infiltration and inflow sub-areas were established and SSES recommendations were developed. Recommendations were developed based on flow metering results as well as data provided by the City – known problem areas, segments previously televised, and upcoming rehabilitation plans.
- Preliminary meter areas for 2019 were developed based on 2018 flow meter results and areas not included in the 2018 metering program.

2019 Upcoming Activities

- Final selection of 2019 meter areas
- Installation, maintenance and monitoring of 20 flow meters by Flow Assessment Services. It is anticipated that these meters will be installed in March 2019.
- Two rain gauges will be installed in location central to the metering areas.
- Arcadis will perform a flow metering analysis calculating average daily flow, peak daily flow, base infiltration and rainfall inducted infiltration and inflow.
- High infiltration and inflow sub-areas will be established and SSES recommendations will be developed.
- Development of a Final Flow Monitoring Program Letter report summarizing findings, results and SSES recommendations.

Task 5 – Investigation of Major I/I Sources – Sewer System Evaluation Survey (SSES)

Task 5 includes the development and implementation of a collection system I/I investigation strategy that includes flow isolation, closed circuit television (CCTV) inspections, manhole inspections, smoke testing, dye testing, building inspection as appropriate to identify major sources of I/I. **Task 5 kicked off in the Fall of 2018 after the first round of SSES recommendations were developed. This task is ongoing and currently on schedule and budget.** ***Through October 2018, we have not billed under this Task as we are just beginning implementation of SSES activities.***

- 2018 SSES recommendations include: 194,710 LF of flow isolation in sub-areas 4, 5, 7, 8, 14, 15, 16, 18, 21, 22 and 28; 27,611 LF of CCTV in sub-areas 9, 19, 20 and 29; and 443 manhole inspections in sub-areas 4, 8, 9, 15, 16, 17, 22, 28 and 29. It is anticipated that the flow isolation and CCTV will be completed in December of 2018. Manhole inspections will be completed in the spring of 2019.
- 2019 SSES recommendations will be developed after the 2019 flow metering is completed.

- Flow Isolation, CCTV and manhole inspections will be conducted in both the spring and fall of 2019. Large building inspections and smoke testing will be conducted in the summer of 2019.

Task 6 – Wastewater Collection System Analysis and Action Plan

Task 6 includes the development of a Wastewater Collection System Analysis and Action Plan Report and a presentation of Final Report and recommendations to the city. **This task is 0% complete. It is anticipated that this task will kick off in the Summer or Fall of 2019.**

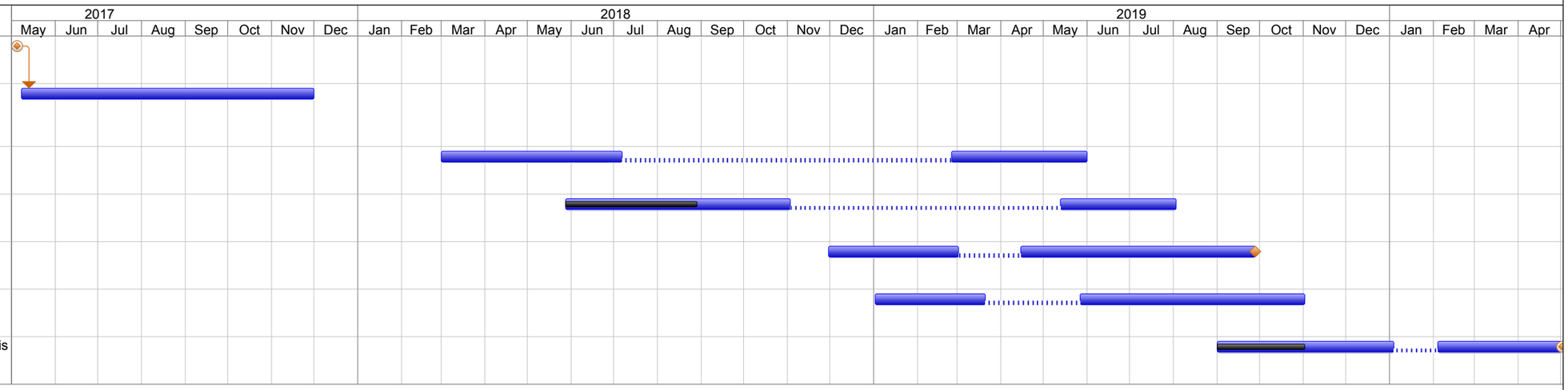
Schedule

A revised project schedule has been attached to this progress report.

Project Schedule

ARCADIS Design & Consultancy for natural and built assets

ID	Task Name
1	Execute Contract for I/I Program
2	Data gathering and gap analysis
3	Flow monitoring program
4	Analysis of flow metering, I/I source identification, prioritization for SSES activities
5	Conduct SSES activities in high priority I/I areas
6	Identification of I/I rehabilitation needs
7	Draft and Final "Wastewater Collection System Analysis and Action Plan" Report



City of Portland, Maine

HYDRAULIC MODEL GAP ANALYSIS

November 2018

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EXECUTIVE SUMMARY

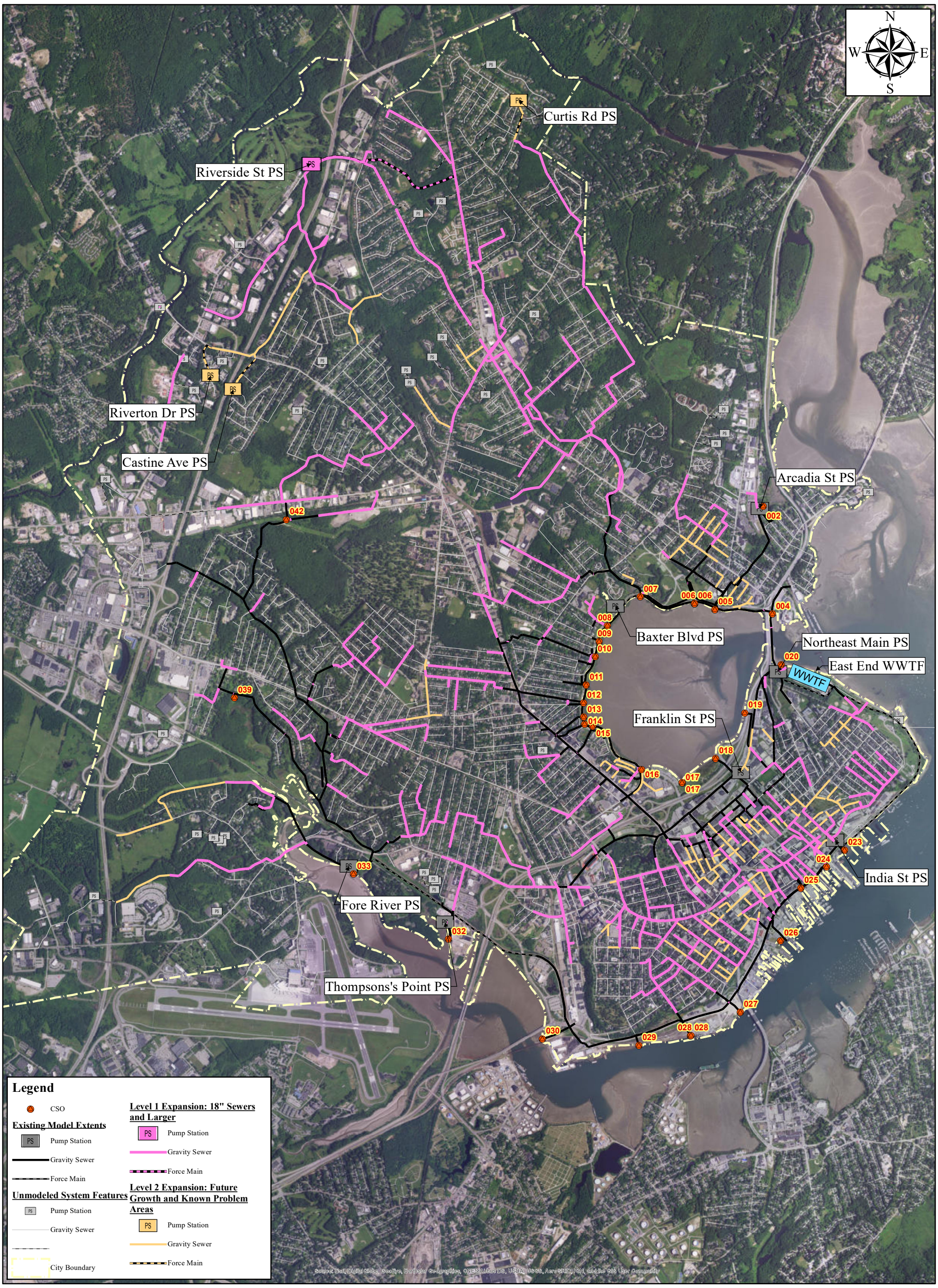
As part of the "*Planning & Engineering Services for an Infiltration and Inflow (I&I) Program of the Sanitary Sewer System*" contract for the City of Portland (City), Arcadis performed a gap analysis of City's sewer system hydraulic model to identify deficiencies and to recommend updates and improvements that will support City programs. This report summarizes the findings and recommendations of the gap analysis and provides multiple options for expansion and recalibration of the City's sewer system model depending on specific objectives.

Historically, the City's model has been used for estimating combined sewer overflow (CSO) discharge volumes, sizing mitigation projects, and quantifying the resulting reductions at the downstream CSOs. As configured, the City's model is appropriate for its current uses.

Moving forward, we understand the City would like to expand and upgrade the sewer system model to support:

- Developing an understanding of the system-wide performance during large rainfall events in both separated sanitary and combined sewers
- Evaluating system performance during large rainfall events and developing potential improvements for areas potentially subject to SSOs, surface flooding, and/or basement backups
- Assessing the impacts of new development to facilitate collection system capacity evaluations, wet weather planning and capital improvement program development
- Continuing to support Discharge Monitoring Report (DMR) analyses
- Supporting planning/design for Integrated Plan projects, including operational plan development and projection of flows and loads to the East End Wastewater Treatment Facility
- Prioritizing basins and sewer segments for rehabilitation/replacement and periodic cleaning for I/I mitigation
- Evaluating CSO flows and loads for future water quality analysis
- Evaluating real-time control scenarios

To achieve these objectives, significant expansions in the extents and level of detail of the model are necessary. The Level 1 & 2 Hydraulic Model Expansion option, as described in detail in this report and as shown in **Figure ES-1**, is recommended for the next stage in developing the City's sewer model.



0 0.25 0.5 1 Miles

City of Portland, ME
Level 1&2 Model Expansion Options
Figure ES-1
May 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\Model Files\Map 1_L1-L2_Model Expansion Options.mxd

Level 1 Expansion involves expanding the existing system model to include all sewers 18 inches and larger, providing a solid backbone for developing a system-wide understanding of overall sewer performance. Level 2 Expansion entails extending the model into potential future growth areas and known problem areas (i.e., areas experiencing capacity-limited SSOs, City-identified flooding areas, and areas affected by tidal fluctuations). The Level 1 & 2 Expansion option includes modeling 11 pump stations in total and approximately 39 percent of the existing gravity sewers (by length). Levels 1 and 2 also provide sufficient detail to determine where Real-Time-Controls (RTCs) could provide inline storage for CSOs without increasing the risks for basement backups beyond acceptable levels during large rainfall events.

Because the City's GIS does not include rim elevations for most manholes, nor invert elevations for most gravity sewers, a significant data collection effort will be necessary to develop these attributes to expand the hydraulic model. Although the City does have as-built drawings, the City has requested that the manhole and pipe attributes necessary for the model development be surveyed. We estimate that it would take about 125 days of a two-person survey crew (2,000 total labor hours) to obtain rim and invert elevations for approximately 2,800 manholes associated with sewers 18-inches and larger. Additional time would be required for recording and tabulation of data and interfacing with the City's GIS.

A comprehensive audit of model inputs for all CSO regulators and to-be modeled pump stations is also recommended as part of the model expansion. **Table ES-1** provides an estimate of modeling labor hours for the recommended Level 1 and 2 Model Expansion option.

It should be noted that these estimates comprise the level of effort to complete the updates and expansion of the model and to complete an initial recalibration of the model, but they do not include the actual use and application of the model for the various City initiatives indicated above. The labor estimates also do not include the surveying level of effort described above or flow monitoring needed to support expansion and calibration of the model. Flow monitoring needs are discussed below.

Table ES-1. Labor and Flow Monitoring Estimates for Level 1 and 2 Model Expansion

Model Expansion Tasks	Estimated Labor Hours
Finalize Network for Model Integration, Develop Basin Schematics, Select Meter sites for Calibration	128
Develop hydrologic inputs	314
Model Network Integration and Finalization	80
Model calibration	1,270
Project Management and Model Documentation	172
Total	1,964

The effort required to obtain and troubleshoot physical data for the Level 1 & 2 Expansion also provides an opportunity to update the GIS in those same locations. **Figure ES-2** shows a workflow, where data collection and troubleshooting tasks for the model expansion produce updates and corrections for the GIS. The formats and procedures developed during the model expansion, as they pertain to updating the City's GIS, also provide a solid platform for continuing to coordinate future updates of the model and GIS together.

Paired with Level 1 & 2 Expansion of the City's sewer model, a significant recalibration effort is recommended using 28 flow monitoring locations. The recalibration effort also assumes the availability of pumped flow data for the 11 pump stations, which will be explicitly modeled in the Level 1 & 2 Expansion.

Some of the flow monitoring data which is being collected as part of the City-wide I/I Program in 2018 and 2019 can be utilized for the hydraulic model expansion, thus reducing the number of additional flow monitoring locations needed. The number and location of I/I Program flow monitoring locations which could also be utilized for the model expansion would need to be determined when a more specific scope of work is developed for conducting the Level 1 & 2 Expansion.

For the additional flow monitoring locations needed for the model recalibration effort (to reach a total of 28 metered locations), we suggest the City budget for a three-to-four month flow and rainfall monitoring program, preferably occurring during the spring and summer months. For the recommended Level 1 & 2 Expansion, in addition to the flow monitoring data collection, we recommend 2 level sensors downstream of CSO regulators, 2 groundwater gauges and 6 rain gauges. Again, some of the gauges already installed and activated within the City's collection system could be utilized.

Macro-level planning models, such as the recommended Level 1 & 2 Expansion option, can be adequately calibrated using a minimum of three or four storms, if these storms match the specific sizing conditions of interest. However, when sizing volume-based improvements, single event-based calibrations run the risk of undersizing or oversizing the proposed improvements. For the recalibration effort, we recommend using continuous mode simulations for the full monitoring period (after single event simulations) to develop model parameters that can better account for the impacts of back-to-back storms and improve the model's use in sizing volume-based improvements.

The above recommendations, as well as recommendations for software selection for the model expansion, are discussed in greater detail in Section 3 of this report.

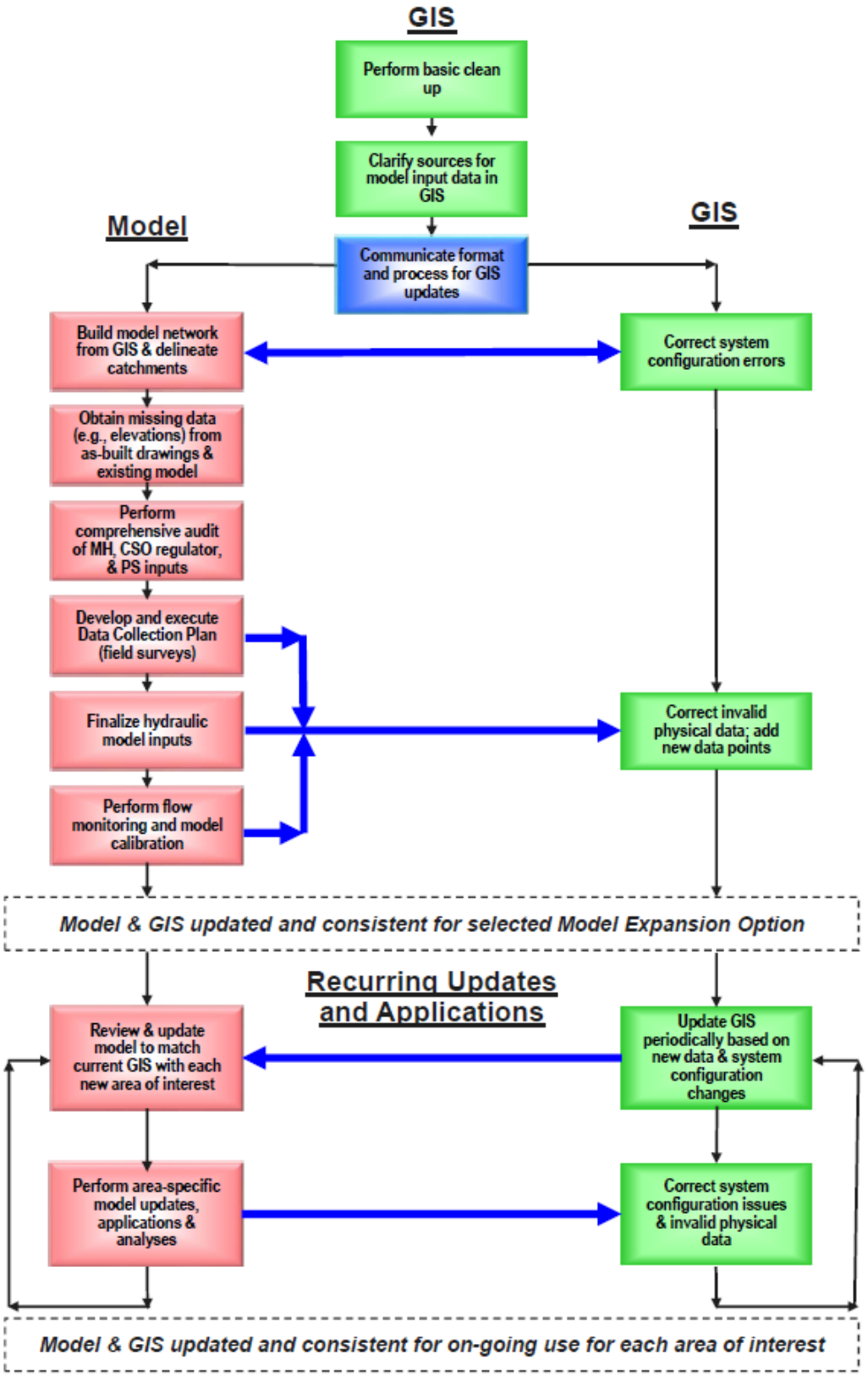


Figure ES-2. Model Expansion & GIS Coordination Workflow Schematic

1 INTRODUCTION

1.1 Purpose & Goals

As part of the "*Planning & Engineering Services for an Infiltration and Inflow (I&I) Program of the Sanitary Sewer System*" contract for the City, Arcadis performed a gap analysis of City's sewer system hydraulic model to identify deficiencies and to recommend updates and improvements that will support City programs. This report summarizes the findings and recommendations of the gap analysis and provides multiple options for expansion and recalibration of the City's sewer system model depending on specific objectives.

Historically, the City's model has been used for estimating CSO discharge volumes, sizing mitigation projects, and quantifying the resulting reductions at the downstream CSOs. Based on information provided by the City and discussions with staff, we understand the City would like to develop the existing sewer model over time into a solid, consistent analysis tool capable of the following:

- Developing an understanding of the system-wide performance during large rainfall events in both separated sanitary and combined sewers
- Evaluating system performance during large rainfall events and developing potential improvements for areas potentially subject to SSOs, surface flooding, and/or basement backups
- Assessing the impacts of new development to facilitate collection system capacity evaluations, wet weather planning and capital improvement program development
- Continuing to support DMR analyses
- Supporting planning/design for Integrated Plan projects, including operational plan development and projection of flows and loads to the East End Wastewater Treatment Facility
- Prioritizing basins and sewer segments for rehabilitation/replacement and periodic cleaning for I/I mitigation
- Evaluating CSO flows and loads for future water quality analysis
- Evaluating real-time control scenarios

1.2 Model History

The City began development of its sewer system model in the early 1990s for use in reducing CSOs under the 1993 Long Term Control Plan (LTCP). The model was subsequently updated and expanded by DeLuca-Hoffman Associates and CDM Smith/Wright-Pierce to support the Tier II and Tier III CSO LTCP updates in 2003 and 2010, respectively. Since then, the City and Portland Water District (PWD) have worked with Jordan Environmental Engineering to maintain the sewer system model for use in estimating CSOs along Back Cove, Fore River and Portland Harbor. The modeled annual overflow volume estimates are also used for the City's and PWD's ongoing reporting requirements for their National Pollutant Discharge Elimination System (NPDES) permits.

In 2015 Wright-Pierce expanded and recalibrated the City's model within the Bayside and Baxter Boulevard sewersheds to support sizing and design of the Back Cove South Storage Conduit (BCSSC). In 2016 Wright-Pierce also expanded and recalibrated the City's sewer system model in the Back Cove West sewershed for use in sizing the proposed Back Cove West Storage Conduit (BCWSC).

In a separate effort, Woodard & Curran used the City's CSO model, available sewer system GIS data, and 2-ft topographical contours as the basis for developing a rough all-pipes model in 2013. This model was used for assessing the hydraulic capacity of individual pipes as part of risk-based renewal planning for the 2013 *Capacity, Management, Operation and Maintenance (CMOM) Assessment and Corrective Action Plan Report*.

1.3 GAP Analysis Supporting Information

Supporting information reviewed for this gap analysis includes the following items:

- *Capacity, Management, Operation and Maintenance (CMOM) Assessment and Corrective Action Plan Report*, prepared by Woodard & Curran, November 2013.
- *Combined Sewer Overflow Long Term Control Plan Tier III Update Report*, prepared by CDM Smith and Wright-Pierce, January 2013.
- *Portland BCWSC – InfoSWMM Modeling Memorandum*, prepared by Wright-Pierce, August 2017 (File name: ModelingMemorandum_v3 Full.pdf).
- InfoSWMM Version 14.5 model files for sewer system flows tributary to the Northeast Main Pump station, which serves the northern and eastern areas of the City, including the Back Cove West, Baxter Boulevard, and Bayside sewersheds (File name: PortlandBCS_InfoSWMM_8-30-17.zip).
    1. The *Portland BCWSC – InfoSWMM Modeling* Memorandum listed above describes model changes in the Back Cove West sewershed, which are included in these modeling files.
    2. Upon receipt of these modeling files, we re-ran the June 2016 verification storm and following the removal of a few external file references, the model run was completed successfully.
- Separate Sanitary Sewer Overflow (SSO) locations (Table 2), from the *2016 CMOM Annual Report* prepared by Woodard & Curran.
- City of Portland GIS information for each sewershed, including sewer system data; historical and current flow meters and rain gauges, and other geographic information; and digital aerial photos.
- Locations of currently-planned and/or recently constructed stormwater, combined sewer, and separate sanitary sewer improvements.
- Potential future development or redevelopment areas within the City's service area.
- Area known to be tidally-influenced or near tidally-influenced water bodies, including Back Cove, Capisic Brook, Fore River, and Portland Harbor.

This gap analysis is a high-level assessment of the City's existing model based on best available information. Please note also that several significant items were requested but not available for the gap analysis; as such, the resulting findings and recommendations may require refinements and adjustments upon subsequent review of the unavailable items. These items include:

- Modeling files for the western and southern areas of the City, which drain to interceptors along Capisic Brook, Fore River and Portland Harbor.
- Calibration plots documenting comparisons between model results and observed data for the Tier III LTCP model calibration in 2010 and the 2015 recalibration in the Bayside and Baxter Boulevard sewersheds.
- InfoSWMM modeling files for the all-pipes model developed for the *CMOM Assessment and Corrective Action Plan Report* in 2013.

Through a culmination of data collected from previous models and additional projects the City has continued to update a GIS database for the sanitary sewer pipes that comprise the combined and separated sewage system. A summary of total pipe lengths by diameter as presented in the City's GIS database is as follows:

Pipe Diameter (in)	Pipe Length (LF)	Percentage of System Total Linear Footage
2"	297	0.08%
4"	515	0.13%
6"	5,304	1.38%
8"	167,038	43.51%
10"	38,907	10.14%
12"	48,394	12.61%
14"	677	0.18%
15"	30,488	7.94%
16"	311	0.08%
18"	29,482	7.68%
20"	3,894	1.01%
21"	3,006	0.78%
22"	296	0.08%
24"	17,086	4.45%
27"	2,352	0.61%
30"	9,943	2.59%
36"	3,810	0.99%
42"	4,680	1.22%
44"	1,832	0.48%
48"	4,341	1.13%
54"	1,604	0.42%
60"	386	0.10%
66"	867	0.23%
72"	545	0.14%
75"	600	0.16%
84"	675	0.18%
96"	863	0.22%
Diameter Not Known	5,687	1.48%
Total	**383,878**	**100%**

2 GAP ANALYSIS FINDINGS & RECOMMENDATIONS

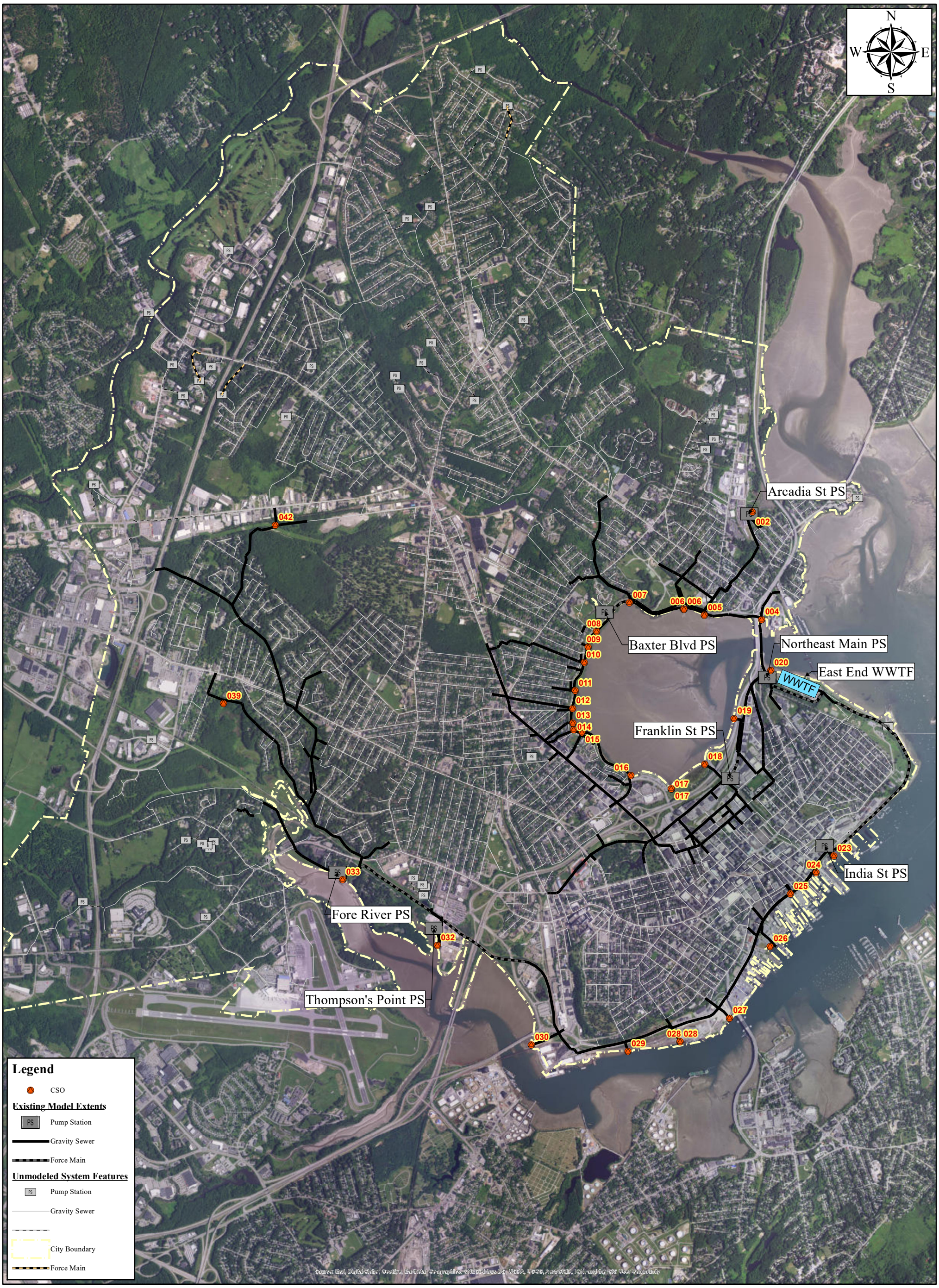
The model gap analysis approach includes the following elements to develop recommendations for improving the existing sewer system model and its ability to support City programs:

- Evaluating the extents and level of detail within the existing sewer model relative to potential areas of interest for the City.
- Identifying hydraulic input data collection needs for the recommended model expansion option and detailing how model and GIS updates may be coordinated.
- Providing input regarding software choices and long-term model file management.
- Developing a recommended framework for a system-wide recalibration of the City's sewer system model, including the identification of potential flow monitoring locations based on the City's areas of interest.

2.1 Model Extents & Level of Detail

Historically, the City's sewer system model has been used for characterizing and mitigating CSOs. **Figure 1** documents our understanding of the existing model's extents, which include the City's 33 permitted CSOs, seven major pump stations, and approximately 12 percent of the existing gravity sewers (by length). As shown, the City is served by two distinct sewer systems, which combine at the influent channel of the East End Wastewater Treatment Facility (WWTF). The model is slightly less detailed in the southern system, which drains to interceptors along Capisic Brook, Fore River, and Portland Harbor. To our knowledge, the southern model has not been substantially updated since development of the Tier III LTCP update in 2010. By contrast, the model for the northern system, which encircles Back Cove, was recently expanded to support the design of the Back Cove West and Back Cove South Storage Conduits.

The level of detail in the model catchments - that is, the areas generating the dry weather and wet weather flows tributary to the downstream sewers and pump stations - also reflects its usage for characterizing and mitigating CSOs. Areas tributary to each CSO outfall were established by first delineating catchment boundaries based on topographical data from an available Digital Elevation Model (DEM) and sewer system asset data. **Table 1** shows the resulting average size of the modeled catchments, ranging from 89 acres for Back Cove model to 147 acres for the Fore River sewer model.



0 0.25 0.5 1 Miles

City of Portland, ME

Existing Sewer Model Extents
Figure 1

May 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\Model Files\Map 0_Existing Sewer Model Extents.mxd

Table 1. Existing Sewer Model – Catchments' Level of Detail

	Back Cove Model	Fore River Model	Overall
Drainage Area	5,790 ac	5,140 ac[1]	10,930 ac
Number of Catchments	65	35*	100
Average Catchment Size	89 ac	147 ac	109 ac
Size Range	3 to 2,055 ac	Not available	Not available

1. Estimates based on City's service area and Tier III LTCP update report.

2.1.1 Model Expansion Options

Moving forward, significant expansions in the extents and level of detail are necessary for the City's sewer model to be used for identifying deficiencies and developing solutions in areas potentially subject to SSOs, surface flooding, and/or basement backups. **Table 2** and **Figures 2 and 3** provide three options for expansion of the City's sewer system model, depending on specific objectives:

- ***Level 1 Expansion - 18" Sewers and Larger,*** providing a solid backbone for system-wide understanding of overall performance during large storm events, plus sufficient detail to identify where Real-Time-Controls (RTCs) could provide inline storage for CSO volumes without increasing the risks for SSOs and basement backups beyond acceptable levels.
- ***Level 1 & 2 Expansion: Future Growth and Known Problem Areas,*** solid backbone plus extensions to evaluate deficiencies and identify solutions for future growth and known problem areas.
- ***Level 1, 2, & 3 Expansion: Better System Coverage,*** including the solid backbone, extensions to future growth and known problem areas, plus additional detail in separate sanitary areas and upstream flow splits.

To meet the City's goals and desired objectives, we recommend that the City select the Level 1 & 2 Expansion option for the next stage of model development. Expanding the existing system model to include all sewers 18 inches and larger provides a solid backbone for developing a system-wide understanding of overall performance in both separate sanitary and combined sewers during large rainfall events. The Level 1 option also provides the City with sufficient detail to determine where RTCs could provide inline storage for CSOs during small rainfall events without increasing the risks for basement backups beyond acceptable levels for larger storms. The Level 1 option, including all sewers 18 inches and larger, also supports individual or system-wide assessments of impacts from potential green infrastructure projects.

Table 2. Hydraulic Model Expansion Options - Summary

	Existing System	Existing Model	Level 1 Expansion	Level 1 & 2 Expansion	Level 1, 2, & 3 Expansion
Length of Gravity Sewers[1]	231 miles	28 miles (12%)	77 miles (33%)	91 miles (39%)	124 miles (54%)
Length of Force Mains[1]	9.9 miles	3.5 miles (35%)	5.3 miles (53%)	6.0 miles (61%)	6.1 miles (62%)
No of Pump Stations	23[2]	7	8	11	13
No of Manholes, if Explicitly Modeled[3]	6,410	912	2,397	2,801	3,694
No of Pipes, if Explicitly Modeled[3]	6,801	791	2,230	2,681	3,538

[1]Estimates based on pipe lengths from City's sewer system GIS data and maps from Tier III LTCP update report.

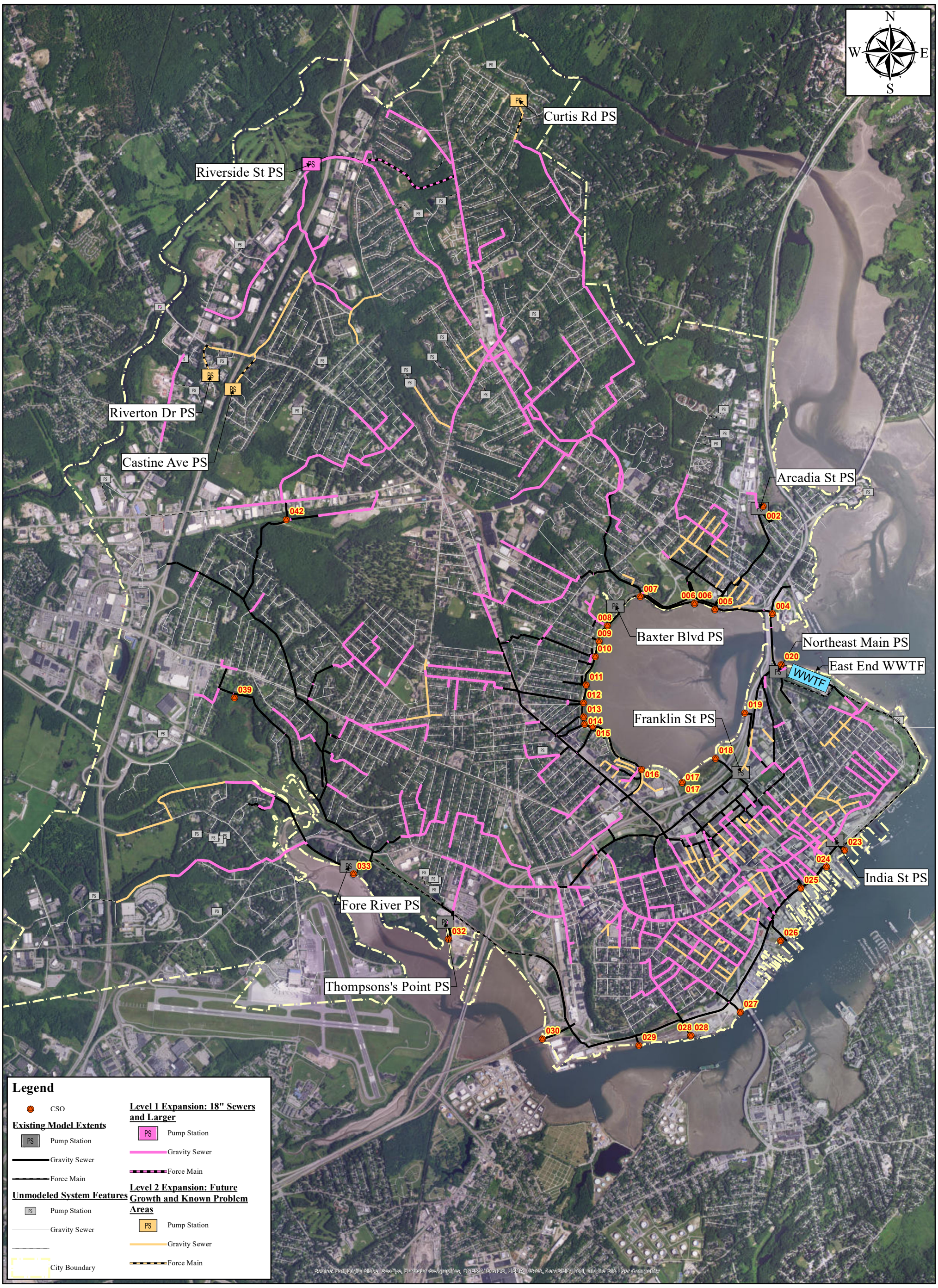
[2]Estimates based on facilities owned by the City and PWD (from CMOM report), which drain to interceptors along Capisic Brook, Fore River, and Back Cove.

[3]Estimates based on number of assets from City's sewer system GIS data and information from Tier III LTCP update report. Number of nodes & pipes in existing model are less than the "number of manholes & pipes, if explicitly-modeled" because sewer pipes were lumped together.

The Level 2 Expansion then prepare the model for use in evaluating system impacts and developing improvements for both potential future growth areas and known problem areas (i.e., capacity-limited SSOs, City-identified flooding and basement backup areas; areas affected by tidal fluctuations). The Level 1 & 2 Expansion option includes 11 pump stations in total and approximately 39 percent of the existing gravity sewers by length. The Level 1 & 2 model would also include approximately 2,800 modeled manholes and 2,700 modeled pipes.

The Level 1, 2, & 3 Expansion option, which extends the model to include a total of 13 pump stations and approximately 54 percent of the existing gravity sewers, could form the basis for a second future stage of model development. It could be implemented all at once; however, we recommend instead implementing the model expansion in phases over time, depending on specific questions and areas of interest. When complete, the Level 1, 2, & 3 model would include approximately 3,700 modeled manholes and 3,500 modeled pipes.

Tables 3 and 4 summarize the potential extents and level of detail for the three model expansion options for the City's two distinct sewer systems, which combine at the influent channel of the East End WWTF. The Level 1 & 2 Expansion option for Fore River includes 3 pump stations in total and approximately 41 percent of the existing gravity sewers, while Back Cove includes 8 pump stations and approximately 38 percent of the existing gravity sewers. The recommended Level 1 & 2 models for Back Cove and Fore River would include approximately 1,600 pipes and 1,100 pipes, respectively.



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City of Portland, ME
Level 1&2 Model Expansion Options
Figure 2
May 2018

ARCADIS Design & Consultancy for natural and built assets

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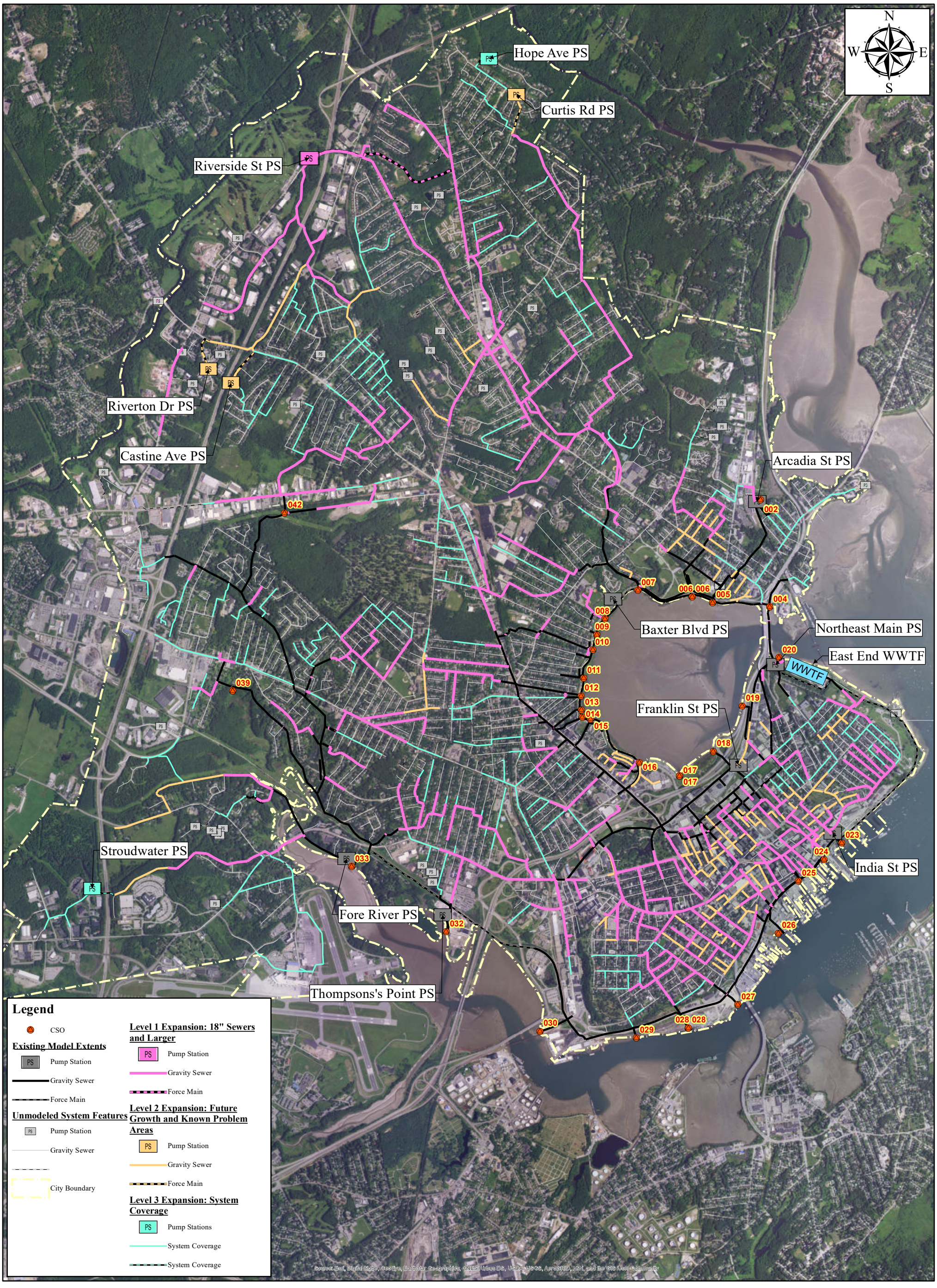

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City of Portland, ME
Level 1, 2, &3 Model Expansion Options
Figure 3
May 2018

ARCADIS Design & Consultancy for natural and built assets

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Table 3. Fore River Hydraulic Model Expansion Options - Summary

	Existing System	Existing Model	Level 1 Expansion	Level 1 & 2 Expansion	Level 1, 2, & 3 Expansion
Length of Gravity Sewers[1]	87 miles	11 miles (13%)	31 miles (36%)	36 miles (41%)	50 miles (57%)
Length of Force Mains[1]	3.6 miles	2.7 miles (75%)	2.7 miles (75%)	2.7 miles (75%)	2.8 miles (78%)
No of Pump Stations	5[2]	3	3	3	4
No of Manholes, if Explicitly Modeled[3]	2,422	305	952	1,098	1,463
No of Pipes, if Explicitly Modeled[3]	2,558	288	910	1,071	1,427

[1]Estimates based on pipe lengths from City's sewer system GIS data and maps from Tier III LTCP update report.

[2]Estimates based on facilities owned by the City and PWD (from CMOM report), which drain to interceptors along Capisic Brook, Fore River, and Back Cove.

[3]Estimates based on number of assets from City's sewer system GIS data and information from Tier III LTCP update report. Number of nodes & pipes in existing model are likely less than the "number of manholes & pipes, if explicitly-modeled" because sewer pipes were lumped together.

Table 4. Back Cove Hydraulic Model Expansion Options - Summary

	Existing System	Existing Model	Level 1 Expansion	Level 1 & 2 Expansion	Level 1, 2, & 3 Expansion
Length of Gravity Sewers[1]	144 miles	17 miles (12%)	46 miles (32%)	55 miles (38%)	74 miles (51%)
Length of Force Mains[1]	6.3 miles	0.8 miles (13%)	2.6 miles (41%)	3.3 miles (52%)	3.3 miles (52%)
No of Pump Stations	18[2]	4	5	8	9
No of Manholes, if Explicitly Modeled[3]	3,988	607	1,445	1,703	2,231
No of Pipes, if Explicitly Modeled[3]	4,243	503	1,320	1,610	2,111

[1]Estimates based on pipe lengths from City's sewer system GIS data and maps from Tier III LTCP update report.

[2]Estimates based on facilities owned by the City and PWD (from CMOM report), which drain to interceptors along Capisic Brook, Fore River, and Back Cove.

[3]Estimates based on number of assets from City's sewer system GIS data and information from Tier III LTCP update report. Number of nodes & pipes in existing model (328 nodes) are less than the "number of manholes & pipes, if explicitly-modeled" because sewer pipes were lumped together.

2.1.2 Model Catchments

The level of detail for model catchments must also increase in kind for the sewer model to support City programs as desired. Generally, we recommend that the average size of modeled catchments range from 5 to 20 acres, with the highest level of detail in areas of specific interest, such as areas potentially subject to SSOs, surface flooding, and/or basement backups. The approximately 400 catchments delineated for the all-pipes model that supported the *CMOM Assessment and Corrective Action Plan Report* in 2013 could provide a good starting point.

Contrasting with delineations in the existing model, which delineated only in areas tributary to the combined sewer system, catchments for the model expansion should be delineated for all areas tributary to the City's sewer system, including both separated sanitary sewer areas and combined sewer areas. Catchments in the existing model account for separated areas by subtracting out the separated acreage and using only the total combined sewer area for generating wet weather flows. If both separated and combined areas are represented explicitly, the City's sewer model can then assess local and downstream benefits from potential gray and green infrastructure improvements affecting either or both separate sanitary and combined sewer areas.

In areas where the City may consider implementing small-scale green infrastructure (GI) techniques for stormwater management (i.e., rain gardens, bioswales, pervious pavers, etc.), the model will likely require an even higher level of detail in the modeled catchments to simulate the benefits of the resulting runoff volume and peak flow reductions for the receiving sewer system. For example, the average size of modeled catchments in urban areas where small-scale GI projects are implemented could range from 1 to 5 acres. For these assessments, the City may also find it advantageous to delineate each catchment into multiple runoff surfaces, as shown in **Figure 4**, where each surface corresponds to a unique stormwater runoff source type with an associated flow path. Representing the different runoff source types explicitly rather than lumping them together as either pervious or impervious areas then leads to better understanding of the flow contributions from different runoff sources and better sizing of the corresponding GI improvements.

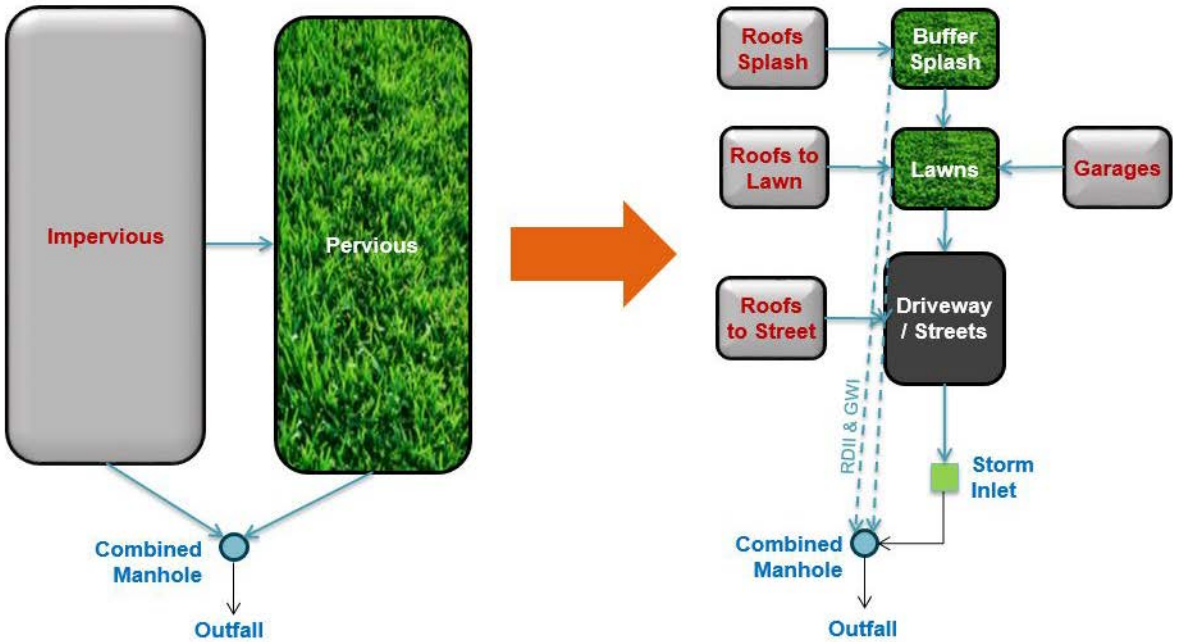


Figure 4. Potential Future Catchment Representation – Multiple Runoff Surfaces

2.2 Hydraulic Model Input Data

2.2.1 Physical Infrastructure Data Collection

Expanding the City's existing model from approximately 28 miles to nearly 90 miles of modeled gravity sewers (Level 1 & 2 Expansion option) will require significant effort to gather the physical infrastructure data needed to simulate system hydraulics in each modeled pipe and pump station. Developed from mostly as-built drawings, the City's sewer system GIS data will be the primary source for the initial model skeleton, utilizing the following GIS attributes for modeled pipes and nodes:

- X and Y coordinates for manholes
- Upstream and downstream pipe connections
- Pipe shape and dimensions for gravity sewer pipes
- Sewer system type (combined, separate storm, etc.)

Figure 5 illustrates the full list of hydraulic inputs needed for modeled manholes and pipes.

Because the City's GIS does not include rim elevations for most manholes nor invert elevations for most gravity sewers, a significant data collection effort will be required to develop these attributes. Although the City does have as-built drawings, the City has requested that the manhole and pipe attributes necessary for the model development be surveyed. This is further discussed in Section 3 and the Executive Summary of this report. Hydraulic inputs from the existing sewer model will also be reviewed for potential use in the expanded model.

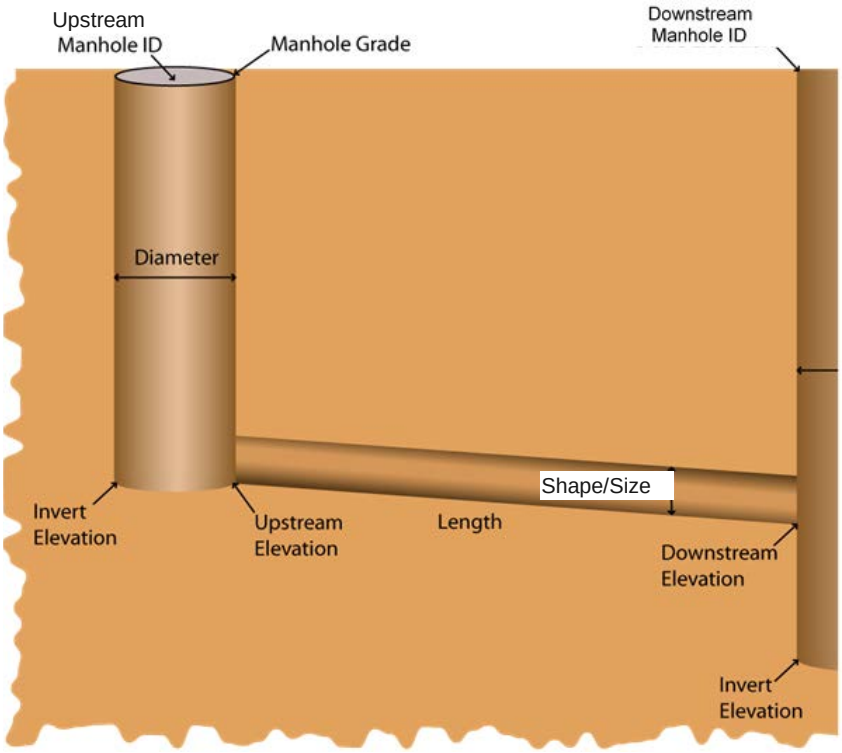


Figure 5. Hydraulic Input Data Needs for Sewer Models

Labor estimates for the recommended Level 1 and 2 Expansion option utilizing field surveyed elevations for up to 2,800 manholes proposed for Level 1 and 2 are 2,000 man-hours. Instead of field surveys for all modeled manholes, a lower cost option would be field surveying a percentage of the to-be-modeled system to establish invert elevations and confirm pipe dimensions and shapes. Manholes would be surveyed at critical locations within the modeled system (i.e., changes in pipe diameter, major changes in alignment, upstream and downstream of street/railroad crossings), as well as at locations spatially distributed across the service area. Invert elevations for non-surveyed manholes could then be interpolated based on elevations for upstream and downstream survey points. Available Light Detection

and Ranging (LiDAR) survey data or 2-foot topographical contours for Cumberland County could be used to populate rim elevations for non-surveyed manholes in the model.

Additional recommendations to improve the physical representation of the modeled sewer system include the following:

- Performing a comprehensive audit of model inputs for the CSO regulators to determine if field surveys are required for the model expansion. The review will consider available information about incoming and outgoing pipe shapes, dimensions, and invert elevations; sketches and photos for each regulator; presence of flap gates and/or tide gates, dimensions and elevations for weirs, orifices, and any other elements necessary to represent regulator hydraulics. The last comprehensive review of the CSO regulators likely pre-dates the Tier III LTCP update in 2010.
- Developing pump station representations for both currently modeled and to-be-modeled stations based on recent and accurate information regarding wet well size and configuration, actual pump curves (from pump tests), and pumping operations, including pertinent SCADA controls.

The comprehensive audit of model inputs for all CSO regulators and to-be-modeled pump stations is estimated at approximately 120 man-hours. This assumes that field surveys are not required to complete the facility audits.

2.2.2 Model & GIS Coordination

The large effort required to obtain and troubleshoot physical data for the Level 1 & 2 Expansion also provides the City with an easy opportunity to update the GIS in those same locations. **Figure 6** shows a workflow, where data collection and troubleshooting tasks for the model expansion produce updates and corrections for the GIS. The formats and procedures developed during the model expansion for updating the City's GIS also lay the groundwork for future updates in either GIS or model to occur together.

The process begins with basic cleanup of the City's GIS to prepare it for use in the model expansion. Specific tasks may include confirming the GIS matches the existing sewer system configuration (i.e., Are all recently completed construction projects included correctly in the GIS?); addressing quick-and-easy recommendations from the GIS gap analysis; and deleting notes and comments which no longer apply. Next, clarification of sources involves identifying the various data sources used for model attributes shown in Figure 5, which will be imported into model from GIS. In most cases, these attributes are based on as-built drawings; however, the GIS may also include data taken from topographical contours, previous field surveys and inspections, and the City's existing model, or the data source may be unknown. Understanding the source of elevations and pipe diameters will be critical in decision-making about model inputs where data conflicts exist. Defining the format and setting up procedures for updating the City's GIS based on additional data and corrections identified during the model expansion is also a necessary task.

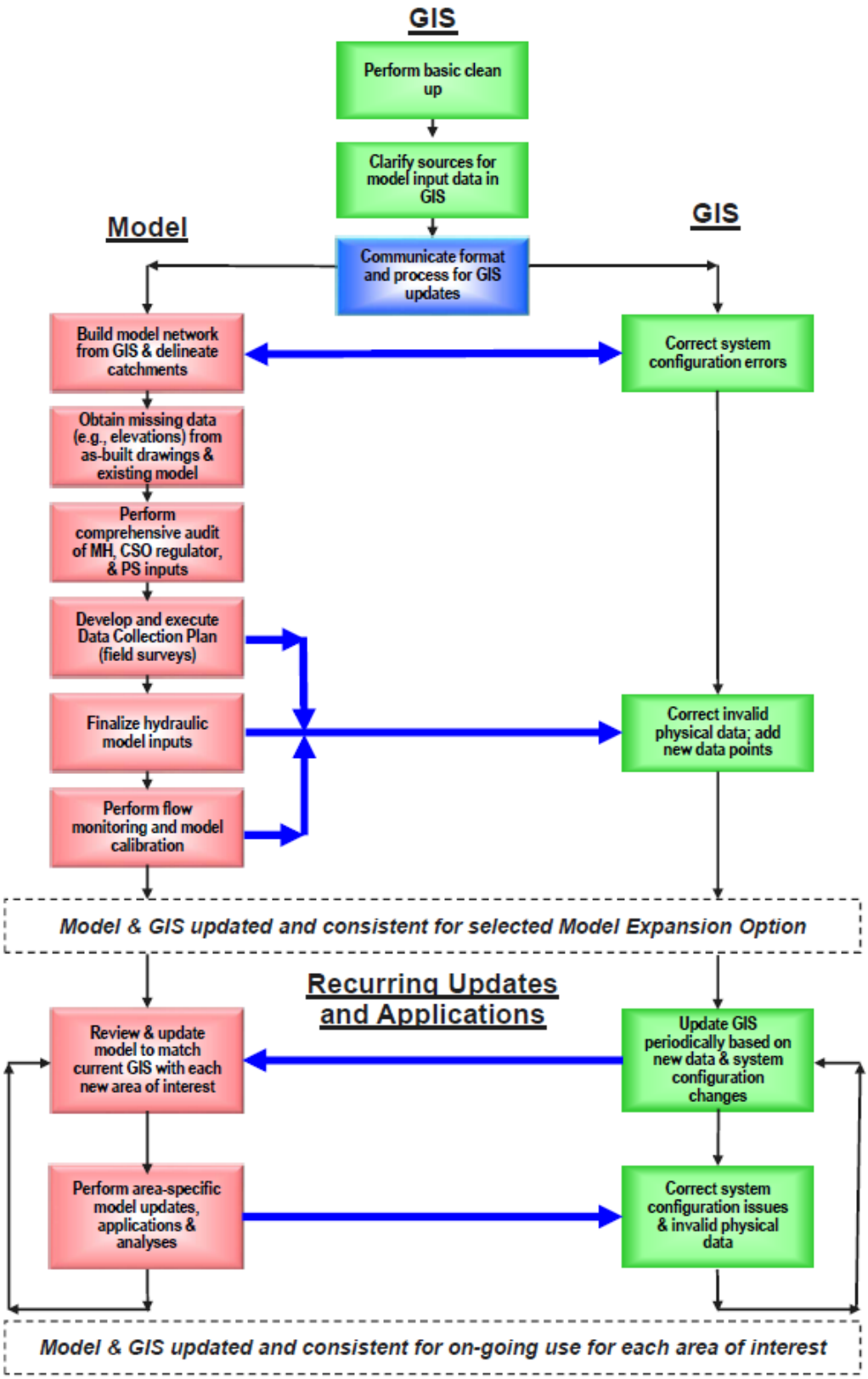


Figure 6. Model Expansion & GIS Coordination Workflow Schematic

Following the introductory tasks, model expansion begins by importing GIS data for the to-be-modeled manholes and pipes into the modeling software to create the new network. Unlike the City's previous modeling projects, we recommend that the expanded model be created from the City's GIS, rather than starting from the existing model. Building directly from the GIS establishes the one-to-one correspondence between model and GIS elements, which is necessary for quick and easy coordination of data updates and corrections. The existing model itself has significantly fewer pipes than the corresponding GIS sewer pipes. When the existing model was built in the 1990s, sewer pipes with the same diameters and slopes were usually lumped together into a single model pipe. At that time, reducing the number of modeled pipes as much as possible was necessary, so that long-term simulations could be performed with reasonable run times. Because of vast increases in computer processing speeds in the last few decades, the computational engines used in most industry-standard software packages today are fast enough that long-term simulations have reasonable run times, even though the number of model pipes has increased substantially.

Creating the expanded model network and delineating catchments from the GIS also lays the groundwork for model expansion work to identify system configuration errors in the GIS and have these transferred back to the GIS in the first round of updates and corrections. Subsequent rounds of updates and corrections in the GIS will focus on adding in new physical data points or correcting invalid data based on the hydraulic model build, flow monitoring, and calibration activities for the model expansion.

When the model expansion is complete, modeled manholes and sewers in the expanded model will exactly match their corresponding elements in the GIS for physical infrastructure attributes shown in Figure 5. The formats and procedures developed during the model expansion for updating the City's GIS also provide a solid platform for continuing to coordinate future updates of model and GIS together.

Table 5 summarizes the modeling labor estimates required for building the model network and developing initial inputs for the Level 1 and 2 Model Expansion option. Labor estimates for flow monitoring and surveying rim and invert elevations are not included in the table; however, an estimated level of effort for surveying is included elsewhere in this report..

Table 5. Labor Estimates for Level 1 and 2 Model Expansion Option –Model Build Tasks

Model Expansion Tasks	Estimated Labor Hours
Finalize Network for Model Integration, Develop Basin Schematics, Select Meter sites for Calibration	128
Develop hydrologic inputs	314
Model Network Integration and Finalization	80
Model calibration	1,270
Project Management and Model Documentation	172
Total	**1,964**

2.2.3 Tidal Influence Model Inputs

Within the City's existing sewer model tidal influence is accounted for by using time series water level data for the NOAA tide gauge (station id 8418150) in Portland Harbor directly within the model software as the boundary condition for all outfalls along Fore River and Portland Harbor. The same time series data with an elevation adjustment is used as the boundary condition for outfalls along Back Cove. The 0.5 ft-elevation adjustment for Back Cove was determined by comparing water surface elevations at CSO 5 and at the NOAA tide gauge during the last system-wide calibration effort in 2010, which occurred during the Tier III LTCP update.

If the invert elevation of the outfall is below the applied water surface elevations for a time, then the model predicts tidal inflows unless the outfall has a flap gate/tide gate to prevent such from occurring. SSOs, surface flooding, and basement backups caused by tidal influence - instead of local pipe bottlenecks - can then be investigated by running model simulations with and without the tidal influence boundary conditions and looking for differences in sewer system performance. Moving forward, we recommend the model expansion continue accounting for tidal influence by using water level data from Portland Harbor and Back Cove to set boundary conditions.

2.3 Software and Model Management

The City's sewer system hydraulic model was initially developed in the early 1990s using EPA's public domain Storm Water Management Model (SWMM) Version 4 software and then upgraded to EPA's SWMM 5 software in the mid-2000s. More recently, the northern model, representing the sewer system encircling Back Cove, was converted to Innovyze's InfoSWMM version 14.5 software. InfoSWMM, along with PCSWMM, XP-SWMM, and others, is an EPA SWMM 5.1-based software package, to which enhanced graphical user interfaces (GUIs), GIS integration capabilities, and other analysis features have been added to manage input data and interpret model results. The southern model, representing sewers draining toward Capisic Brook, Fore River, and Portland Harbor, may also have been converted to InfoSWMM version 14.5, which is specifically based on EPA's SWMM 5.1.012 software build.

2.3.1 Software Options & Considerations

Moving forward, the City has flexibility in its software choice, including continuing with InfoSWMM, changing to the public domain EPA-SWMM 5.1 software, or shifting to another SWMM 5.1-based software package. Any of these choices can be made without affecting the model's ability to support City programs as desired. These software packages are fully dynamic hydraulic modeling software packages, meaning the models use the dynamic wave solution method for the full Saint-Venant equations, the one-dimensional unsteady open channel flow equations used by distributed flow routing models. These fully dynamic hydraulic models are then capable of simulating the backwater effects caused by tidal or non-tidal conditions; free-surface flow; pressure or surcharge flow; flow reversals; flow transfers between sewer appurtenances (e.g., weirs, orifices, pump stations); and equalization basins in dendritic or looped systems.

The City's CMOM schedule, which is part of NPDES requirements for the CSOs, does suggest that the City may be required to consolidate metering and monitoring data from past and future projects into the SWMM 5.0 modeling software (superseded by SWMM 5.1 in 2014), while using the InfoSWMM modeling software for determining deficiencies within the collection system. The schedule language is confusing and implies that two different software packages must be used for modeling-related tasks; however, this is not the case. InfoSWMM and other SWMM 5.1-based software packages all use EPA SWMM 5.1 as their calculation engine, and then GIS interfaces, graphing routines, and database management capabilities are added on top without changing the calculation engine itself. As such, the City may choose to use either software (InfoSWMM or EPA SWMM 5.1) for both tasks without repercussions.

Switching to the other industry-standard software packages, which would meet the City's objectives, Innovyze's ICM or DHI's MikeUrban software packages, is generally not recommended because of higher software costs and because they are not based on EPA's SWMM 5.1 engine.

Software decision-making can instead depend on the purchase price, annual maintenance costs, and the preferences of software users (persons maintaining and working with the model every day) and software viewers (persons viewing model input data and results occasionally). Purchase price and annual maintenance costs generally increase with the size of the software license. The existing sewer model for Back Cove includes approximately 300 nodes and pipes, while the recommended Level 1 & 2 Expansion options for the Back Cove and the Fore River models would include approximately 1,600 pipes and 1,100 pipes, respectively. A software license of 2000 nodes would be sufficient for working with both sewer models individually, including some room for simulating future growth areas and potential future system improvements. If the City would like to view both sewer systems within the same model file at the same time, then a 3000-node license would be sufficient.

Software cost comparisons should also consider the costs for an ArcGIS license, which is also required for InfoSWMM, since the modeling software is fully integrated with ArcGIS. By contrast, PCSWMM and XP-SWMM do not require an ArcGIS license, yet both are ArcObjects-capable, meaning that GIS shapefiles or geodatabases can be actively displayed, color coded, and queried within the model software.

While the City has flexibility with software choice, great care is needed when switching a model from one software to another. While most packages have well-developed import-export capabilities (often through EPA SWMM 5.1), the process of transferring input data from one software to another is not wholly trouble free. More importantly though, different software packages may produce differing sewer system hydraulics even when using the same input data and the same EPA SWMM 5.1 engine; as such, we generally recommend that software changes be timed to occur when models are recalibrated, or that careful reviews be done to confirm that any changes in model results (i.e., CSO discharge volumes) are acceptable.

2.3.2 Wet Weather Flow Generation Methods

InfoSWMM, PCSWMM, XP-SWMM, and EPA SWMM 5.1 offer a range of hydrologic methods for use in simulating system inflows because of wet weather. Moving forward, we recommend that City continue using the non-linear reservoir method in SWMM (i.e., SWMM runoff method) for simulating stormwater runoff from combined sewer catchments. The key catchment properties required for the SWMM runoff model are catchment area, width, percentage imperviousness, and catchment slope.

The software packages also have range of hydrologic methods for simulating rainfall-induced inflow and infiltration (RDII) flows in separate sanitary catchments. The options include the SWMM runoff model (paired with the Horton or Green-Ampt infiltration models), the RTK surfaces model, and SWMM 5.1's Groundwater Infiltration Module (GIM). These methods can be used individually or in combination with each other; and all three have some capability to match wet weather response over a range of moisture conditions.

The empirically-based RTK surfaces model has been more widely used, and monthly or seasonal applications of the RTK model along with monthly or seasonally-adjusted base flows can be successful in matching system response to back-to-back storms during varying moisture conditions. We generally prefer using SWMM 5.1's GIM to predict RDII flows from different sources (i.e., direct downspout connection, foundation drains from splashed roofs and building buffers, lateral service connections, manhole lids and castings, and sewer mains), since it is a physically-based model for simulating groundwater recharge and its effects on sewer systems. The GIM method can also effectively simulate the longer time-frame, highly-attenuated indirect responses to rainfall that are heavily influenced by antecedent conditions and seasonal variations.

2.3.3 Model Ownership and Maintenance

Once the hydraulic model is fully developed and recalibrated, we recommend that the City actively obtain and maintain its own sewer system modeling files, rather than relying on consultants. The City could designate a single contact person, who would coordinate with City project teams and consultants to receive updated model files as projects conclude. If in-house resources allow, this person might be responsible for coordinating updates and maintaining master files for the City's existing sewer model, so that the City itself always has easy access to the existing system modeling files whenever necessary.

2.4 Model Calibration

Model calibration is the process of adjusting estimated model parameters within reasonable ranges to match measured observed data (i.e., flow monitoring results; sewer system backups and flooding). This step is essential to creating a predictive model that accurately represents the response of a sewer system to both dry and wet weather conditions. Calibration also provides the evidence that model results are credible and reliable, building confidence in subsequent uses of the model for system performance evaluations and sizing improvements.

Reflecting its current use for characterizing and mitigating CSOs, past calibration efforts of the City's sewer model focused on the large volume CSOs. The last system-wide calibration effort occurred during the Tier III LTCP update in 2010, which used 25 monitoring sites (34 separate monitors) focused around 21 of 33 CSOs to calibrate modeled depths and flows to observed data for three rainfall events between late September and mid-December, 2009. The 2010 calibration also used available monitoring data from PWD, including Telog flow data at six of seven modeled pump stations, three rain gages across the City, and influent flows at the East End WWTF. Water level data recorded at the NOAA tide gauge in Portland Harbor was used to estimate appropriate boundary conditions, including tidal variations, at the outfalls.

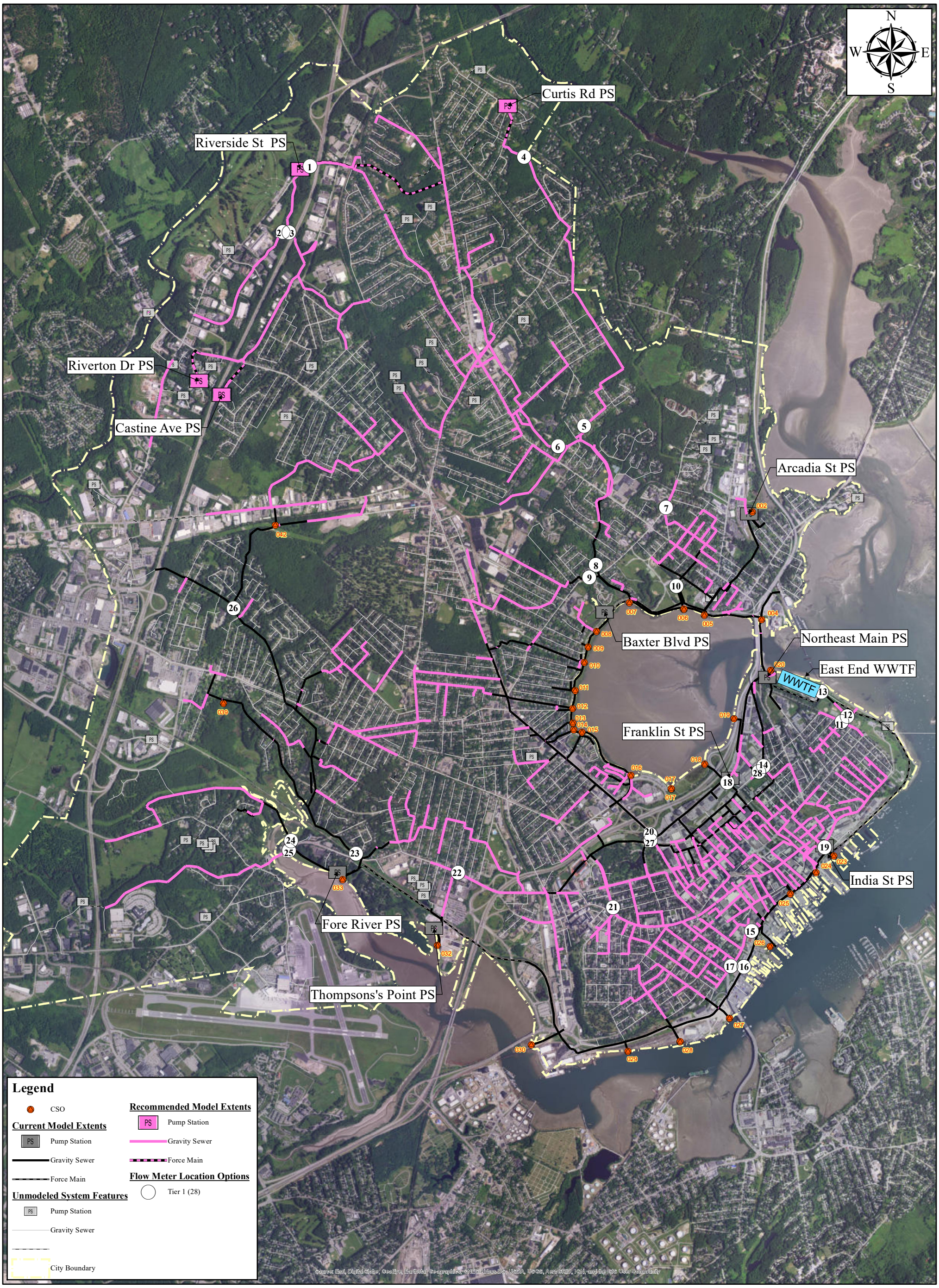
More recently, the northern system model encircling Back Cove has been updated and recalibrated within the Bayside, Baxter Boulevard, and Back Cove West sewersheds to support sizing and design of the Back Cove South and West Storage Conduits. The 2016 recalibration effort, which focused on the Back Cove West sewershed, used 13 in-system flow monitors, 13 CSO monitors, two rain gauges, and pumping rates at the Baxter Boulevard PS for two large rainfall events, one occurring in late September 2015 and one from early June 2016.

2.4.1 Flow Monitoring Options for Calibration

Paired with the recommended expansion of the City's sewer model, a significant recalibration effort is also recommended to support the City's objectives of developing a better understanding of overall system flows/performance and using the model to identify deficiencies and developing solutions in areas potentially subject to SSOs, surface flooding, and/or basement backups. **Figure 7** and **Table 6** summarize the 28 proposed flow monitoring locations which correspond to the recommended Level 1 & 2 Model Expansion option, and which support these system objectives.

If the City would consider a higher-resolution flow monitoring program, **Figure 8** shows additional locations that provide more detailed coverage system-wide and some redundancy in data collection. Flow monitoring locations for both program options do overlap to some extent with both past monitoring sites and currently-proposed sites for 2018; however, flow monitoring locations for the recalibration effort will be further refined based on discussions with the City regarding the benefits of a single monitoring period for calibration versus the challenge of using several monitoring periods to calibrate different tributary areas.

This model calibration effort also assumes the availability of pumped flow data (15-min or smaller time increment for each time series) for the 11 pump stations, which would be explicitly modeled in the Level 1 & 2 Expansion. Six rain gauges distributed across the City's service area are also recommended to support the recalibration effort. As done previously, the recalibration effort could use PWD's existing rain gauges and the NOAA rainfall gauge at the Portland International Jetport as part of the recommended six-gauge data set. The expanded model will also use time series water level data from the NOAA gauge in Portland Harbor to account for tidal variations and impacts during the calibration period. Additional water level monitoring along Fore River and in Back Cove (e.g., downstream of selected CSO regulators) is also recommended to identify and track differences in tidal elevations in the City's receiving waterbodies.



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City of Portland, ME
Recommended Flow Monitoring Locations for Model Calibration
Figure 7
May 2018

ARCADIS Design & Consultancy for natural and built assets

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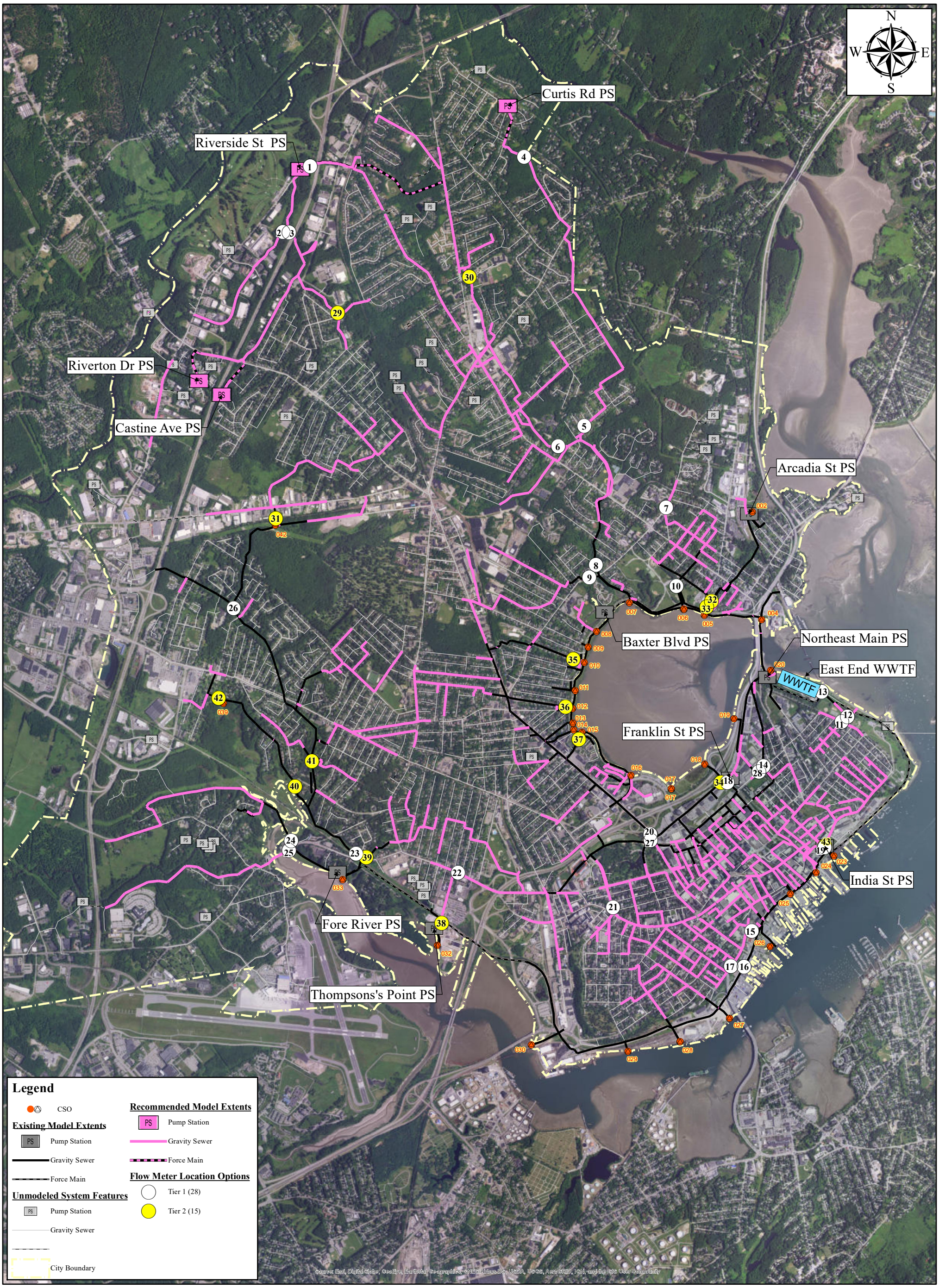
Table 6. Recommended Flow Monitoring Locations for Model Calibration

Meter ID	Location Description	Sewer System	Purpose
1	15-in Riverside St Sewer	Back Cove	System Flows
2	10-in Presumpscot North Interceptor	Back Cove	System Flows
3	24-in Presumpscot North Interceptor	Back Cove	System Flows
4	18-in Virginia-Carter Interceptor	Back Cove	System Flows
5	24-in Virginia-Carter Interceptor	Back Cove	System Flows
6	72-in Fall Brook Interceptor	Back Cove	System Flows
7	12-in Ocean Ave Sewer	Back Cove	Known flooding area
8	84-in Fall Brook Interceptor	Back Cove	System Flows
9	72-in Ocean Ave Sewer	Back Cove	System Flows
10	48-in Johansen St Sewer	Back Cove	System Flows
11	24-in Eastern Promenade Sewer	Fore River	Historic Capacity-Related SSOs
12	36-in Eastern Promenade Sewer	Fore River	Historic Capacity-Related SSOs
13	Influent Flow Channel at WWTF	Back Cove, Fore River	System Flows
14	48-in Anderson St Sewer (downstream of CSO19 diversion)	Back Cove	System Flows
15	45-in Oval Maple St Trunk Sewer	Fore River	Recent Capacity-Related SSOs
16	48-in Lower Fore River Interceptor	Fore River	Recent Capacity-Related SSOs
17	36-in Egg-Shaped York St Sewer	Fore River	Recent Capacity-Related SSOs
18	72-in Franklin Art Sewer	Back Cove	System Flows
19	48-in India St Sewer	Fore River	System Flows
20	30-in Forest Ave Sewer	Back Cove	System Flows
21	18-in Deering Ave Sewer	Back Cove	Recent Capacity-Related SSOs
22	24-in Congress St Sewer	Fore River	Known flooding area (Libbytown)
23	60-in West Side Combined Sewer	Fore River	System Flows
24	21-in Upper Fore River Interceptor	Fore River	System Flows

Meter ID	Location Description	Sewer System	Purpose
25	18-in Stroudwater Interceptor	Fore River	System Flows
26	24-in West Side Interceptor	Fore River	Known flooding area (Dennet St)
27	96-in North Side Interceptor	Back Cove	Recent Capacity-Related SSOs
28	60-in Anderson St Outfall sewer (downstream of CSO19 diversion)	Back Cove	System Flows



0 0.25 0.5 1 Miles

City of Portland, ME
Expanded Option for Flow Monitoring Locations for Model Calibration
Figure 8

May 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\Model Files\Map 3_FlowMonLocCal.mxd

2.4.2 Calibration Monitoring Period

For the recalibration effort, a three-to-four month flow and rainfall monitoring program is recommended, preferably occurring during the spring and summer months. Three to four months during this timeframe can be long enough to capture dry weather and wet weather system response for a wide variety of conditions, including fluctuations in groundwater conditions, as well as the larger less frequent storms used for sizing improvements to address SSOs, surface flooding, and basement backups.

For the recommended Level 1 & 2 Model Expansion with 28 flow monitors, 2 depth monitors downstream of CSO regulators, and 6 rain gauges, the implementation labor estimates for coordination of a monitoring program range from approximately 240 to 280 man-hours for a three or four-month monitoring program. While longer monitoring periods do facilitate development of models which more tightly match system response before, during, and after storm events over extended periods with varying antecedent moisture conditions (and reduce conservatism in the resulting sizing of improvements), we do not recommend the City commit to such a large recalibration effort until specific questions and analysis goals dictate the need.

2.4.3 Dry Weather Calibration

For dry weather calibration during the recalibration effort, a two-week calibration period is recommended (depending on available data), so the model can account for differences under both weekday and weekend conditions. Dry weather calibration verifies that the model adequately simulates base flows as a “platform” for wet weather simulations. When dry weather flow estimates significantly differ from observed data, potential errors in connectivity or understanding can be identified and corrected based on further investigations. Dry weather calibration also confirms that model-predicted depths match observed data under base flow conditions, with significant differences suggesting blockages, sedimentation, or other unknown restrictions.

Dry weather flow calibration focuses not just on matching volumes, but also on matching the shape of the diurnal flow hydrograph, as shown in **Figure 9.** Accurately matching diurnal flow patterns is particularly important in separate sanitary systems, since peak dry weather flows are a significantly larger proportion of overall flows. The recalibration effort should specifically include calibration based on the observed diurnal flow patterns at each flow monitor. The existing model does include diurnal flow patterns; however, these were developed based on influent flows to the East End WWTF rather than using in-system monitoring data.

Modeled dry weather flows are typically separated into two components: sanitary sewage discharges and groundwater infiltration (GWI), which often vary seasonally based on the groundwater table. Sanitary discharges are usually estimated as a fraction (e.g., 80 percent) of the geo-coded water billing data for low-usage months, while GWI is calculated as the difference between the estimated sanitary flows and the flow monitoring data. This separation allows the model to explicitly account for seasonal variations in GWI, whether the variations are represented by monthly-varying constant flow inputs or by using SWMM 5.1’s GWI module.

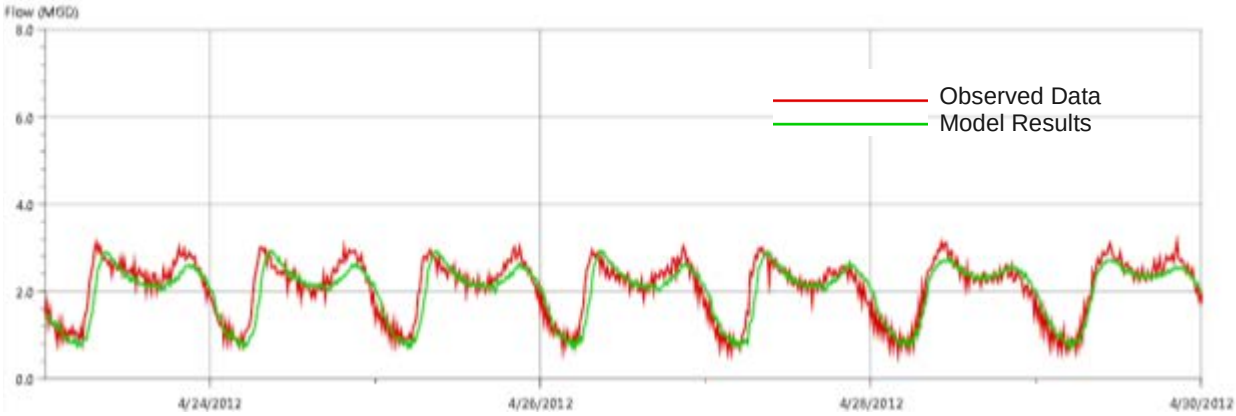


Figure 9. Dry Weather Flow Hydrograph - Calibration Example

2.4.4 Wet Weather Calibration

Wet weather calibration involves the development of a set of hydrologic model parameters that adequately predict sewer system response caused by precipitation events, while maintaining realistic parameter values. Since most models are used to predict system response to large rainfall events, the storms selected for wet weather calibration should include the larger, less frequent storms, which are of interest for sizing proposed improvements to the collection system. With the City's focus on developing solutions for areas affected by SSOs, surface flooding, and basement backups, the recalibration effort should include storms of a similar size to those causing the sewer performance issues of interest, typically storms with return periods ranging from 2 to 10 years or higher.

By contrast, for combined sewer systems, wet weather model calibration generally focuses on smaller-sized storm events with return periods of one year or less, since CSO planning and regulations are based on annual average measures of system performance.

Macro-level planning models, such as the recommended Level 1 & 2 Expansion option, can be adequately calibrated using a minimum of three or four storms, if these storms match the specific sizing conditions of interest. In combined sewer systems, where system response is dominated by impervious surface runoff, these single event simulations can be sufficient for calibration, especially when sizing conveyance is the main analysis goal. However, when sizing volume-based improvements, single event-based calibrations, such as those used for the 2016 recalibration effort in the Back Cove West sewershed, run the risk of undersizing or oversizing the proposed improvements.

For the recommended Level 1 and 2 Expansion, we estimate that model calibration (dry weather and wet weather inclusive) for the 28 in-system flow monitors will require between 800 and 1200 man-hours. The large difference in these man-hour estimates occurs because of the strong influence which the following items have on calibration success: the quality of the flow monitoring data, the degree to which system repairs and system blockages affect system conditions, the data; the degree of both spatial and temporal variability in rainfall, the number of storm events used for calibration., etc.

2.4.5 Continuous Mode Simulations

For the recalibration effort, after the initial single event simulations, it is strongly recommended that continuous mode simulations for the full monitoring period be utilized to develop model parameters that can simulate the effects of changes in antecedent soil moisture conditions and inter-event recovery processes, as well as seasonal changes in groundwater conditions. These changes improve the model's ability to match observed volumes during a wide variety of system conditions, which is critical when sizing storage-based alternatives.

The continuous mode calibrations increase the model's ability to predict RDII flow responses, whether in a purely separate sanitary system or in a combined system with outlying separated areas. The computational engines used in most industry-standard software packages are also sufficiently fast that long-term simulations of 3 to12 months have reasonable run times. These longer calibration periods inherently include a range of storm events during both wet and dry periods, as well as back-to-back storms whose cumulative effects may cause different system responses than those observed when the storms occur individually.

Figure 10 provides an example of model calibration results for a separate sanitary basin in Columbus, Ohio. These results were developed using a continuous calibration approach and nearly 30 storm events during a 1-year long monitoring period. With a three-to-four month monitoring program recommended for the City's model, the resulting calibrations will not be as robust as those shown in Figure 9, because they will be based on a shorter monitoring period with potentially less variations in weather and groundwater conditions. However, even small improvements in the model's ability to accurately simulate wet weather response during back-to-back storms under varying conditions reduces conservatism in sizing potential improvements and reduces overall construction costs.

Continuous mode calibration also provides benefits for combined service areas, where CSO planning requires an understanding of long-term statistics (through typical or multi-year simulations). These long-term statistics are affected by the differing system responses for small storms during wet and dry antecedent moisture conditions and by system response to large storms, where pervious runoff volumes are more significant. Continuous simulations are very useful for fine-tuning model parameters that affect these responses. The performance of small-scale green infrastructure techniques for stormwater management (i.e., rain gardens, bioswales, pervious pavers, etc.) also depend on these processes, and better model representations enable better assessments of the potential benefits of GI for downstream CSOs.

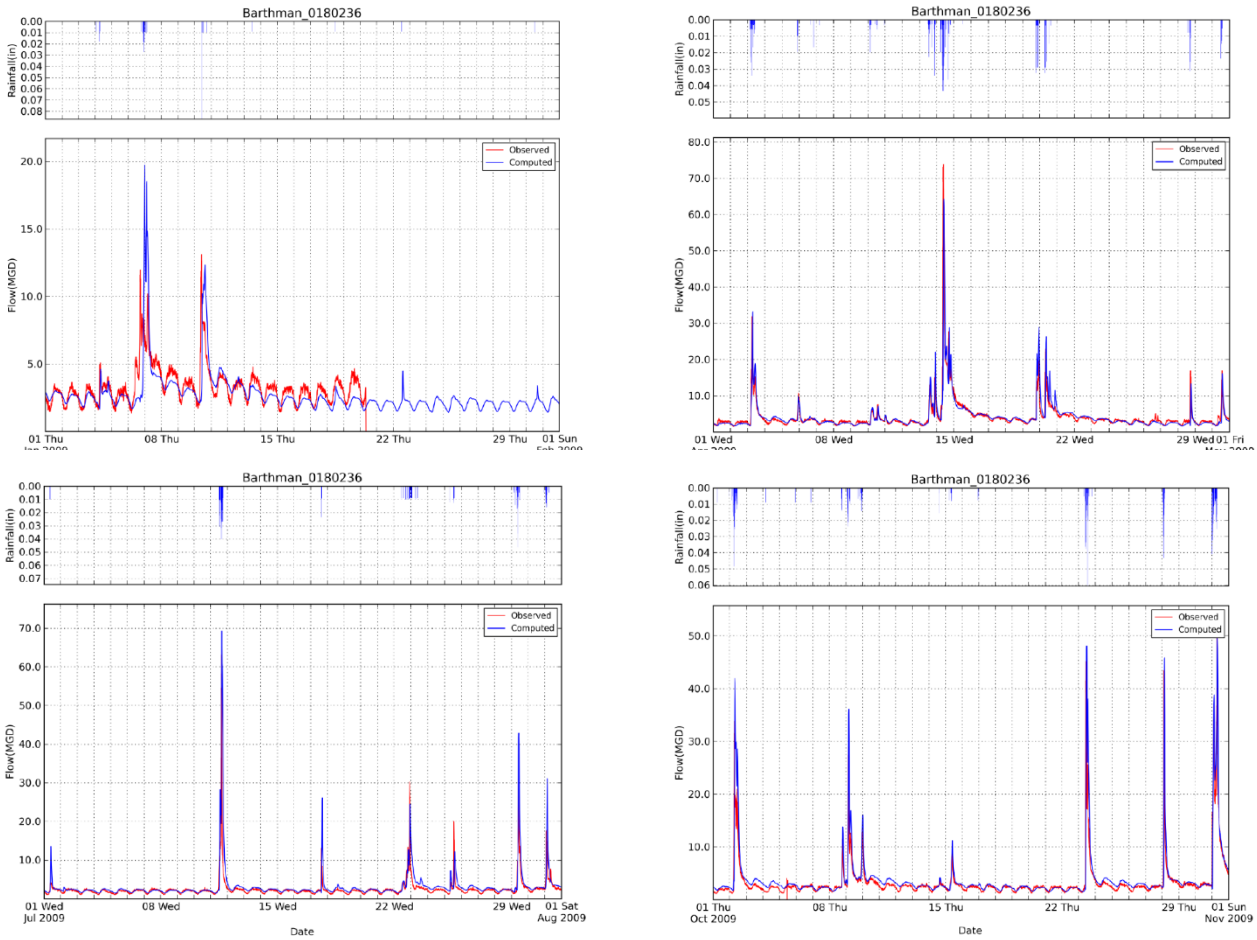


Figure 10. Wet Weather Flow Hydrograph – Continuous Calibration Example

3 SUMMARY OF RECOMMENDATIONS

This section summarizes the overall findings and recommendations from the gap analysis of the City's existing sewer system hydraulic model. The findings and recommendations identify multiple options for expansion and recalibration of the City's sewer system model depending on specific objectives, and **Table 7** provides a resource estimate for the recommended model expansion option.

Model Expansion

- Historically, the City's model has been used for estimating combined sewer overflow (CSO) discharge volumes, sizing potential mitigation projects, and then quantifying the resulting reductions at the downstream CSOs. As configured, the City's model is appropriate for its current uses.
- Given the City's desire to use the model for identifying deficiencies and developing solutions in areas potentially subject to SSOs, surface flooding, and/or basement backups, significant expansions in the extents and level of detail of the model are necessary. We recommend the Level 1 & 2 Expansion option for the next stage in developing the City's sewer model.
- Level 1 includes expanding the existing system model to include all sewers 18 inches and larger to provide a solid backbone for developing a macro-level or system-wide understanding of overall sewer system performance in both separate sanitary and combined sewers during large rainfall events. Level 2 would entail extending the model into potential future growth areas and known problem areas (i.e., capacity-limited SSOs, City-identified flooding areas; areas affected by tidal fluctuations). The Level 1 & 2 Expansion option includes 11 pump stations in total and approximately 39 percent of the existing gravity sewers (by length).
- Level 1 also provides sufficient detail to determine where Real-Time-Controls (RTCs) could provide inline storage for CSOs during small rainfall events without increasing the risks for SSOs and basement backups beyond acceptable levels for larger storms. Level 1 also supports individual or system-wide assessments of impacts from potential green infrastructure projects.
- The level of detail for model catchments must also increase in kind for the model to support City programs as desired. Generally, we recommend that the average size of modeled catchments range from 5 to 20 acres, with the highest level of detail in areas of specific interest.
- In areas where the City may consider implementing small-scale green infrastructure (GI) techniques for stormwater management (i.e., rain gardens, bioswales, pervious pavers, etc.), the model will likely require an even higher level of detail in the modeled catchments to simulate the benefits of the resulting runoff volume and peak flow reductions for the receiving sewer system. For example, the average size of modeled catchments in urban areas where small-scale GI projects are implemented could range from 1 to 5 acres.
- Unlike the existing model, where catchments are delineated only in areas tributary to combined sewers, catchments for the model expansion should be delineated for both separate sanitary and combined sewer areas.

Table 7 summarizes the modeling labor estimates required for building the model network and developing initial inputs for the Level 1 and 2 Model Expansion option. It should be noted that these

estimates comprise the level of effort to complete the updates and expansion of the model and to complete an initial recalibration of the model, but they do not include the actual use and application of the model for the various City initiatives indicated above. The labor estimates also do not include the surveying level of effort or flow monitoring needed to support expansion and calibration of the model. These items are discussed in the following subsections below.

Table 7. Labor Estimates for Level 1 and 2 Model Expansion Option

Model Expansion Tasks	Estimated Labor Hours
Finalize Network for Model Integration, Develop Basin Schematics, Select Meter sites for Calibration	128
Develop hydrologic inputs	314
Model Network Integration and Finalization	80
Model calibration	1,270
Project Management and Model Documentation	172
Total	**1,964**

Physical Infrastructure Data Collection

- Because the City's GIS does not include rim elevations for most manholes, nor invert elevations for most gravity sewers, a significant data collection effort will be necessary to develop these attributes to expand the hydraulic model.

- Although the City does have as-built drawings, the City has requested that the manhole and pipe attributes necessary for the model development be surveyed. We estimate that it would take about 125 days of a two-person survey crew (2,000 total labor hours) to obtain rim and invert elevations for approximately 2,800 manholes associated with sewers 18-inches and larger. Additional time would be required for recording and tabulation of data and interfacing with the City's GIS.
- Additional recommendations to improve the physical representation of the sewer system in the model include:
    1. Performing a comprehensive audit of model inputs for the CSO regulators to determine if field surveys are required for the model expansion. The last comprehensive review of the model's representation of the City's CSO regulators likely has not been done since before Tier III LTCP update in 2010.
    2. Developing detailed pump station representations for both currently modeled and to-be-modeled stations based on recent and accurate information regarding wet well size and configuration, actual pump curves (from pump tests), and pumping operations.
- The comprehensive audit of model inputs for all CSO regulators and to-be-modeled pump stations is estimated at approximately 120 man-hours. This assumes that field surveys are not necessary for CSO regulators and to-be-modeled pump stations.

Model & GIS Coordination

- The large effort required to obtain and troubleshoot physical data for the Level 1 & 2 Expansion also provides an opportunity to update the GIS in those same locations.
- When complete, modeled manholes and sewers in the expanded model will exactly match their corresponding elements in the GIS for the physical infrastructure attributes of interest. The formats and procedures developed during the model expansion for updating the City's GIS also provide a solid platform for continuing to coordinate future updates of model and GIS together.

Modeling Software

- The City has flexibility in its modeling software choice, including continuing with InfoSWMM, changing to the public domain EPA-SWMM 5.1 software, or shifting to another SWMM 5.1-based software package. Any of these choices can be made without affecting the model's ability to support City programs as desired.
- The CMOM schedule does suggest the City may be required to consolidate metering and monitoring data into the SWMM 5.0 modeling software (superseded by SWMM 5.1 in 2014), while using the InfoSWMM modeling software for determining deficiencies within the collection system. However, this is not the case. InfoSWMM and other SWMM 5.1-based software packages all use EPA SWMM 5.1 as their calculation engine, and then GIS interfaces, graphing routines, and database management capabilities are added on top without changing the calculation engine itself. As such, the City may choose to use either software (InfoSWMM or EPA SWMM 5.1) for both tasks without repercussions.
- Software decision-making can instead depend on the purchase price, annual maintenance costs, and the preferences of software users (persons maintaining and working with the model every day) and software viewers (persons viewing model input data and results occasionally).
- Software cost comparisons should also consider the costs for an ArcGIS license, which is also required for InfoSWMM. By contrast, PCSWMM and XP-SWMM do not require an ArcGIS license, yet GIS shapefiles or geodatabases can be actively displayed, color coded, and queried within both software packages.
- While the City has flexibility with software choice, great care is needed when switching a model from one software to another. We generally recommend that software changes be timed to occur when models are recalibrated, or that careful reviews be done to confirm that any changes in model results (i.e., CSO discharge volumes) are acceptable.
- InfoSWMM, PCSWMM, XP-SWMM, and EPA SWMM 5.1 offer a range of hydrologic methods for use in simulating system inflows because of wet weather. Moving forward, we recommend that City continue using the non-linear reservoir method in SWMM (i.e., SWMM runoff method) for simulating stormwater runoff from combined sewer catchments.
- For simulating RDII flows in separate sanitary sewer systems (and in combined sewer systems)., the empirically-based RTK surfaces model is has been more widely used; however, we prefer using SWMM 5.1's GIM to predict RDII flows from different sources, since it is a physically-based model for simulating groundwater recharge and its effects on sewer systems. Both methods can simulate the longer time-frame highly-attenuated indirect responses to rainfall that are heavily influenced by antecedent conditions and seasonal variations in the groundwater table.
- If in-house resources and personnel are available, the City could actively obtain and maintain its own sewer system modeling files. The City could designate a single contact person to be responsible for coordinating updates and maintaining master files for the City's existing sewer model.

Model Calibration

- Paired with Level 1 & 2 Expansion option of the City's sewer model, a significant recalibration effort is recommended using 28 flow monitoring locations. This recalibration effort also assumes the availability of pumped flow data for the 11 pump stations, which will be explicitly modeled in the Level 1 & 2 Expansion. Additional water level monitoring along Fore River and in Back Cove (e.g., downstream of selected CSO regulators) is also recommended to identify and track differences in tidal elevations in the City's receiving waterbodies.
- Some of the flow monitoring data which is being collected as part of the City-wide I/I Program in 2018 and 2019 can be utilized for the hydraulic model expansion, thus reducing the number of additional flow monitoring locations needed. The number and location of I/I Program flow monitoring locations which could also be utilized for the model expansion would need to be determined when a more specific scope of work is developed for conducting the Level 1 & 2 Expansion.
- For the additional flow monitoring locations needed for the model recalibration effort (to reach a total of 28 metered locations), we suggest the City budget for a three-to-four month flow and rainfall monitoring program, preferably occurring during the spring and summer months. For the recommended Level 1 & 2 Expansion, in addition to the flow monitoring data collection, we recommend 2 level sensors downstream of CSO regulators, 2 groundwater gauges and 6 rain gauges. Again, some of the gauges already installed and activated within the City's collection system could be utilized.
- Three to four months is long enough to capture dry weather and wet weather system response for a wide variety of conditions, including fluctuating groundwater conditions and larger, less frequent storms which can be used for sizing improvements to address SSOs, surface flooding, and basement back-ups.
- Macro-level planning models, such as the recommended Level 1 & 2 Expansion option, can be adequately calibrated using a minimum of three or four storms, if these storms match the specific sizing conditions of interest. However, when sizing volume-based improvements, single event-based calibrations run the risk of undersizing or oversizing the proposed improvements.
- For the recommended Level 1 and 2 Expansion, labor hour estimates for model calibration (dry weather and wet weather inclusive) for the 28 in-system flow monitors range from 800 to 1200 man-hours, depending on the quality of the flow monitoring data; the degree to which system repairs and system blockages affect system conditions and the data; the degree of both spatial and temporal variability in rainfall, etc.
- For the recalibration effort, after the initial single event simulations, we recommend using continuous mode simulations for the full monitoring period to develop model parameters that can simulate the effects of changes in antecedent soil moisture conditions and inter-event recovery processes, as well as seasonal changes in groundwater conditions. These changes improve the model's ability to match observed volumes during a wide variety of system conditions, which is critical when sizing storage-based alternatives.

ARCADIS Design & Consultancy for natural and built assets

City of Portland, Maine

GIS GAP ANALYSIS

November 2018

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APPENDICES

Appendix A - Data Profiler™ Detailed Output

1 OVERVIEW

As part of the work under the "Planning & Engineering Services for an Infiltration and Inflow (I&I) Program of the Sanitary Sewer System" contract for the City of Portland (City), Arcadis performed a gap analysis of the City's existing Geographic Information System (GIS) to identify deficiencies and to recommend updates and improvements to the geographic network structure. The gap analysis focused primarily on the available GIS for the City's sanitary and combined sewer system.

The City of Portland, ME provided one file geodatabase for review of the data as it related to the City's I/I Program. This file represents the City's Geographic Information System (GIS).

- sde.gdb
  ESRI ArcGIS 10.4.1 File Geodatabase (FGDB)
  Dated: October 17, 2017

Arcadis used an in-house software called Data Profiler™ to analyze the FGDB for completeness and consistency, and to identify gaps and breaks in the network structure. Appendix A contains the complete Data Profiler™ output, a detailed data profile of the GIS database.

The following sections provide an outline and summary of the City's existing sanitary sewer GIS and utilize the data profile results and other analysis tools to identify strengths and weaknesses in the FGDB and overall geometric network.

1.1 Existing GIS Inventory

The projection used in the FGDB is NAD 1983 HARN State Plane Maine, West, feet.

The FGDB contains 45 data objects including:

- 2 non-geometry tables
- 2 feature datasets
- 2 geometric networks
- 39 geometry feature classes

These data objects are organized within two feature datasets:

- SewerStormwater
- Stormwater

For the purpose of this gap analysis related to the I/I Program, only the feature classes within the SewerStormwater feature dataset were evaluated.

Two types of data review were performed:

- Attribute gaps and inconsistencies within the GIS
- Geometric network connectivity within the GIS

Attribute gaps are identified where records contain empty values or if a field does not exist to store data that is typically useful for asset management. Data inconsistency is identified where two or more

attributes do not agree with each other. An example might be a pipe installation date of 01/15/2000 and a lining date of 07/01/1990, where the rehabilitation of the pipe obviously could not take place before it was installed.

An effective geometric network helps enforce proper connectivity of pipes as well as defining individual pipe assets of reasonable length to support asset management. Generally, pipes should only be segmented when there is change in one or more physical attributes, such as size, material, age, or where there is a split in flow.

2 GENERAL CONSIDERATIONS

2.1 Geometric Network

An ArcGIS geometric network is a set of connected edges and junctions, along with specific connectivity rules, that are used to represent and model the behavior of a common network such as a sanitary sewer system, water distribution system or drainage system. An ArcGIS geometric network requires all edge features to have a junction feature at both ends. ArcGIS automatically creates any missing junctions at the ends of edge features using an orphaned junction feature class. The existence of orphaned junctions represents the lack of specific asset documentation and may also indicate invalid geometry. A complex edge is a special type of line that allows other edges or junctions to be attached along its length. This can be useful for connecting isolation valves or service laterals to a water main without breaking that edge into multiple segments. Within a feature dataset, feature classes of types Junction, Complex Edge or Edge are part of a defined geometric network. Stand-alone Point, Polyline and Polygon feature class types do not participate in the geometric network and are not governed by connectivity rules.

2.2 Local Government and Water Utility Models

The ArcGIS Local Government and Water Utilities Data Models provide the foundation for a complete GIS solution geared to the needs of Water, Sewer, and Stormwater utility end users. The Water/Sewer Stormwater Data Model is a collection of objects, feature classes and attributes defined for water and wastewater distribution networks. Many of these predefined management and descriptive attributes can be tailored to meet project requirements for data management and integration with other systems.

Additionally, these models come with add-on applications like Attribute Assistant and Water Utility Network Tools which provide a series of predefined methods to automatically populate attributes and edit network features.

2.3 Asset IDs

Every GIS feature that represents a physical asset must have a unique and persistent ID that does not change over the lifetime of the asset. This ID is then used as a reference by other computer systems and paper records to track information and activities related to each asset.

ArcGIS defines and maintains an ObjectID and in some cases a GlobalID field for each feature class. Although the ObjectID and GlobalID are unique, they are maintained by the ArcGIS system which can

reassign the value when certain processes are run. Therefore, the ObjectID and GlobalID cannot be used as a persistent identifier over the entire asset life.

The ArcGIS Local Government and Water Utilities Data Models define a FACILITYID that is intended to be used as a unique identifier that is managed by the utility. This is the most logical field to store a unique and persistent asset identifier for all features. Attribute Assistant is an excellent add-on application to help manage FACILITYIDs. That said, if the tool is not configured properly or is not running, duplicates or null asset identifiers can be introduced into a dataset.

2.4 Abandoned Assets

Assets that are abandoned in place should be disconnected from the geometric network and attributed as abandoned. An example is an old water main that remains in the ground but is no longer in use. The GIS should represent this abandoned main as an edge with a Cap Fitting on both ends such that these assets appear to be floating on their own and not connected to the rest of the system. These pipe and cap assets should also have their lifecycle status attribute set to ‘Abandoned’.

3 SANITARY SEWER COLLECTION SYSTEM

3.1 Attributes

The City's SewerStormwater feature dataset contains the following feature classes:

Table Name	Description	RecordCount	Total Miles
DynamicValue		188	
GenerateId		54	
SewerStormwater_Net_Junctions	Junction	250	-
ssBend	Junction	-	-
ssCasing	Complex Edge	1	0.01
ssCleanOut	Junction	3	-
ssControlValve	Junction	7	-
ssDetention	Polygon	1	0.14
ssDischargePoint	Junction	8	-
ssFitting	Junction	430	-
ssGravityMain	Complex Edge	6,804	231.65
ssInlet	Junction	1	-
ssLateralLine	Complex Edge	118	1.43
ssManhole	Junction	6,370	-
ssNetworkStructure	Junction	142	-
ssOpenDrain	Complex Edge	-	-
ssPressurizedMain	Complex Edge	78	9.92
ssPump	Junction	-	-
ssServiceConnection	Junction	-	-
ssSystemValve	Junction	-	-
ssTap	Junction	5	-
ssTestStation	Junction	1	-
ssValveOperator	Junction	-	-
ssVirtualDrainline	Complex Edge	-	-

Many of the junction feature classes do not contain any features. In these cases, their inclusion to the network adds complexity and should be evaluated to determine if they are required for future use.

Recommendation – Junctions that are not being utilized should be removed.

3.1.1 ssGravityMain – 6,804 records

The primary collection assets of the sewer system are the pipes defined in the ssGravityMain feature class. The table below lists all attributes within the ssGravityMain feature class. The most critical attributes are highlighted bold and column names with an asterisk (*) are populated with unique values. Critical attributes are elaborated upon in the following sub-sections.

Column Name	Data Type	Percent Populated
ACTIVEFLAG	**Int16**	**99.90%**
ADMINAREA	String	100.00%
CATCHMENT	String	0.01%
COMMENTS	String	98.77%
CONDITION	Int16	0.00%
DIAMETER	**Double**	**95.77%**
DOWNELEV	**Double**	**8.82%**
ENABLED	**Int16**	**100.00%**
ESOURCE	Int16	94.81%
FACILITYID*	**String**	**100.00%**
FACILITYID_OLD	String	99.68%
FROMMH	**String**	**100.00%**
GlobalID*	Guid	100.00%
HEIGHT	**Double**	**95.77%**
INSTALLDATE	**DateTime**	**86.83%**
INSTALLEDBY	String	0.03%
LASTEDITOR	String	100.00%
LASTUPDATE	DateTime	100.00%
LINEDYEAR	String	5.91%

Column Name	Data Type	Percent Populated
LINERTYPE	String	81.08%
LININGCONTR	String	0.03%
LOCDESC	String	100.00%
MAINSHAPE	**String**	**86.20%**
MAINTBY	**String**	**99.97%**
MATERIAL	**String**	**90.48%**
MEDIAREF	String	99.19%
OBJECTID*	Int32	100.00%
OWNEDBY	**String**	**97.77%**
SHAPE	Byte[]	100.00%
SHAPE_Length	Double	100.00%
SLOPE	Double	62.90%
SLOPELENGTH	Double	66.40%
SUMFLOW	Double	0.00%
SURVEYREF	String	0.07%
TOMH	**String**	**99.96%**
UPELEV	**Double**	**8.39%**
WATERTYPE	**String**	**98.68%**
WIDTH	**Double**	**86.18%**

3.1.1.1 Asset Identifier

FacilityIDs have been completely populated and are unique.

<u>Recommendation</u> – Setup database views or develop routines within the GIS environment to capture duplicate and null FacilityIDs if/when they arise.

3.1.1.2 Ownership

OWNEDBY and MAINTBY fields are well populated and highly consistent with each other. There are 152 features with a null OWNEDBY value and only 2 nulls within the MAINTBY field. Excluding null values, there are 935 pipes that have a contradictory value between the OWNEDBY and MAINTBY fields. Additionally, there are 18 pipes that are out of domain in either the OWNEDBY and MAINTBY fields.

Recommendation – Assign OWNEDBY values to those that are empty. Assign MAINTBY values to those that are empty. Investigate discrepancies including values that are out of domain.

OWNEDBY	MAINTBY	Count
1	CITY	12
CITY	1	5
CITY	PRIVATE	410
PRIVATE	CITY	281
STATE	CITY	4
WAT	1	1
WAT	CITY	216
WAT	PRIVATE	6
Total		**935**

3.1.1.3 Installation Date

Installation date is Null for 896 records and 285 records installed prior to 1900.

Recommendation – Update the missing and questionable DATE_INSTALLED values.

Install Decade	Count
1860	17
1870	18
1880	96
1890	154
Total	**285**

3.1.1.4 Diameter

Two size fields, DIAMETER and HEIGHT are highly populated with roughly 96% populated. The size field WIDTH and pipe shape field MAINSHAPE are roughly 86% populated. All three are highly correlated with only 102 inconsistencies across the three size fields. Within the DIAMETER field there are eight -1 values. Additionally, within the MAINSHAPE field there are only 7 pipes that are out of domain.

Recommendation – Update the missing or negative size values. Fill in the missing pipe shape information. Correct the pipe shape that is out of domain.

Main Shape	DIAMETER	HEIGHT	WIDTH	Count
Arched	120	120	120	2
Barrel	18	18	18	2
Barrel	48	48	48	2
Circular	12	12	8	2
Circular	12	12	10	2
Circular	15	15	18	2
Circular	24	24	18	2
Egg Shaped	18	18	18	30
Egg Shaped	20	20	20	4
Egg Shaped	24	24	24	20
Egg Shaped	36	36	36	4
Horseshoe	36	36	36	2
Horseshoe	44	44	44	2
Oval	10	10	10	2
Oval	15	15	15	2
Oval	18	18	18	8
Oval	24	24	24	2
Oval	36	36	36	2
Oval	48	48	48	10
Total				**102**

3.1.1.5

3.1.1.5 Material

There are 648 Null and 8 other or unknown values for sewer main Material as shown in the following table. Some pipes have an installation date that does not appear to correspond to the specific material, i.e. PVC in the 1880s and VCP after 1980. Finally, there are four materials that are out of domain: ACP, CIPP, HT, and STN.

MATERIAL	Min Diameter	Max Diameter	Min Install Year	Max Install Year	Count
	-1	**84**	**1869**	**2015**	**648**
ABS	6	8	1988	1988	7
AC	6	27	1874	2015	661
ACP	**8**	**8**	**1978**	**1978**	**4**
BR	**-1**	**75**	**1864**	**1977**	**341**
CIPP	**4**	**36**	**1956**	**1956**	**6**
CMP	15	72	1956	1969	7
CP	8	18	1919	1953	5
CSB	48	48			1
CSU	48	48	1953	1953	4
DIP	8	30	1952	2015	71
HT	**6**	**6**	**1955**	**1955**	**2**
PCP	8	8			1
PE	12	48	1933	1998	13
PP	8	60	1953	2015	64
PVC	4	60	1881	2017	1568
RCP	6	120	1880	2015	652
RPM	8	12	1979	1982	26
STN	**30**	**36**	**1918**	**1943**	**6**
VCP	6	60	1875	2015	2709
ZZZ	**8**	**18**	**1939**	**1992**	**8**
Total					**6804**

<u>Recommendation</u> – Update the missing and questionable MATERIAL values. Add 4 missing coded domains.

3.1.1.6 To/From MH ID and Inverts

TOMH and FROMMH IDs are very well populated having only 3 pipes that have a null ID. Within ssGravityMain feature class only 356 pipes have both invert elevations populated. Additionally, there are three sets of pipes that have a duplicate TOMH and FROMMH ID.

<u>Recommendation</u> – Run the Attribute Assistant tool to ensure the correct FacilityID from a connected junction layer is referenced in the TOMH and FROMMH fields and to populate missing values. Use the referenced drawings within the pipe layer to fill in the missing invert elevations.

ToMH	FromMH	Count
SWDP-1108	SSCV-0002	2
SSMH-6569	SSMH-6570	2
SWDP-0431	SSNS-0053	2

3.1.2 ssPressurizedMain – 78 records

Pressurized mains account for a relatively small yet critical portion of the collection system. The table below lists all attributes within the ssPressurizedMain feature class. The most critical attributes have been **highlighted bold** and column names with an asterisk (*) are populated with unique values. Critical attributes are elaborated upon in the following sub-sections.

Column Name	Data Type	Percent Populated
ACTIVEFLAG	Int16	100.00%
ADMINAREA	String	100.00%
CATCHMENT	String	0.00%
COMMENTS	String	100.00%
CONDITION	Int16	0.00%
DIAMETER	**Double**	**84.62%**
DOWNELEV	**Double**	**15.38%**
ENABLED	Int16	100.00%
ESOURCE	Int16	100.00%
FACILITYID*	**String**	**100.00%**
FACILITYID_OLD	String	98.72%
FROMMH	**String**	**92.31%**
GlobalID*	Guid	100.00%
INSTALLDATE	**DateTime**	**50.00%**
INSTALLEDBY	String	0.00%
LASTEDITOR	String	100.00%
LASTUPDATE	DateTime	100.00%
LINEDYEAR	String	0.00%
LINERTYPE	String	0.00%

Column Name	Data Type	Percent Populated
LININGCONTR	String	0.00%
LOCDESC	String	100.00%
MAINSHAPE	String	0.00%
MAINTBY	**String**	**100.00%**
MATERIAL	**String**	**38.46%**
MEASUREMENT1	Double	0.00%
MEASUREMENT2	Double	0.00%
MEDIAREF	String	1.28%
OBJECTID*	Int32	100.00%
OWNEDBY	**String**	**100.00%**
SHAPE	Byte[]	100.00%
SHAPE_Length*	Double	100.00%
SLOPE	Double	1.28%
SLOPELENGTH	Double	6.41%
SUMFLOW	Double	0.00%
SURVEYREF	String	0.00%
TOMH	**String**	**94.87%**
UPELEV	**Double**	**14.10%**
WATERTYPE	**String**	**100.00%**

3.1.2.1 Asset Identifier

FacilityIDs have been completely populated and are unique.

Recommendation – Setup database views or develop routines within the GIS environment to capture duplicate and null FacilityIDs if/when they arise.

3.1.2.2 Ownership

OWNEDBY and MAINTBY fields are completely populated and consistent with each other. There are 25 pipes that have a contradictory value between the OWNEDBY and MAINTBY fields. Additionally, there are 7 pipes that are out of domain in either the OWNEDBY and MAINTBY fields.

Recommendation –Investigate discrepancies including values that are out of domain.

OWNEDBY	MAINTBY	Count
CITY	1	2
PRIVATE	1	4
PRIVATE	CITY	16
WAT	1	1
WAT	CITY	2
Total		25

3.1.2.3 Diameter

There are 12 records with null diameter and 2 pipes with unknown diameter.

Recommendation – Update the missing or unknown size values.

3.1.2.4 Installation Date

There are 39 records with a null installation date.

Recommendation – Update the missing installation date values.

3.1.2.5 Material

There are 48 Null and 2 values for pressure main Material that are out of domain in the following table. The two pipes out of material dimain with material of HTPEP also have unknown diameter.

<u>Recommendation</u> – Update the missing materials and correct the two pipes that are out of material domain.

MATERIAL	Min Diameter	Max Diameter	Min Install Year	Max Install Year	Count
	2	33	1977	2013	48
CIP	36	36			1
DIP	4	12	1980	2012	9
HTPEP	999	999			2
PVC	2	8	1987	2012	11
RCP	15	48	1977	1977	7

3.1.2.6 To/From MH ID and Inverts

There are three pipes that are missing TOMH and FROMMH IDs.

<u>Recommendation</u> – Run the Attribute Assistant tool to ensure the correct FacilityID from a connected junction layer is referenced in the TOMH and FROMMH fields and to populate missing values.

3.1.3 ssManhole – 6,370 records

Column Name	Data Type	Percent Populated
ACCESSDIAM	Int16	4.35%
ACTIVEFLAG	Int16	100.00%
ADMINAREA	String	99.83%
CATCHMENT	String	0.00%
COMMENTS	String	99.67%
CONDITION	Int16	0.25%
CUTDEPTH	Double	0.00%
CVTYPE	String	0.02%
ENABLED	Int16	100.00%
ESOURCE	Int16	95.62%
FACILITYID	**String**	**100.00%**
FACILITYID_OLD	String	94.13%
FLOWDIR	String	0.00%
GlobalID*	Guid	100.00%
GPSDATE	DateTime	0.00%
GRADE	String	0.00%
HIGHELEV	Double	0.17%
INSTALLDATE	**DateTime**	**76.88%**

Column Name	Data Type	Percent Populated
INSTALLEDBY	String	0.00%
INVERT	**Double**	**0.08%**
INVERTELEV	**Double**	**0.20%**
LASTEDITOR	String	100.00%
LASTUPDATE	DateTime	100.00%
LINED	String	0.00%
LOCDESC	String	88.78%
MAINTBY	**String**	**100.00%**
MEDIAREF	String	99.84%
MHTYPE	**String**	**93.36%**
OBJECTID*	Int32	100.00%
OWNEDBY	**String**	**95.65%**
RIMELEV	**Double**	**26.61%**
SHAPE	Byte[]	100.00%
SUMFLOW	Double	0.00%
SURVEYREF	String	0.03%
WALLMAT	String	0.25%
WATERTYPE	String	97.30%

3.1.3.1 Asset Identifier

FacilityIDs have been completely populated, however they are not completely unique.

<u>Recommendation</u> – Identify duplicate FacilityIDs and rerun Attribute Assistant Create Function to generate a unique ID. Setup database views or develop routines within the GIS environment to capture duplicate and null FacilityIDs if/when they arise.

3.1.3.2 Asset Type

There are 432 records with null value in the MHTYPE field and one record with a value of “Other.”

<u>Recommendation</u> – Update all unknown manhole types. Investigate the one record with a a value of “Other” changing it to a more descriptive type or updating the manhole type domain to accommodate additional manhole types.

MHTYPE	Count
	423
DIV	1
DRP	12
OTH	1
STD	5,933
Total	**6,370**

3.1.3.3 Ownership

There are 649 manholes that have conflicting information between the OWNEDBY and MAINTBY fields. Additionally, there are 156 records that are out of domain.

<u>Recommendation</u> – Investigate discrepancies including values that are out of domain.

OWNEDBY	MAINTBY	Count
1	CITY	156
PRIVATE	CITY	366
STATE	CITY	2
WAT	CITY	125
Total		**649**

3.1.3.4 Installation Date

1,473 manholes have null or unknown installation date. Additionally, there are 177 manholes with an installation date prior to 1900.

<u>Recommendation</u> – Update the missing and questionable INSTALLDATE values.

Installation Decade	Count
	1,473
1870	9
1880	54
1890	114
Total	1,650

3.1.3.5 Material

There are 16 manholes with a known wall material.

<u>Recommendation</u> – Update the missing manhole wall material.

3.1.3.6 Elevations

The four elevation fields within the manholes layer are very sparsely populated. Invert elevation are essentially completely unknown despite having approximately 500 pipes with a known invert elevation saved to the ssGravityMains feature class.

<u>Recommendation</u> – Backfill the know invert elevations from the ssGravityMains layer and fill in the remaining values from As-Built and/or from field inspections.

HIGHELEV	INVERT	INVERTELEV	RIMELEV	Count
Known	Known	Unknown	Known	3
Known	Unknown	Known	Known	8
Unknown	Known	Unknown	Known	2
Unknown	Unknown	Known	Known	5
Unknown	Unknown	Unknown	Known	1,677
Unknown	Unknown	Unknown	Unknown	4,675

3.1.4 ssNetworkStructure – 142 records

Column Name	Data Type	Percent Populated
ACCESSDIAM	Int16	7.04%
ACTIVEFLAG	Int16	100.00%
ADMINAREA	String	100.00%
AncillaryRole	Int16	0.00%
CATCHMENT	String	0.00%
COMMENTS	String	100.00%
CONDITION	String	0.00%
CONDITION_1	Int16	0.00%
CUTDEPTH	Double	0.00%
ENABLED	Int16	100.00%
ESOURCE	Int16	92.96%
FACILITYID*	**String**	**100.00%**
FACILITYID_OLD	String	92.96%
GlobalID*	Guid	100.00%
GPSDATE	DateTime	0.00%
INSTALLDATE	**DateTime**	**39.44%**

Column Name	Data Type	Percent Populated
INSTALLEDBY	String	0.00%
INVERT	**Double**	**0.00%**
INVERTELEV	**Double**	**0.00%**
LASTEDITOR	String	100.00%
LASTUPDATE*	DateTime	100.00%
LOCDESC	String	100.00%
MAINTBY	**String**	**100.00%**
MEDIAREF	String	100.00%
OBJECTID*	Int32	100.00%
OWNEDBY	**String**	**92.25%**
RIMELEV	**Double**	**1.41%**
SHAPE	Byte[]	100.00%
STRUCTTYPE	**String**	**71.13%**
SURVEYREF	String	0.00%
WATERTYPE	String	100.00%

3.1.4.1 Asset Identifier

FacilityIDs have been completely populated and are unique.

<u>Recommendation</u> – Setup database views or develop routines within the GIS environment to capture duplicate and null FacilityIDs if/when they arise.

3.1.4.2 Asset Type

There are 41 records with null value in the STRUCTYPE field. Additionally, there are 2 manholes and one record with an asset type of “Other.”

<u>Recommendation</u> – Update all unknown structure types. Investigate the record with “Other” value and either update to the correct value or update the domain to accommodate additional structure types. Move all manhole features in the structures feature class to the ssManhole feature class.

3.1.4.3 Ownership

OWNEDBY and MAINTBY fields are well populated and relatively consistent with each other. There are 11 features with a null OWNEDBY value. Excluding null values, there are 42 structures that have a contradictory value between the OWNEDBY and MAINTBY fields.

Recommendation – Assign OWNEDBY values to those that are empty. Investigate discrepancies between the OWNEDBY and MAINTBY fields.

OWNEDBY	MAINTBY	Expr1
	CITY	11
PRIVATE	CITY	32
WAT	CITY	10

3.1.4.4 Installation Date

Roughly 60% of the network structures have a null INSTALLDATE.

Recommendation – Update the missing installation date values.

3.1.4.5 Elevations

There are 140 network structures where all three elevation fields are null. Two records have only a known rim elevation consistent with the ground elevation within the City of Portland.

Recommendation - Fill in the remaining values from as-built drawings and/or from field inspections.

3.2 Geometric Network

Sanitary sewer collection systems have a designed flow direction that takes advantage of topography and gravity as much as possible and utilizes pump stations as necessary. Therefore, the GIS using geometric network can be designed to allow flow tracing. ArcGIS provides several means of defining flow direction, but the preferred method for a gravity system is to always draw pipes starting at the upstream end and finishing at the downstream end. The City of Portland's sanitary system GIS was created in this manner.

There are 76 orphaned junctions in the sewer collection system.

Recommendation – These orphaned junctions should be converted to specific asset junctions or deleted if they are not necessary.

Node Feature Class	Count
Clean Outs	1
Control Valves	3
Fittings	16
Network Structures	13
Sewer Manholes	42
Test Stations	1
Total	76

There are multiple features that have a questionable number of pipe connections that are **highlighted bold** in the table below. There are a minor number of features that have five or more pipes connected. The 1,107 manholes that only have one pipe connection are potentially the most troublesome.

Feature Class	Pipe Count	Quantity
ssControlValve	1	2
ssControlValve	**3**	**2**
ssDischargePoint	1	8
ssFitting	1	351
ssFitting	2	13
ssFitting	3	7
ssFitting	4	1
ssInlet	1	1
ssManhole	**1**	**1,107**
ssManhole	2	3,914
ssManhole	3	1,105
ssManhole	4	130
ssManhole	**5**	**13**
ssManhole	**6**	**5**
ssManhole	**8**	**3**
ssManhole	**10**	**1**
ssNetworkStructure	1	33
ssNetworkStructure	2	26
ssNetworkStructure	3	32
ssNetworkStructure	4	15
ssNetworkStructure	**5**	**2**
ssNetworkStructure	**6**	**2**

In **Figure 1** we see a sanitary gravity main that flows into a storm gravity main. Typically, within a combined collection system it is not uncommon to identify separated storm pipes flowing into an older combined pipe. However, it is not common for a combined sewer pipe to flow directly to a separated storm collection system. There are 243 sanitary manholes that intersect or flow into storm gravity mains.

<u>Recommendation</u> – Investigate the junction feature that have five or more pipe connections and make corrections when appropriate. Investigate the 243 sanitary manholes that intersect storm water infrastructure. Whole segments of pipe and junction features may need to be migrated over from one feature dataset to the other and vice versa depending on the situation.

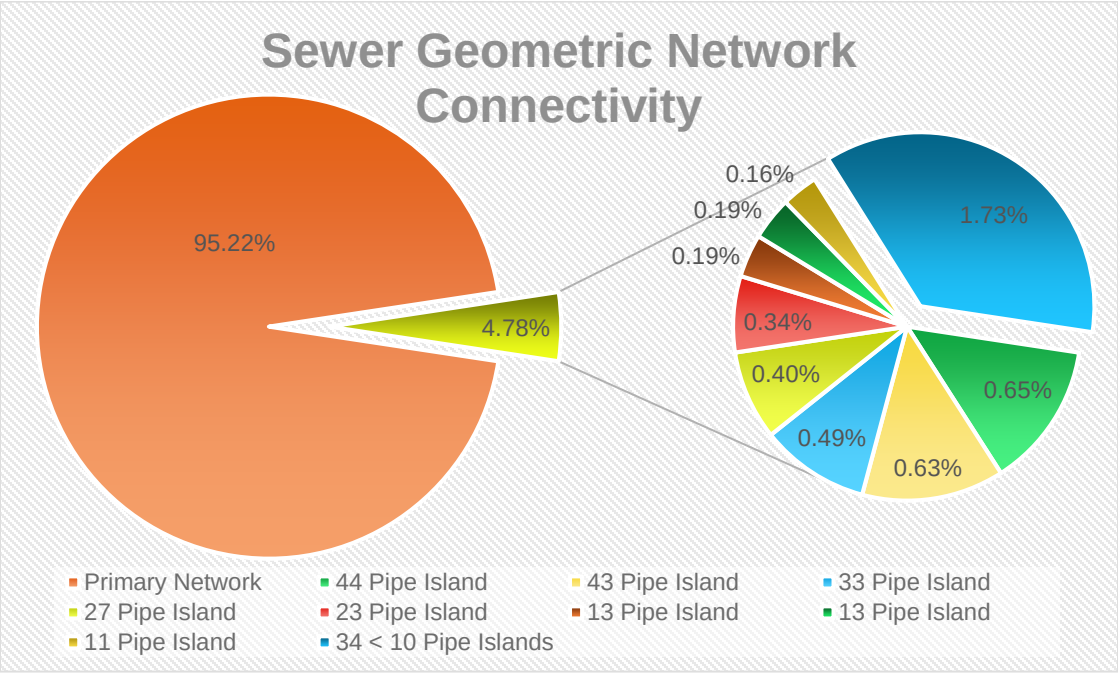
Figure 1 – Sanitary Gravity Main to Storm Gravity Main

Flow trace analysis indicates there are breaks due to two types of geometry issues, inconsistent flow direction and disconnected features. Currently, within the system there are 42 islands of disconnected pipe and junction features. An example of two pipe islands in the system is highlighted in blue in Figure 2 below. A breakdown, by percentage, of the pipe network connectivity is shown in Figure 3. Figure 3 shows that approximately 95% of the system is fully connected, with the remaining 5% broken into 42 islands. The breakdown of the 42 islands is shown by percentage as the “slice” of the pie chart.

Recommendation – Perform upstream accumulation trace tests from the treatment plant to identify the features breaking the trace. Connect disconnected pipes and flip pipes with inconsistent flow direction.

Figure 2 – Disconnected Pipe and Junction Features

Figure 3 – Geometric Network Connectivity by Percentage

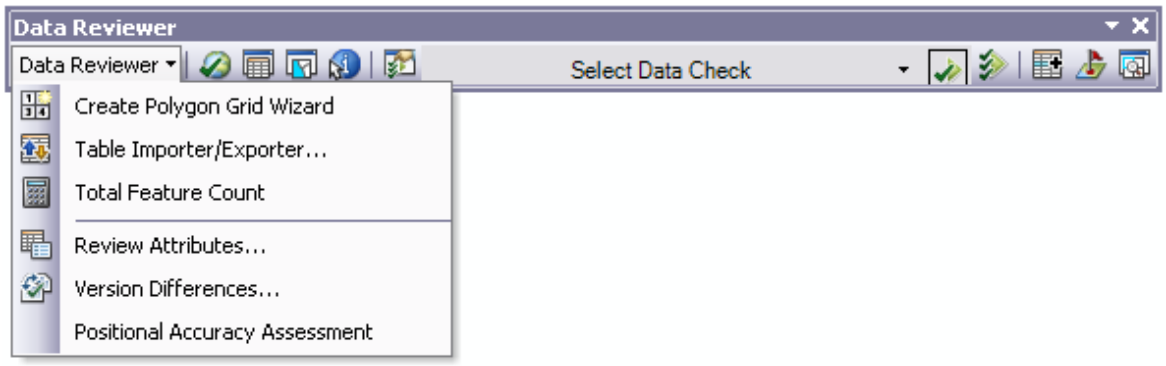


As the attribute data is gradually filled in, there is potential for additional errors to arise. While evaluating the geometric network by linking pipes together via TOMH to FROMMH, 295 pipes were discovered to have decreasing diameter. Additionally, 293 pipes were found to have a downstream pipe that is higher in elevation than the upstream pipe. Given that only approximately 10% of the gravity mains have an invert elevation that is populated, that number is sure to rise.

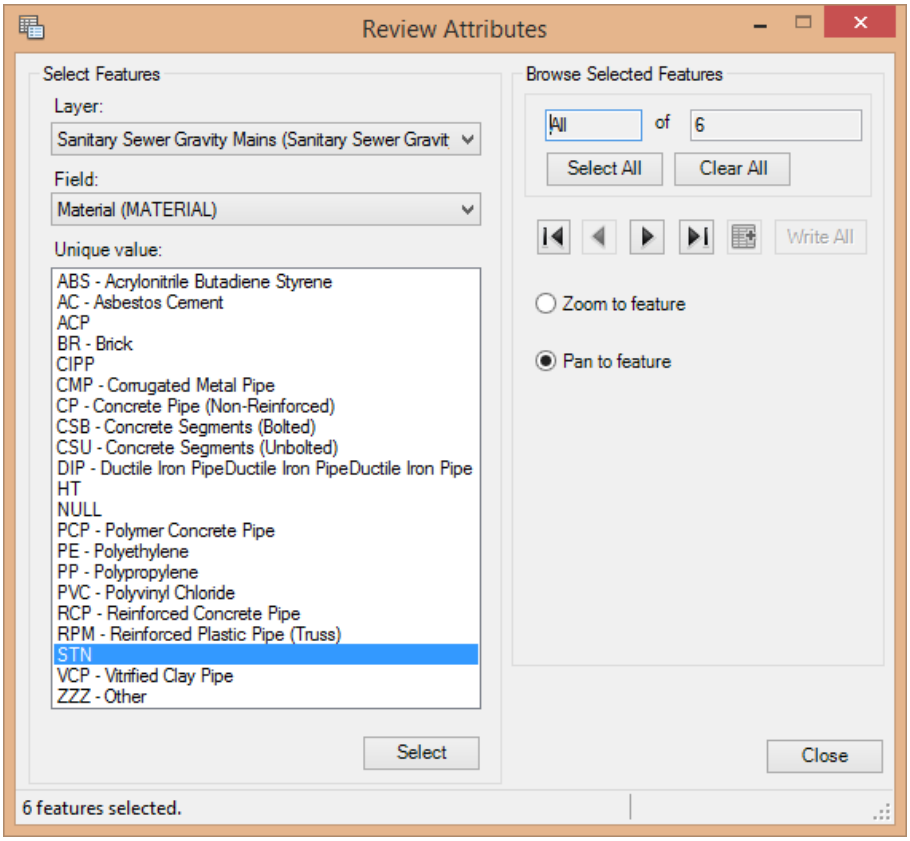
Recommendation – Ensure the Attribute Assistant has assigned the correct TO/FROM manhole IDs to the pipes. Correct the decreasing diameters and downstream pipe elevations that are higher than upstream pipes.

4 CLOSING THE GAPS

The primary tool to identify errors and gaps within GIS is the ArcGIS Data Reviewer tool set. It allows users to manage quality of data in support of data production and analysis. Data Reviewer provides users the ability to configure automated data quality control checks and also provides tools for manually reviewing attribute and spatial data.



The Review Attributes tool within the Data Reviewer drop-down is an excellent means to quickly select records with the dubious attribute values outlined in the gap document. When a layer and field are selected via drop-down, all the unique values are displayed within a list box. All of the records with a highlighted value can be selected and stepped through using the arrows in the Review Attributes dialog.



More complex checks involving geometry, multiple attributes, domains, and/or any combination of the three can be run individually as a one-off analysis or saved within a batch file for future quality analysis. The results of these checks are saved for future review in a Data Reviewer Workspace table or via the Browse Features window.

APPENDIX A

Data Profiler™ Detailed Output

PortlandME_Sewer_pgdb

Data Profile

The following list contains the profiled database table names and their record count. The table name and record count are highlighted red if there are no records in a table. An asterisk (*) is placed in front of any table without a Primary Key and it is highlighted yellow.

Summary Records per Table

*DynamicValue	188	*ssDischargePoint (Junction)	8	*ssPressurizedMain (Edge)	78
*GenerateId	54	*ssFitting (Junction)	430	*ssPump (Junction)	0
*SewerStormwater_Net_Junctions (Junction)	250	*ssGravityMain (Edge)	6,804	*ssServiceConnection (Junction)	0
*ssBend (Junction)	0	*ssInlet (Junction)	1	*ssSystemValve (Junction)	0
*ssCasing (Edge)	1	*ssLateralLine (Edge)	118	*ssTap (Junction)	5
*ssCleanOut (Junction)	3	*ssManhole (Junction)	6,370	*ssTestStation (Junction)	1
*ssControlValve (Junction)	7	*ssNetworkStructure (Junction)	142	*ssValveOperator (Junction)	0
*ssDetention (Polygon)	1	*ssOpenDrain (Edge)	0	*ssVirtualDrainline (Edge)	0

The following pages detail each table having one or more records.

Each table field is listed with the percent of populated, zero and negative values. An empty field has a Null value, zero length string or all spaces. Zero or negative values may occur in a numeric field. Although empty, zero and negative values are not necessarily invalid, they may indicate a problem. Fields containing all empty, zero or negative values are highlighted red. Fields containing 50-100% empty or zero values or any negative values are highlighted yellow.

An asterisk (*) is placed in front of any field containing all unique values, they are highlighted blue and **UNIQUE** is shown next to the field name.

Text fields may have the top 10 most occurring value lengths listed. If listed, the quantity of zero length strings will be highlighted red.

The top 10 most occurring values (greater than 1% and occurring more than once) will be listed. Empty or zero values will be highlighted red.

DynamicValue Table - 188 records

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

COMMENTS	4%	/	/	FIELDNAME	96%	/	/	*GlobalID	100%	/ 0%	/ 0%
*OBJECTID	100%	/ 0%	/ 0%	ON_CHANGE	100%	/ 51%	/ 0%	ON_CHANGEGEO	99%	/ 62%	/ 0%
ON_CREATE	100%	/ 8%	/ 0%	ON_MANUAL	99%	/ 94%	/ 0%	RUN_WEIGHT	12%	/ 0%	/ 0%
TABLENAME	100%	/	/	VALUEINFO	79%	/	/	VALUEMETHOD	100%	/	/

COMMENTS (string255)

Unique: **6** Null/Zero/Neg: **181 / 0 / 0**

Most Occurring Lengths	Count	%
31 Characters:	2	1%

Most Occuring Values	Count	%
Generates a 4 digit Facility ID	2	1%

FIELDNAME (string64)

Unique: **86** Null/Zero/Neg: **7 / 0 / 0**

Most Occurring Lengths	Count	%
10 Characters:	63	34%
8 Characters:	37	20%
7 Characters:	24	13%
9 Characters:	21	11%
6 Characters:	11	6%
11 Characters:	9	5%
12 Characters:	5	3%
5 Characters:	5	3%
4 Characters:	5	3%

Most Occuring Values	Count	%
FACILITYID	53	28%
	6	3%
FULLNAME	6	3%
LOCDESC	5	3%
COMPLEXID	4	2%
DIAMETER	4	2%
EVENTID	4	2%
PLANID	4	2%
ASSIGNEDTO	3	2%
ATTACHID	3	2%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **188** Null/Zero/Neg: **0 / 0 / 0**

OBJECTID *UNIQUE* (int32, 1 to 3383, Avg=445.55, StDev=748.36)

Unique: **188** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	83	44%
2 Characters:	59	31%
4 Characters:	37	20%
1 Characters:	9	5%

ON_CHANGE (int16, 0/1 to 1, Avg=0.49/1.0, StDev=0.5/0.0)

Unique: **2** Null/Zero/Neg: **0 / 95 / 0**

Most Occuring Values	Count	%
0	95	51%
1	93	49%

ON_CHANGEGEO (int16, 0/1 to 1, Avg=0.38/1.0, StDev=0.49/0.0)

Unique: **2** Null/Zero/Neg: **1 / 116 / 0**

Most Occurring Lengths	Count	%
1 Characters:	187	99%

Most Occuring Values	Count	%
0	116	62%
1	71	38%

ON_CREATE (int16, 0/1 to 1, Avg=0.92/1.0, StDev=0.27/0.0)

Unique: **2** Null/Zero/Neg: **0 / 15 / 0**

Most Occuring Values	Count	%
1	173	92%
0	15	8%

ON_MANUAL (int16, 0/1 to 1, Avg=0.05/1.0, StDev=0.23/0.0)

Unique: **2** Null/Zero/Neg: **2 / 176 / 0**

Most Occurring Lengths	Count	%
1 Characters:	186	99%

Most Occuring Values	Count	%
0	176	94%
1	10	5%

RUN_WEIGHT (int16, 1 to 10, Avg=3.61, StDev=3.6)

Unique: **8** Null/Zero/Neg: **165 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	20	11%
2 Characters:	3	2%

Most Occuring Values	Count	%
1	14	7%
10	3	2%

DynamicValue Table - 188 records

TABLENAME (string254)

Unique: **78** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
13 Characters:	27	14%
14 Characters:	23	12%
16 Characters:	20	11%
12 Characters:	16	9%
17 Characters:	13	7%
5 Characters:	12	6%
1 Characters:	12	6%
21 Characters:	11	6%
18 Characters:	9	5%
9 Characters:	9	5%

Most Occuring Values	Count	%
RoadCenterline	15	8%
*	12	6%
SiteAddressPoint	10	5%
ssGravityMain	8	4%
BuildingFloorplanLine	7	4%
FacilitySitePoint	7	4%
PostalAddress	7	4%
AddressEntrancePoint	4	2%
BuildingInteriorSpace	4	2%
Levee	4	2%

VALUEINFO (string254)

Unique: **113** Null/Zero/Neg: **40 / 0 / 0**

Most Occurring Lengths	Count	%
23 Characters:	16	9%
26 Characters:	13	7%
25 Characters:	12	6%
22 Characters:	12	6%
20 Characters:	10	5%
21 Characters:	9	5%
24 Characters:	8	4%
10 Characters:	8	4%
27 Characters:	6	3%
37 Characters:	5	3%

Most Occuring Values	Count	%
	38	20%
FacilitySite|FACILITYID	8	4%
FACILITYID	6	3%
GeocodingLines|LABEL_NAME|LOCDESC|100	4	2%
BuildingFloor|BUILDINGKEY	3	2%
BuildingFloor|FLOORID	3	2%
Pole|FACILITYID	3	2%
PreIncidentPlan|PLANID	3	2%
SpecialEvent|EVENTID	3	2%
	2	1%

VALUEMETHOD (string254)

Unique: **23** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
11 Characters:	54	29%
20 Characters:	47	25%
10 Characters:	43	23%
17 Characters:	9	5%
26 Characters:	7	4%
19 Characters:	6	3%
29 Characters:	4	2%
16 Characters:	4	2%
15 Characters:	3	2%
25 Characters:	2	1%

Most Occuring Values	Count	%
GENERATE_ID	54	29%
INTERSECTING_FEATURE	47	25%
LAST_VALUE	34	18%
EXPRESSION	9	5%
NEAREST_FEATURE_ATTRIBUTES	7	4%
FROM_JUNCTION_FIELD	4	2%
INTERSECTING_FEATURE_DISTANCE	4	2%
LINK_TABLE_ASSET	4	2%
TO_JUNCTION_FIELD	4	2%
CASCADE_ATTRIBUTE	3	2%

GenerateId Table - 54 records

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

COMMENTS	59% /		/	*GlobalID	100% /	0%	/ 0%	*OBJECTID	100% /	0%	/ 0%
SEQCOUNTER	100% /	6%	/ 0%	SEQINTERV	100% /	0%	/ 0%	*SEQNAME	100% /		/

COMMENTS (string255)

Unique: **32** Null/Zero/Neg: **22 / 0 / 0**

Most Occurring Lengths	Count	%
37 Characters:	6	11%
32 Characters:	5	9%
42 Characters:	4	7%
40 Characters:	2	4%
38 Characters:	2	4%
35 Characters:	2	4%
34 Characters:	2	4%
31 Characters:	2	4%
30 Characters:	2	4%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **54** Null/Zero/Neg: **0 / 0 / 0**

OBJECTID *UNIQUE* (int32, 9 to 1233, Avg=433.06, StDev=422.2)

Unique: **54** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	26	48%
2 Characters:	26	48%

SEQCOUNTER (int32, 0/1 to 10342, Avg=732.33/775.41, StDev=2205.92/2263.62)

Unique: **32** Null/Zero/Neg: **0 / 3 / 0**

Most Occurring Lengths	Count	%
1 Characters:	30	56%
3 Characters:	9	17%
2 Characters:	9	17%
4 Characters:	5	9%

Most Occuring Values	Count	%
1	15	28%
3	4	7%
0	3	6%
11	2	4%
4	2	4%
5	2	4%

SEQINTERV (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1	54	100%

SEQNAME *UNIQUE* (string75)

Unique: **54** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
13 Characters:	9	17%
9 Characters:	7	13%
11 Characters:	6	11%
8 Characters:	6	11%
18 Characters:	4	7%
7 Characters:	4	7%
14 Characters:	3	6%
12 Characters:	3	6%
10 Characters:	3	6%
6 Characters:	3	6%

SewerStormwater_Net_Junctions Table - 250 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

Enabled	100%	0%	0%	*OBJECTID	100%	0%	0%	SHAPE	100%	0%	0%

Enabled (int16, 1 to 1, Avg=1.0, StDev=0.0) Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	250	100%

OBJECTID *UNIQUE* (int32, 1 to 250, Avg=125.5, StDev=72.31) Unique: **250** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	151	60%
2 Characters:	90	36%
1 Characters:	9	4%

SHAPE (byte[]) Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

ssCleanOut Table - 3 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACCESSDIAM	33%	0%	0%	ACCESSMAT	0%			ACCESSTYPE	100%		
ACTIVEFLAG	100%	0%	0%	ADMINAREA	0%			COMMENTS	0%		
CONDITION	0%	0%	0%	DEVICETYPE	100%			ENABLED	100%	0%	0%
ESOURCE	0%	0%	0%	*FACILITYID	100%			FACILITYID_OLD	0%		
*GlobalID	100%	0%	0%	INSTALLDATE	0%	0%	0%	INTDEPTH	0%	0%	0%
LASTEDITOR	100%			*LASTUPDATE	100%	0%	0%	MAINTBY	67%		
MEDIAREF	0%			*OBJECTID	100%	0%	0%	OWNEDBY	67%		
ROTATION	67%	33%	0%	SHAPE	100%	0%	0%	SURVEYREF	0%		

ACCESSDIAM (double, 24.0 to 24.0, Avg=24.0, StDev=0.0) — Unique: **1** — Null/Zero/Neg: **2 / 0 / 0**

ACCESSMAT (string20) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

ACCESSTYPE (string20) — Unique: **1** — Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
Cover	3	100%

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0) — Unique: **1** — Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	3	100%

ADMINAREA (string20) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

COMMENTS (string250) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

CONDITION (int16) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

DEVICETYPE (string30) — Unique: **2** — Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	2	67%

Most Occuring Values	Count	%
Cleanout	2	67%

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0) — Unique: **1** — Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	3	100%

ESOURCE (int16) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

FACILITYID *UNIQUE* (string20) — Unique: **3** — Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

GlobalID *UNIQUE* (guid, to , Avg=, StDev=) — Unique: **3** — Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

INTDEPTH (double) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

LASTEDITOR (string50) — Unique: **2** — Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
DPS146\jag	2	67%

LASTUPDATE *UNIQUE* (datetime, 2016 to 2017, Avg=2016.67, StDev=0.58) — Unique: **3** — Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
20 Characters:	2	67%

MAINTBY (string10) — Unique: **1** — Null/Zero/Neg: **1 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	2	67%

Most Occuring Values	Count	%
1	2	67%

MEDIAREF (string255) — Unique: **0** — Null/Zero/Neg: **3 / 0 / 0**

OBJECTID *UNIQUE* (int32, 401 to 1601, Avg=1067.67, StDev=611.01) — Unique: **3** — Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	2	67%

ssCleanOut Table - 3 records

Junction

OWNEDBY (string10) Unique: **1** Null/Zero/Neg: **1 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	2	67%

Most Occuring Values	Count	%
1	2	67%

ROTATION (double, 0.0/320.03 to 320.03, Avg=160.01/320.03, StDev=226.29/0.0) Unique: **2** Null/Zero/Neg: **1 / 1 / 0**

SHAPE (byte[]) Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SURVEYREF (string255) Unique: **0** Null/Zero/Neg: **3 / 0 / 0**

ssControlValve Table - 7 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	100%	0%	0%	ADMINAREA	0%			COMMENTS	0%		
CONDITION	0%	0%	0%	DIAMETER	57%	0%	0%	ENABLED	100%	0%	0%
ESOURCE	0%	0%	0%	*FACILITYID	100%			FACILITYID_OLD	0%		
*GlobalID	100%	0%	0%	INSTALLDATE	43%	0%	0%	LASTEDITOR	100%		
*LASTUPDATE	100%	0%	0%	LOCDESC	43%			MAINTBY	100%		
MEDIAREF	0%			*OBJECTID	100%	0%	0%	OWNEDBY	100%		
ROTATION	100%	86%	0%	SHAPE	100%	0%	0%	SURVEYREF	0%		
VALVETYPE	100%										

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	7	100%

ADMINAREA (string20)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

COMMENTS (string250)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

CONDITION (int16)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

DIAMETER (double, 8.0 to 36.0, Avg=15.0, StDev=14.0)

Unique: **2** Null/Zero/Neg: **3 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	3	43%

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	7	100%

ESOURCE (int16)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

FACILITYID *UNIQUE* (string20)

Unique: **7** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **7** Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime, 2014 to 2014, Avg=2014.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **4 / 0 / 0**

Most Occurring Lengths	Count	%
9 Characters:	3	43%

Most Occuring Values	Count	%
6/27/2014 12:00:00 AM	3	43%

LASTEDITOR (string50)

Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
DPS146\jag	4	57%
DPS164\avf	3	43%

LASTUPDATE *UNIQUE* (datetime, 2016 to 2016, Avg=2016.0, StDev=0.0)

Unique: **7** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
20 Characters:	6	86%

LOCDESC (string100)

Unique: **1** Null/Zero/Neg: **4 / 0 / 0**

Most Occurring Lengths	Count	%
9 Characters:	3	43%

Most Occuring Values	Count	%
Front St.	3	43%

MAINTBY (string10)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1	7	100%

MEDIAREF (string255)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

OBJECTID *UNIQUE* (int32, 2 to 802, Avg=402.0, StDev=326.19)

Unique: **7** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	5	71%
1 Characters:	2	29%

ssControlValve Table - 7 records

Junction

OWNEDBY (string10)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1	7	100%

ROTATION (double, 0.0/208.53 to 208.53, Avg=29.79/208.53, StDev=78.82/0.0)

Unique: **2** Null/Zero/Neg: **0 / 6 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6	86%

Most Occuring Values	Count	%
0	6	86%

SHAPE (byte[])

Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SURVEYREF (string255)

Unique: **0** Null/Zero/Neg: **7 / 0 / 0**

VALVETYPE (string30)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
Backflow Control	7	100%

ssDischargePoint Table - 8 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	75%	0%	0%	ADMINAREA	25%			AncillaryRole	75%	75%	0%
APRONMAT	0%			AVGDISCH	0%			CATCHMENT	0%		
COMMENTS	0%			CONDITION	25%	0%	0%	CSONUMBER	75%		
DIAMETER	0%	0%	0%	DISCHID	0%			DISCHRGTYP	0%		
ENABLED	100%	0%	0%	ESOURCE	0%	0%	0%	*FACILITYID	100%		
FACILITYID_OLD	25%			*GlobalID	100%	0%	0%	INSTALLDATE	0%	0%	0%
INSTALLEDBY	0%			LASTEDITOR	100%			*LASTUPDATE	100%	0%	0%
LOCDESC	25%			MAINTBY	100%			MEDIAREF	0%		
*OBJECTID	100%	0%	0%	OWNEDBY	75%			PEAKDISCH	0%		
PERMIT	75%			PERMITID	50%			*ROTATION	100%	0%	0%
SHAPE	100%	0%	0%	SURVEYREF	0%						

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6	75%

Most Occuring Values	Count	%
1 (True)	6	75%

ADMINAREA (string20)

Unique: **1** Null/Zero/Neg: **6 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	2	25%

Most Occuring Values	Count	%
1	2	25%

AncillaryRole (int16, 0/0 to 0, Avg=0.0/0.0, StDev=0.0/0.0)

Unique: **1** Null/Zero/Neg: **2 / 6 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6	75%

Most Occuring Values	Count	%
0	6	75%

APRONMAT (string10)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

AVGDISCH (string10)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

CATCHMENT (string30)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

COMMENTS (string250)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

CONDITION (int16, 2 to 3, Avg=2.5, StDev=0.71)

Unique: **2** Null/Zero/Neg: **6 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	2	25%

CSONUMBER (string5)

Unique: **5** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	6	75%

DIAMETER (double)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

DISCHID (string20)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

DISCHRGTYP (string50)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	8	100%

ESOURCE (int16)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

FACILITYID *UNIQUE* (string20)

Unique: **8** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **2** Null/Zero/Neg: **6 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	2	25%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **8** Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

INSTALLEDBY (string10)

Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

LASTEDITOR (string50) Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
DPS164\avf	6	75%
DPS146\jag	2	25%

LASTUPDATE *UNIQUE* (datetime, 2016 to 2016, Avg=2016.0, StDev=0.0) Unique: **8** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
22 Characters:	5	63%
19 Characters:	2	25%

LOCDESC (string100) Unique: **1** Null/Zero/Neg: **6 / 0 / 0**

Most Occurring Lengths	Count	%
11 Characters:	2	25%

Most Occuring Values	Count	%
Baxter Blvd	2	25%

MAINTBY (string10) Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1	8	100%

MEDIAREF (string255) Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

OBJECTID *UNIQUE* (int32, 1 to 1601, Avg=802.88, StDev=565.99) Unique: **8** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	3	38%
3 Characters:	3	38%
1 Characters:	2	25%

OWNEDBY (string10) Unique: **1** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6	75%

Most Occuring Values	Count	%
1	6	75%

PEAKDISCH (string10) Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

PERMIT (string30) Unique: **1** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	6	75%

Most Occuring Values	Count	%
Yes	6	75%

PERMITID (string20) Unique: **4** Null/Zero/Neg: **4 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	4	50%

ROTATION *UNIQUE* (double, 97.98 to 358.17, Avg=230.12, StDev=90.42) Unique: **8** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	7	88%

SHAPE (byte[]) Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SURVEYREF (string255) Unique: **0** Null/Zero/Neg: **8 / 0 / 0**

ssFitting Table - 430 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	100%	0%	0%	ADMINAREA	6%			COMMENTS	3%		
CONDITION	0%	0%	0%	ENABLED	100%	0%	0%	ESOURCE	0%	0%	0%
FACILITYID	100%			FACILITYID_OLD	0%			FITTINGTYPE	12%		
*GlobalID	100%	0%	0%	INSTALLDATE	4%	0%	0%	LASTEDITOR	100%		
LASTUPDATE	100%	0%	0%	LOCDESC	3%			MAINTBY	100%		
MEDIAREF	3%			*OBJECTID	100%	0%	0%	OWNEDBY	100%		
ROTATION	100%	5%	0%	SHAPE	100%	0%	0%	SURVEYREF	0%		

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	430	100%

ADMINAREA (string20)

Unique: **4** Null/Zero/Neg: **405 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	25	6%

Most Occuring Values	Count	%
5	17	4%
4	5	1%

COMMENTS (string250)

Unique: **11** Null/Zero/Neg: **418 / 0 / 0**

Most Occurring Lengths	Count	%
24 Characters:	5	1%
46 Characters:	2	0%
40 Characters:	2	0%

CONDITION (int16)

Unique: **0** Null/Zero/Neg: **430 / 0 / 0**

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	430	100%

ESOURCE (int16, 8 to 8, Avg=8.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **429 / 0 / 0**

FACILITYID (string20)

Unique: **428** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **0** Null/Zero/Neg: **430 / 0 / 0**

FITTINGTYPE (string50)

Unique: **7** Null/Zero/Neg: **377 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	34	8%
8 Characters:	11	3%
5 Characters:	4	1%
10 Characters:	2	0%
7 Characters:	2	0%

Most Occuring Values	Count	%
Cap	22	5%
Tee	12	3%
Coupling	11	3%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **430** Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime, 1922 to 2015, Avg=2004.84, StDev=24.33)

Unique: **8** Null/Zero/Neg: **411 / 0 / 0**

Most Occurring Lengths	Count	%
9 Characters:	15	3%
8 Characters:	4	1%

Most Occuring Values	Count	%
1/19/2012 12:00:00 AM	10	2%

LASTEDITOR (string50)

Unique: **5** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
10 Characters:	384	89%
3 Characters:	46	11%

Most Occuring Values	Count	%
DPS146\jag	354	82%
JDF	45	10%
DPS164\avf	23	5%
dps033\jag	7	2%

LASTUPDATE (datetime, 2015 to 2017, Avg=2016.05, StDev=0.34)

Unique: **424** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
19 Characters:	225	52%
20 Characters:	156	36%
21 Characters:	40	9%
22 Characters:	9	2%

ssFitting Table - 430 records

Junction

LOCDESC (string100)

Unique: **7** Null/Zero/Neg: **416 / 0 / 0**

Most Occurring Lengths	Count	%
34 Characters:	6	1%
21 Characters:	3	1%

Most Occuring Values	Count	%
West Side Interceptor off Brighton	6	1%

MAINTBY (string10)

Unique: **2** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	416	97%
4 Characters:	12	3%

Most Occuring Values	Count	%
1	416	97%
CITY	12	3%

MEDIAREF (string255)

Unique: **7** Null/Zero/Neg: **419 / 0 / 0**

Most Occurring Lengths	Count	%
22 Characters:	7	2%

Most Occuring Values	Count	%
dwg 203848.90/sheet 14	5	1%

OBJECTID *UNIQUE* (int32, 401 to 22018, Avg=14234.88, StDev=3775.45)

Unique: **430** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
5 Characters:	363	84%
4 Characters:	66	15%

OWNEDBY (string10)

Unique: **2** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	423	98%
4 Characters:	5	1%

Most Occuring Values	Count	%
1	423	98%
CITY	5	1%

ROTATION (double, 0.0/0.96 to 359.87, Avg=182.43/192.27, StDev=108.45/102.48)

Unique: **402** Null/Zero/Neg: **0 / 22 / 0**

Most Occurring Lengths	Count	%
8 Characters:	284	66%
7 Characters:	107	25%
1 Characters:	22	5%
6 Characters:	14	3%
3 Characters:	2	0%

Most Occuring Values	Count	%
0	22	5%

SHAPE (byte[])

Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SURVEYREF (string255)

Unique: **1** Null/Zero/Neg: **429 / 0 / 0**

ssGravityMain Table - 6,804 records

Edge

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	100%	0%	0%	ADMINAREA	100%			CATCHMENT	0%		
COMMENTS	99%			CONDITION	0%	0%	0%	DIAMETER	96%	0%	0%
DOWNELEV	9%	0%	0%	ENABLED	100%	0%	0%	ESOURCE	95%	0%	0%
*FACILITYID	100%			FACILITYID_OLD	100%			FROMMH	100%		
*GlobalID	100%	0%	0%	HEIGHT	96%	0%	0%	INSTALLDATE	87%	0%	4%
INSTALLEDBY	0%			LASTEDITOR	100%			LASTUPDATE	100%	0%	0%
LINEDYEAR	6%			LINERTYPE	81%			LININGCONTR	0%		
LOCDESC	100%			MAINSHAPE	86%			MAINTBY	100%		
MATERIAL	90%			MEDIAREF	99%			*OBJECTID	100%	0%	0%
OWNEDBY	98%			SHAPE	100%	0%	0%	SHAPE_Length	100%	0%	0%
SLOPE	63%	0%	0%	SLOPELENGTH	66%	0%	0%	SUMFLOW	0%	0%	0%
SURVEYREF	0%			TOMH	100%			UPELEV	8%	0%	0%
WATERTYPE	99%			WIDTH	86%	0%	0%				

ACTIVEFLAG (int16, 0/1 to 1, Avg=1.0/1.0, StDev=0.02/0.0)

Unique: **2** Null/Zero/Neg: **5 / 2 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6,799	100%

Most Occurring Values	% Length	Count	%
1	100%	6,797	100%

ADMINAREA (string20)

Unique: **5** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
3	26%	1,698	25%
5	25%	1,688	25%
4	23%	1,561	23%
1	16%	1,222	18%
2	10%	635	9%

CATCHMENT (string30)

Unique: **1** Null/Zero/Neg: **6,803 / 0 / 0**

COMMENTS (string250)

Unique: **569** Null/Zero/Neg: **84 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,077	75%
27 Characters:	516	8%
24 Characters:	154	2%
28 Characters:	117	2%
30 Characters:	88	1%
29 Characters:	82	1%
23 Characters:	75	1%
25 Characters:	65	1%
21 Characters:	62	1%
22 Characters:	43	1%

Most Occurring Values	% Length	Count	%
None	73%	5,062	74%

CONDITION (int16)

Unique: **0** Null/Zero/Neg: **6,804 / 0 / 0**

DIAMETER (double, -1.0/2.0 to 120.0, Avg=15.44/15.46, StDev=11.97/11.97)

Unique: **32** Null/Zero/Neg: **288 / 0 / 5**

Most Occurring Lengths	Count	%
2 Characters:	3,891	57%
1 Characters:	2,624	39%

Most Occurring Values	% Length	Count	%
8	38%	2,499	37%
12	12%	815	12%
10	10%	651	10%
15	7%	521	8%
24	7%	509	7%
18	7%	497	7%
30	3%	218	3%
48	2%	127	2%
36	2%	126	2%
6	1%	106	2%

DOWNELEV (double, -6.57/0.21 to 168.54, Avg=63.19/66.33, StDev=41.87/40.19)

Unique: **571** Null/Zero/Neg: **6,202 / 2 / 25**

Most Occurring Lengths	Count	%
5 Characters:	367	5%
4 Characters:	116	2%
6 Characters:	83	1%
3 Characters:	20	0%
2 Characters:	14	0%
1 Characters:	2	0%

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0) Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
1	100%	6,804	100%

ESOURCE (int16, 3 to 9, Avg=8.98, StDev=0.34) Unique: **4** Null/Zero/Neg: **353 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6,451	95%

Most Occurring Values	% Length	Count	%
9	96%	6,425	94%

FACILITYID *UNIQUE* (string20) Unique: **6,804** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20) Unique: **6,516** Null/Zero/Neg: **22 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,670	83%
3 Characters:	747	11%
5 Characters:	266	4%
2 Characters:	79	1%
10 Characters:	11	0%
1 Characters:	8	0%

Most Occurring Values	% Length	Count	%
99999	2%	208	3%

FROMMH (string11) Unique: **6,624** Null/Zero/Neg: **0 / 0 / 0**

GlobalID *UNIQUE* (guid, to , Avg=, StDev=) Unique: **6,804** Null/Zero/Neg: **0 / 0 / 0**

HEIGHT (double, -1.0/2.0 to 120.0, Avg=15.44/15.46, StDev=11.97/11.97) Unique: **32** Null/Zero/Neg: **288 / 0 / 5**

Most Occurring Lengths	Count	%
2 Characters:	3,891	57%
1 Characters:	2,624	39%

Most Occurring Values	% Length	Count	%
8	38%	2,499	37%
12	12%	815	12%
10	10%	651	10%
15	7%	521	8%
24	7%	509	7%
18	7%	497	7%
30	3%	218	3%
48	2%	127	2%
36	2%	126	2%
6	1%	106	2%

INSTALLDATE (datetime, 1864/1900 to 2017, Avg=1958.32/1961.9, StDev= Unique: **162** Null/Zero/Neg: **896 / 0 / 285**

Most Occurring Lengths	Count	%
8 Characters:	5,807	85%
9 Characters:	101	1%

Most Occurring Values	% Length	Count	%
1/1/1973 12:00:00 AM	3%	182	3%
1/1/1924 12:00:00 AM	2%	136	2%
1/1/1956 12:00:00 AM	2%	101	1%
1/1/1963 12:00:00 AM	2%	93	1%
1/1/1953 12:00:00 AM	1%	81	1%
1/1/1972 12:00:00 AM	1%	78	1%
1/1/1970 12:00:00 AM	1%	73	1%
1/1/1928 12:00:00 AM	1%	72	1%
1/1/1937 12:00:00 AM	1%	71	1%
1/1/1930 12:00:00 AM	1%	69	1%

INSTALLEDBY (string10) Unique: **1** Null/Zero/Neg: **6,802 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	2	0%

LASTEDITOR (string50) Unique: **3** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
10 Characters:	6,766	99%
3 Characters:	38	1%

Most Occurring Values	% Length	Count	%
DPS146\jag	99%	6,705	99%

LASTUPDATE (datetime, 2016 to 2017, Avg=2016.98, StDev=0.15) Unique: **2,491** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
21 Characters:	6,737	99%
20 Characters:	47	1%
22 Characters:	16	0%
19 Characters:	4	0%

LINEDYEAR (string4) Unique: **25** Null/Zero/Neg: **6,402 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	402	6%
0 Characters:	17	0%

Most Occurring Values	% Length	Count	%
	93%	6,385	94%
2014	2%	94	1%

LINERTYPE (string20)

Unique: **4** Null/Zero/Neg: **1,287 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,113	75%
0 Characters:	1,238	18%
2 Characters:	396	6%
14 Characters:	8	0%

Most Occurring Values	% Length	Count	%
NONE	72%	5,113	75%
	21%	1,238	18%
CP	7%	396	6%

LININGCONTR (string250)

Unique: **2** Null/Zero/Neg: **6,802 / 0 / 0**

LOCDESC (string100)

Unique: **985** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
11 Characters:	1,225	18%
10 Characters:	1,203	18%
9 Characters:	1,139	17%
12 Characters:	923	14%
8 Characters:	644	9%
14 Characters:	365	5%
7 Characters:	364	5%
13 Characters:	243	4%
17 Characters:	99	1%
15 Characters:	96	1%

Most Occurring Values	% Length	Count	%
Baxter Blvd	2%	117	2%
Brighton Ave	1%	92	1%
Auburn St	1%	82	1%
Allen Ave	1%	73	1%

MAINSHAPE (string50)

Unique: **10** Null/Zero/Neg: **939 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	5,858	86%
8 Characters:	7	0%

Most Occurring Values	% Length	Count	%
C	85%	5,737	84%

MAINTBY (string10)

Unique: **4** Null/Zero/Neg: **2 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	6,164	91%
7 Characters:	618	9%
1 Characters:	16	0%
3 Characters:	4	0%

Most Occurring Values	% Length	Count	%
CITY	92%	6,164	91%
PRIVATE	8%	618	9%

MATERIAL (string20)

Unique: **20** Null/Zero/Neg: **648 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	5,064	74%
2 Characters:	1,086	16%
4 Characters:	6	0%

Most Occurring Values	% Length	Count	%
VCP	41%	2,709	40%
PVC	22%	1,568	23%
AC	11%	661	10%
RCP	11%	652	10%
BR	5%	341	5%
DIP	1%	71	1%

MEDIAREF (string255)

Unique: **1,612** Null/Zero/Neg: **55 / 0 / 0**

Most Occurring Lengths	Count	%
14 Characters:	5,343	79%
7 Characters:	1,218	18%
15 Characters:	43	1%
0 Characters:	36	1%
9 Characters:	31	0%
13 Characters:	22	0%
4 Characters:	22	0%
10 Characters:	21	0%
16 Characters:	20	0%
30 Characters:	11	0%

OBJECTID *UNIQUE* (int32, 1 to 52080, Avg=4807.83, StDev=6225.69)

Unique: **6,804** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,582	82%
3 Characters:	806	12%
5 Characters:	324	5%
2 Characters:	83	1%
1 Characters:	9	0%

OWNEDBY (string10)

Unique: **5** Null/Zero/Neg: **152 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,927	87%
7 Characters:	482	7%
3 Characters:	227	3%
1 Characters:	12	0%
5 Characters:	4	0%

Most Occurring Values	% Length	Count	%
CITY	88%	5,927	87%
PRIVATE	6%	482	7%
WAT	5%	227	3%

SHAPE (byte[])

Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SHAPE_Length (double, 1.64 to 1535.0, Avg=179.77, StDev=102.55)

Unique: **6,802** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
16 Characters:	6,103	90%
15 Characters:	617	9%
14 Characters:	78	1%
13 Characters:	5	0%

SLOPE (double, 0.0/0.0 to 303.0, Avg=1.93/1.94, StDev=8.03/8.03)

Unique: **1,079** Null/Zero/Neg: **2,522 / 2 / 0**

Most Occurring Lengths	Count	%
3 Characters:	1,896	28%
4 Characters:	1,080	16%
5 Characters:	652	10%
1 Characters:	395	6%
6 Characters:	241	4%
7 Characters:	9	0%
2 Characters:	9	0%

Most Occurring Values	% Length	Count	%
0.4	4%	227	3%
0.3	2%	113	2%

SLOPELENGTH (double, 0.0 to 830.0, Avg=193.29, StDev=92.83)

Unique: **2,120** Null/Zero/Neg: **2,286 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	2,145	32%
6 Characters:	923	14%
5 Characters:	868	13%
2 Characters:	404	6%
4 Characters:	166	2%
1 Characters:	12	0%

SUMFLOW (double)

Unique: **0** Null/Zero/Neg: **6,804 / 0 / 0**

SURVEYREF (string255)

Unique: **6** Null/Zero/Neg: **6,799 / 0 / 0**

Most Occurring Lengths	Count	%
0 Characters:	14	0%
14 Characters:	3	0%

Most Occurring Values	% Length	Count	%
	100%	6,785	100%

TOMH (string11)

Unique: **5,422** Null/Zero/Neg: **3 / 0 / 0**

Most Occurring Lengths	Count	%
9 Characters:	6,801	100%

UPELEV (double, -11.88/1.27 to 172.63, Avg=67.65/70.5, StDev=42.91/41.26)

Unique: **555** Null/Zero/Neg: **6,233 / 0 / 22**

Most Occurring Lengths	Count	%
5 Characters:	343	5%
6 Characters:	103	2%
4 Characters:	95	1%
3 Characters:	17	0%
2 Characters:	13	0%

WATERTYPE (string30)

Unique: **3** Null/Zero/Neg: **90 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	3,920	58%
6 Characters:	2,791	41%
5 Characters:	3	0%

Most Occurring Values	% Length	Count	%
Combined	59%	3,920	58%
Sewage	40%	2,791	41%

WIDTH (double, -1.0/2.0 to 120.0, Avg=13.71/13.72, StDev=10.37/10.37) Unique: **32** Null/Zero/Neg: **940 / 0 / 1**

Most Occurring Lengths	Count	%
2 Characters:	3,239	48%
1 Characters:	2,624	39%

Most Occurring Values	% Length	Count	%
8	38%	2,500	37%
12	12%	824	12%
10	10%	655	10%
15	7%	484	7%
24	5%	375	6%
18	5%	367	5%
30	2%	161	2%
6	1%	105	2%
48	1%	69	1%

ssLateralLine Table - 118 records

Edge

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	100%	0%	0%	DIAMETER	28%	0%	0%	DISTANCE	0%	0%	0%
ENABLED	100%	0%	0%	*FACILITYID	100%			FACILITYID_OLD	6%		
*GlobalID	100%	0%	0%	INSTALLDATE	5%	0%	0%	LASTEDITOR	100%		
LASTUPDATE	100%	0%	0%	LINETYPE	100%			LOCDESC	90%		
MAINTBY	100%			MATERIAL	29%			*OBJECTID	100%	0%	0%
OWNEDBY	54%			SHAPE	100%	0%	0%	SHAPE_Length	100%	0%	0%
WATERTYPE	100%										

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
1 (True)	100%	118	100%

DIAMETER (double, 4.0 to 10.0, Avg=5.94, StDev=1.46)

Unique: **4** Null/Zero/Neg: **85 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	32	27%

Most Occurring Values	% Length	Count	%
6 (6")	10%	19	16%
4 (4")	11%	8	7%
8 (8")	2%	5	4%

DISTANCE (int32)

Unique: **0** Null/Zero/Neg: **118 / 0 / 0**

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
1 (True)	100%	118	100%

FACILITYID *UNIQUE* (string20)

Unique: **118** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **7** Null/Zero/Neg: **111 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	7	6%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **118** Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime, 1959 to 2014, Avg=1989.83, StDev=26.1)

Unique: **5** Null/Zero/Neg: **112 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	4	3%
9 Characters:	2	2%

Most Occurring Values	% Length	Count	%
1/1/1959 12:00:00 AM	1%	2	2%

LASTEDITOR (string50)

Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	90	76%
10 Characters:	28	24%

Most Occurring Values	% Length	Count	%
JAG	81%	90	76%
DPS146\jag	19%	28	24%

LASTUPDATE (datetime, 2017 to 2017, Avg=2017.0, StDev=0.0)

Unique: **13** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
21 Characters:	67	57%
22 Characters:	51	43%

Most Occurring Values	% Length	Count	%
10/13/2017 9:28:10 AM	15%	23	19%
10/13/2017 10:04:29 AM	22%	21	18%
10/13/2017 9:33:18 AM	13%	20	17%
10/13/2017 10:04:30 AM	14%	12	10%
10/13/2017 10:04:28 AM	8%	10	8%
10/13/2017 9:31:18 AM	7%	9	8%
10/13/2017 10:04:31 AM	9%	8	7%
10/13/2017 9:28:09 AM	2%	3	3%
10/13/2017 9:31:17 AM	2%	3	3%
10/13/2017 9:33:16 AM	1%	3	3%

LINETYPE (string30)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
NONE	100%	118	100%

LOCDESC (string100)

Unique: **35** Null/Zero/Neg: **12 / 0 / 0**

Most Occurring Lengths	Count	%
12 Characters:	31	26%
11 Characters:	17	14%
9 Characters:	16	14%
10 Characters:	13	11%
14 Characters:	11	9%
8 Characters:	10	8%
7 Characters:	3	3%
13 Characters:	2	2%

Most Occurring Values	% Length	Count	%
GLENRIDGE DR	17%	15	13%
POWSLAND ST	11%	14	12%
BEDFORD ST	5%	8	7%
WHITE BIRCH LN	5%	6	5%
MORSE ST	4%	5	4%
WASHINGTON AVE	4%	5	4%
WARREN AVE	5%	4	3%
Park Ave	3%	3	3%
Warren Av	6%	3	3%
Forest Av	1%	2	2%

MAINTBY (string10)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
CITY	100%	118	100%

MATERIAL (string20)

Unique: **3** Null/Zero/Neg: **84 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	32	27%
4 Characters:	2	2%

Most Occurring Values	% Length	Count	%
VCP	11%	22	19%
PVC	11%	10	8%
CIPP	1%	2	2%

OBJECTID *UNIQUE* (int32, 801 to 8002, Avg=3767.82, StDev=1880.95)

Unique: **118** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	104	88%
3 Characters:	14	12%

OWNEDBY (string10)

Unique: **2** Null/Zero/Neg: **54 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	55	47%
7 Characters:	9	8%

Most Occurring Values	% Length	Count	%
1	39%	55	47%
PRIVATE	7%	9	8%

SHAPE (byte[])

Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SHAPE_Length (double, 5.95 to 314.32, Avg=63.81, StDev=49.0)

Unique: **116** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
16 Characters:	107	91%
15 Characters:	9	8%
14 Characters:	2	2%

Most Occurring Values	% Length	Count	%
115.8726077055	3%	2	2%
95.2474025726519	3%	2	2%

WATERTYPE (string30)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
Sewage	100%	118	100%

ssManhole Table - 6,370 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACCESSDIAM	4%	0%	0%	ACTIVEFLAG	100%	0%	0%	ADMINAREA	100%		
CATCHMENT	0%			COMMENTS	100%			CONDITION	0%	0%	0%
CUTDEPTH	0%	0%	0%	CVTYPE	0%			ENABLED	100%	0%	0%
ESOURCE	96%	0%	0%	FACILITYID	100%			FACILITYID_OLD	94%		
FLOWDIR	0%			*GlobalID	100%	0%	0%	GPSDATE	0%	0%	0%
GRADE	0%			HIGHELEV	0%	0%	0%	INSTALLDATE	77%	0%	3%
INSTALLEDBY	0%			INVERT	0%	0%	0%	INVERTELEV	0%	0%	0%
LASTEDITOR	100%			LASTUPDATE	100%	0%	0%	LINED	0%		
LOCDESC	89%			MAINTBY	100%			MEDIAREF	100%		
MHTYPE	93%			*OBJECTID	100%	0%	0%	OWNEDBY	96%		
RIMELEV	27%	0%	0%	SHAPE	100%	0%	0%	SUMFLOW	0%	0%	0%
SURVEYREF	0%			WALLMAT	0%			WATERTYPE	97%		

ACCESSDIAM (int16, 24 to 72, Avg=24.17, StDev=2.88)

Unique: **2** Null/Zero/Neg: **6,093 / 0 / 0**

Most Occurring Lengths	Count	%
2 Characters:	277	4%

Most Occuring Values	Count	%
24	276	4%

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	6,370	100%

ADMINAREA (string20)

Unique: **5** Null/Zero/Neg: **11 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6,359	100%

Most Occuring Values	Count	%
3	1,628	26%
5	1,601	25%
4	1,449	23%
1	1,097	17%
2	584	9%

CATCHMENT (string30)

Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

COMMENTS (string250)

Unique: **427** Null/Zero/Neg: **21 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	4,719	74%
21 Characters:	580	9%
27 Characters:	342	5%
28 Characters:	124	2%
29 Characters:	76	1%
22 Characters:	75	1%
34 Characters:	43	1%
24 Characters:	40	1%
20 Characters:	38	1%
19 Characters:	34	1%

Most Occuring Values	Count	%
None	4,700	74%
field verify location	576	9%

CONDITION (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **6,354 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	16	0%

CUTDEPTH (double)

Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

CVTYPE (string20)

Unique: **1** Null/Zero/Neg: **6,369 / 0 / 0**

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	6,370	100%

ESOURCE (int16, 3 to 9, Avg=8.94, StDev=0.49)

Unique: **6** Null/Zero/Neg: **279 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	6,091	96%

Most Occuring Values	Count	%
9	5,967	94%
7	69	1%

FACILITYID (string20)

Unique: **6,360** Null/Zero/Neg: **0 / 0 / 0**

ssManhole Table - 6,370 records

Junction

FACILITYID_OLD (string20) Unique: **5,989** Null/Zero/Neg: **374 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,943	93%
5 Characters:	53	1%

FLOWDIR (string25) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

GlobalID *UNIQUE* (guid, to , Avg=, StDev=) Unique: **6,370** Null/Zero/Neg: **0 / 0 / 0**

GPSDATE (datetime) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

GRADE (string5) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

HIGHELEV (double, 38.34 to 95.65, Avg=52.63, StDev=19.17) Unique: **11** Null/Zero/Neg: **6,359 / 0 / 0**

Most Occurring Lengths	Count	%
5 Characters:	11	0%

INSTALLDATE (datetime, 1870/1900 to 2016, Avg=1960.37/1962.97, StDev= Unique: **152** Null/Zero/Neg: **1,473 / 0 / 177**

Most Occurring Lengths	Count	%
8 Characters:	4,819	76%
9 Characters:	78	1%

Most Occuring Values	Count	%
1/1/1977 12:00:00 AM	198	3%
1/1/1973 12:00:00 AM	132	2%
1/1/1976 12:00:00 AM	112	2%
1/1/1924 12:00:00 AM	99	2%
1/1/1963 12:00:00 AM	98	2%
1/1/1956 12:00:00 AM	89	1%
1/1/1953 12:00:00 AM	74	1%
1/1/1972 12:00:00 AM	69	1%
1/1/1974 12:00:00 AM	64	1%

INSTALLEDBY (string10) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

INVERT (double, -0.99/38.63 to 90.15, Avg=42.29/71.12, StDev=44.26/28.28) Unique: **5** Null/Zero/Neg: **6,365 / 0 / 2**

Most Occurring Lengths	Count	%
5 Characters:	5	0%

INVERTELEV (double, -2.08/38.24 to 100.9, Avg=38.96/51.19, StDev=28.02/18.09) Unique: **13** Null/Zero/Neg: **6,357 / 0 / 3**

Most Occurring Lengths	Count	%
5 Characters:	12	0%

LASTEDITOR (string50) Unique: **3** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
10 Characters:	6,287	99%
3 Characters:	83	1%

Most Occuring Values	Count	%
DPS146\jag	6,283	99%
JAG	83	1%

LASTUPDATE (datetime, 2017 to 2017, Avg=2017.0, StDev=0.0) Unique: **6,316** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
22 Characters:	5,265	83%
21 Characters:	1,105	17%

LINED (string3) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

LOCDESC (string100) Unique: **858** Null/Zero/Neg: **715 / 0 / 0**

Most Occurring Lengths	Count	%
11 Characters:	1,161	18%
10 Characters:	1,083	17%
9 Characters:	974	15%
12 Characters:	697	11%
8 Characters:	561	9%
7 Characters:	328	5%
14 Characters:	275	4%
13 Characters:	248	4%
6 Characters:	73	1%
15 Characters:	69	1%

Most Occuring Values	Count	%
	708	11%
BAXTER BLVD	113	2%
BRIGHTON AVE	69	1%

MAINTBY (string10) Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
CITY	6,370	100%

MEDIAREF (string255) Unique: **1,391** Null/Zero/Neg: **10 / 0 / 0**

Most Occurring Lengths	Count	%
14 Characters:	4,001	63%
4 Characters:	2,263	36%
9 Characters:	27	0%
15 Characters:	22	0%
10 Characters:	19	0%
13 Characters:	17	0%
0 Characters:	10	0%
16 Characters:	3	0%
56 Characters:	2	0%
12 Characters:	2	0%

MHTYPE (string15) Unique: **4** Null/Zero/Neg: **423 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	5,947	93%

Most Occuring Values	Count	%
STD	5,933	93%

OBJECTID *UNIQUE* (int32, 1 to 47807, Avg=4277.24, StDev=5675.88) Unique: **6,370** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,050	79%
3 Characters:	884	14%
5 Characters:	341	5%
2 Characters:	86	1%
1 Characters:	9	0%

OWNEDBY (string10) Unique: **5** Null/Zero/Neg: **277 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	5,444	85%
7 Characters:	366	6%
1 Characters:	156	2%
3 Characters:	125	2%
5 Characters:	2	0%

Most Occuring Values	Count	%
CITY	5,444	85%
PRIVATE	366	6%
1	156	2%
WAT	125	2%

RIMELEV (double, 3.28 to 195.0, Avg=83.26, StDev=38.49) Unique: **1,459** Null/Zero/Neg: **4,675 / 0 / 0**

Most Occurring Lengths	Count	%
5 Characters:	881	14%
4 Characters:	331	5%
6 Characters:	274	4%
2 Characters:	109	2%
3 Characters:	95	1%
8 Characters:	4	0%

SHAPE (byte[]) Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

SUMFLOW (double) Unique: **0** Null/Zero/Neg: **6,370 / 0 / 0**

SURVEYREF (string255) Unique: **1** Null/Zero/Neg: **6,368 / 0 / 0**

Most Occurring Lengths	Count	%
14 Characters:	2	0%

WALLMAT (string25) Unique: **1** Null/Zero/Neg: **6,354 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	16	0%

WATERTYPE (string30) Unique: **3** Null/Zero/Neg: **172 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	3,562	56%
6 Characters:	2,632	41%
5 Characters:	4	0%

Most Occuring Values	Count	%
Combined	3,562	56%
Sewage	2,632	41%

ssNetworkStructure Table - 142 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACCESSDIAM	7%	0%	0%	ACTIVEFLAG	100%	0%	0%	ADMINAREA	100%		
AncillaryRole	7%	7%	0%	CATCHMENT	0%			COMMENTS	100%		
CONDITION	0%			CONDITION_1	0%	0%	0%	CUTDEPTH	0%	0%	0%
ENABLED	100%	0%	0%	ESOURCE	93%	0%	0%	*FACILITYID	100%		
FACILITYID_OLD	93%			*GlobalID	100%	0%	0%	GPSDATE	0%	0%	0%
INSTALLDATE	39%	0%	0%	INSTALLEDBY	0%			INVERT	0%	0%	0%
INVERTELEV	0%	0%	0%	LASTEDITOR	100%			*LASTUPDATE	100%	0%	0%
LOCDESC	100%			MAINTBY	100%			MEDIAREF	100%		
*OBJECTID	100%	0%	0%	OWNEDBY	92%			RIMELEV	1%	0%	0%
SHAPE	100%	0%	0%	STRUCTTYPE	71%			SURVEYREF	0%		
WATERTYPE	100%										

ACCESSDIAM (int16, 24 to 24, Avg=24.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **132 / 0 / 0**

Most Occurring Lengths	Count	%
2 Characters:	10	7%

Most Occuring Values	Count	%
24	10	7%

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	142	100%

ADMINAREA (string20)

Unique: **5** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
3	38	27%
5	36	25%
4	30	21%
1	29	20%
2	9	6%

AncillaryRole (int16, 0/0 to 0, Avg=0.0/0.0, StDev=0.0/0.0)

Unique: **1** Null/Zero/Neg: **132 / 10 / 0**

Most Occurring Lengths	Count	%
1 Characters:	10	7%

Most Occuring Values	Count	%
0	10	7%

CATCHMENT (string30)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

COMMENTS (string250)

Unique: **98** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
20 Characters:	17	12%
4 Characters:	15	11%
27 Characters:	14	10%
28 Characters:	10	7%
31 Characters:	9	6%
21 Characters:	9	6%
16 Characters:	8	6%
24 Characters:	6	4%
41 Characters:	4	3%
22 Characters:	4	3%

Most Occuring Values	Count	%
private pump station	17	12%
None	13	9%
field verify location	5	4%
diversion chamber	3	2%
overflow chamber	3	2%
overflow structure	3	2%
pump station	3	2%
distribution box	2	1%
diversion structure	2	1%
Franklin & Anderson Interceptor Diversion	2	1%

CONDITION (string10)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

CONDITION_1 (int16)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

CUTDEPTH (double)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
1 (True)	142	100%

ESOURCE (int16, 9 to 9, Avg=9.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **10 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	132	93%

Most Occuring Values	Count	%
9	132	93%

FACILITYID *UNIQUE* (string20)

Unique: **142** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **132** Null/Zero/Neg: **10 / 0 / 0**

Most Occurring Lengths	Count	%
2 Characters:	79	56%
3 Characters:	44	31%
1 Characters:	9	6%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **142** Null/Zero/Neg: **0 / 0 / 0**

GPSDATE (datetime)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

INSTALLDATE (datetime, 1922 to 2015, Avg=1981.62, StDev=18.29)

Unique: **30** Null/Zero/Neg: **86 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	56	39%

Most Occuring Values	Count	%
1/1/1977 12:00:00 AM	9	6%
1/1/1973 12:00:00 AM	4	3%
1/1/1980 12:00:00 AM	4	3%
1/1/1961 12:00:00 AM	3	2%
1/1/1962 12:00:00 AM	3	2%
1/1/1976 12:00:00 AM	3	2%
1/1/1998 12:00:00 AM	3	2%
1/1/2009 12:00:00 AM	3	2%
1/1/1988 12:00:00 AM	2	1%
1/1/2001 12:00:00 AM	2	1%

INSTALLEDBY (string10)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

INVERT (double)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

INVERTELEV (double)

Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

LASTEDITOR (string50)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
JAG	142	100%

LASTUPDATE *UNIQUE* (datetime, 2017 to 2017, Avg=2017.0, StDev=0.0)

Unique: **142** Null/Zero/Neg: **0 / 0 / 0**

LOCDESC (string100)

Unique: **84** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
11 Characters:	22	15%
12 Characters:	21	15%
10 Characters:	21	15%
9 Characters:	19	13%
14 Characters:	18	13%
13 Characters:	12	8%
8 Characters:	7	5%
15 Characters:	5	4%
23 Characters:	4	3%
7 Characters:	4	3%

Most Occuring Values	Count	%
Forest Ave	8	6%
Mcalister Farm	8	6%
Congress St	6	4%
Partridge Cir	6	4%
Commercial St	5	4%
Baxter Blvd	4	3%
Plymouth St	4	3%
Riverside St	4	3%
Marginal Way	3	2%
Ocean Ave	3	2%

MAINTBY (string10)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occuring Values	Count	%
CITY	142	100%

MEDIAREF (string255)

Unique: **81** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
14 Characters:	96	68%
4 Characters:	40	28%
16 Characters:	2	1%
15 Characters:	2	1%
13 Characters:	2	1%

Most Occuring Values	Count	%
None	40	28%
00969_011__002	8	6%
00501_003__052	3	2%
00916_009__001	3	2%
00501_003__017	2	1%
00501_003__022	2	1%
00502_004__012	2	1%
00564_005__001	2	1%
00647_014__001	2	1%
00919_005__001	2	1%

ssNetworkStructure Table - 142 records

Junction

OBJECTID *UNIQUE* (int32, 1 to 4538, Avg=230.94, StDev=658.13) Unique: **142** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
2 Characters:	87	61%
3 Characters:	37	26%
4 Characters:	9	6%
1 Characters:	9	6%

OWNEDBY (string10) Unique: **3** Null/Zero/Neg: **11 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	89	63%
7 Characters:	32	23%
3 Characters:	10	7%

Most Occuring Values	Count	%
CITY	89	63%
PRIVATE	32	23%
WAT	10	7%

RIMELEV (double, 12.0 to 19.89, Avg=15.94, StDev=5.58) Unique: **2** Null/Zero/Neg: **140 / 0 / 0**

SHAPE (byte[]) Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

STRUCTTYPE (string30) Unique: **14** Null/Zero/Neg: **41 / 0 / 0**

Most Occurring Lengths	Count	%
12 Characters:	66	46%
17 Characters:	19	13%
15 Characters:	6	4%
13 Characters:	3	2%
16 Characters:	2	1%
11 Characters:	2	1%

Most Occuring Values	Count	%
Pump Station	45	32%
Diversion Chamber	19	13%
Flow Control	19	13%
Sewer Regulator	4	3%
Grease Separator	2	1%
Grease Trap	2	1%
Split Manhole	2	1%
Tide Chamber	2	1%

SURVEYREF (string255) Unique: **0** Null/Zero/Neg: **142 / 0 / 0**

WATERTYPE (string30) Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
6 Characters:	72	51%
8 Characters:	70	49%

Most Occuring Values	Count	%
Sewage	72	51%
Combined	70	49%

ssPressurizedMain Table - 78 records

Edge

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

ACTIVEFLAG	100%	0%	0%	ADMINAREA	100%			CATCHMENT	0%		
COMMENTS	100%			CONDITION	0%	0%	0%	DIAMETER	85%	0%	0%
DOWNELEV	15%	0%	0%	ENABLED	100%	0%	0%	ESOURCE	100%	0%	0%
*FACILITYID	100%			FACILITYID_OLD	99%			FROMMH	92%		
*GlobalID	100%	0%	0%	INSTALLDATE	50%	0%	0%	INSTALLEDBY	0%		
LASTEDITOR	100%			LASTUPDATE	100%	0%	0%	LINEDYEAR	0%		
LINERTYPE	0%			LININGCONTR	0%			LOCDESC	100%		
MAINSHAPE	0%			MAINTBY	100%			MATERIAL	38%		
MEASUREMENT1	0%	0%	0%	MEASUREMENT2	0%	0%	0%	MEDIAREF	1%		
*OBJECTID	100%	0%	0%	OWNEDBY	100%			SHAPE	100%	0%	0%
*SHAPE_Length	100%	0%	0%	SLOPE	1%	0%	0%	SLOPELENGTH	6%	0%	0%
SUMFLOW	0%	0%	0%	SURVEYREF	0%			TOMH	95%		
UPELEV	14%	0%	0%	WATERTYPE	100%						

ACTIVEFLAG (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
1 (True)	100%	78	100%

ADMINAREA (string20)

Unique: **5** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
5	49%	43	55%
3	22%	16	21%
1	19%	10	13%
4	8%	8	10%

CATCHMENT (string30)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

COMMENTS (string250)

Unique: **28** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	47	60%
28 Characters:	5	6%
42 Characters:	4	5%
27 Characters:	3	4%
26 Characters:	2	3%
21 Characters:	2	3%

Most Occurring Values	% Length	Count	%
None	59%	47	60%
Incomplete GIS for these pressurized mains	1%	4	5%
precast concrete cylinder?	13%	2	3%

CONDITION (int16)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

DIAMETER (double, 2.0 to 999.0, Avg=39.82, StDev=171.26)

Unique: **15** Null/Zero/Neg: **12 / 0 / 0**

Most Occurring Lengths	Count	%
1 Characters:	48	62%
2 Characters:	16	21%
3 Characters:	2	3%

Most Occurring Values	% Length	Count	%
2 (2")	7%	13	17%
3 (3")	15%	13	17%
4 (4")	15%	11	14%
8 (8")	6%	6	8%
6 (6")	5%	5	6%
33 (33")	14%	4	5%
16 (16")	9%	2	3%
24 (24")	2%	2	3%
27 (27")	13%	2	3%
48 (48")	3%	2	3%

DOWNELEV (double, 4.0 to 130.6, Avg=72.31, StDev=50.65)

Unique: **12** Null/Zero/Neg: **66 / 0 / 0**

Most Occurring Lengths	Count	%
6 Characters:	4	5%
2 Characters:	4	5%
5 Characters:	2	3%

ENABLED (int16, 1 to 1, Avg=1.0, StDev=0.0)

Unique: **1** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
1 (True)	100%	78	100%

ESOURCE (int16, 3 to 9, Avg=8.92, StDev=0.68)

Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Values	% Length	Count	%
9	100%	77	99%

FACILITYID *UNIQUE* (string20)

Unique: **78** Null/Zero/Neg: **0 / 0 / 0**

FACILITYID_OLD (string20)

Unique: **75** Null/Zero/Neg: **1 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	75	96%
3 Characters:	2	3%

Most Occurring Values	% Length	Count	%
7133	9%	2	3%
7160	13%	2	3%

FROMMH (string11)

Unique: **72** Null/Zero/Neg: **6 / 0 / 0**

Most Occurring Lengths	Count	%
9 Characters:	72	92%

GlobalID *UNIQUE* (guid, to , Avg=, StDev=)

Unique: **78** Null/Zero/Neg: **0 / 0 / 0**

INSTALLDATE (datetime, 1977 to 2013, Avg=1995.0, StDev=12.02)

Unique: **21** Null/Zero/Neg: **39 / 0 / 0**

Most Occurring Lengths	Count	%
8 Characters:	39	50%

Most Occurring Values	% Length	Count	%
1/1/1977 12:00:00 AM	22%	4	5%
1/1/1980 12:00:00 AM	3%	4	5%
1/1/2009 12:00:00 AM	1%	4	5%
1/1/2012 12:00:00 AM	2%	4	5%
1/1/1992 12:00:00 AM	5%	3	4%
1/1/2000 12:00:00 AM	2%	3	4%
1/1/1997 12:00:00 AM	1%	2	3%
1/1/2001 12:00:00 AM	1%	2	3%

INSTALLEDBY (string10)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

LASTEDITOR (string50)

Unique: **2** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
10 Characters:	69	88%
3 Characters:	9	12%

Most Occurring Values	% Length	Count	%
DPS146\jag	90%	69	88%
JDF	10%	9	12%

LASTUPDATE (datetime, 2016 to 2017, Avg=2016.88, StDev=0.32)

Unique: **32** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
22 Characters:	69	88%
19 Characters:	9	12%

Most Occurring Values	% Length	Count	%
10/16/2017 10:39:40 AM	5%	6	8%
10/16/2017 10:39:41 AM	11%	6	8%
10/16/2017 10:39:42 AM	7%	6	8%
10/16/2017 10:17:55 AM	6%	5	6%
10/16/2017 10:17:58 AM	15%	5	6%
9/7/2016 2:52:03 PM	7%	5	6%
10/16/2017 10:17:50 AM	5%	4	5%
10/16/2017 10:17:56 AM	3%	4	5%
10/16/2017 10:39:44 AM	3%	4	5%
10/16/2017 10:17:52 AM	2%	3	4%

LINEDYEAR (string4)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

LINERTYPE (string20)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

LININGCONTR (string250)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

LOCDESC (string100)

Unique: **50** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
12 Characters:	14	18%
10 Characters:	13	17%
9 Characters:	12	15%
13 Characters:	10	13%
11 Characters:	10	13%
8 Characters:	5	6%
14 Characters:	4	5%
15 Characters:	3	4%
28 Characters:	2	3%

Most Occurring Values	% Length	Count	%
Riverside St	20%	7	9%
Plymouth St	2%	5	6%
Forest Ave	3%	4	5%
Haverty's Way	2%	4	5%
Smith Farm Ln	1%	4	5%
Willow Ln	3%	3	4%
Cutter St	9%	2	3%
Lower Fore River Interceptor	13%	2	3%
Parsons Pond Dr	1%	2	3%
Pwd Treatment Plant	3%	2	3%

MAINSHAPE (string50)

Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

MAINTBY (string10)

Unique: **4** Null/Zero/Neg: **0 / 0 / 0**

Most Occurring Lengths	Count	%
4 Characters:	49	63%
7 Characters:	14	18%
3 Characters:	8	10%
1 Characters:	7	9%

Most Occurring Values	% Length	Count	%
CITY	64%	49	63%
PRIVATE	12%	14	18%
WAT	18%	8	10%
1	5%	7	9%

MATERIAL (string20) Unique: **5** Null/Zero/Neg: **48 / 0 / 0**

Most Occurring Lengths	Count	%
3 Characters:	28	36%
5 Characters:	2	3%

Most Occurring Values	% Length	Count	%
PVC	21%	11	14%
DIP	8%	9	12%
RCP	24%	7	9%
HTPEP	2%	2	3%

MEASUREMENT1 (double) Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

MEASUREMENT2 (double) Unique: **0** Null/Zero/Neg: **78 / 0 / 0**

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1 Characters:	9	12%
4 Characters:	2	3%

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4 Characters:	33	42%
3 Characters:	11	14%

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CITY	45%	33	42%
WAT	32%	11	14%

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SSMH-6112	1%	2	3%

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4 Characters:	2	3%
2 Characters:	2	3%

Most Occurring Values	% Length	Count	%
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ssTap Table - 5 records

Junction

Primary Key: NONE

Percent Populated / Zero / Negative Values per Field

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FACILITYID_OLD (string20)

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338.8624	2	40%

SHAPE (byte[])

Unique: **0** Null/Zero/Neg: **0 / 0 / 0**

ARCADIS Design & Consultancy for natural and built assets

Christopher C. Branch, P.E.
Director of Public Works

Via Electronic Mail
December 28, 2018

Mr. Alex Rosenberg, Compliance Officer
Office of Environmental Stewardship
U.S. Environmental Protection Agency – Region 1
5 Post Office Square – Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

Re: Inflow and Infiltration Phase 1 Report – 2018 Flow Monitoring

Dear Mr. Rosenberg:

As required in the Administrative Order Docket Number CWA-R1-AO-12-009, the City of Portland (City) is hereby submitting this Inflow and Infiltration Phase 1 Report for flow monitoring completed in 2018 as part of the Inflow and Infiltration Program. The Inflow and Infiltration Program was awarded to Arcadis through a Request for Qualification based process in May of 2017 and is currently on schedule for completion by April 2020 as required.

The attached report includes information regarding the two-year flow monitoring approach currently underway which will include the installation, maintenance, and monitoring of approximately 40 flow meters over two years. A second year of flow monitoring was planned to allow for potentially unfavorable weather conditions, the ability to meter small subsections of each sub-area, and time to allow for corrections to the City's GIS. This report summarizes the results of the first 20 flow meters for monitoring completed in 2018.

Currently, Arcadis is utilizing subcontractors Flow Assessment Services and Ted Berry Company to begin the Investigation of Major Inflow and Infiltration Sources as part of Phase 2 for areas identified in Phase 1 as having greater than 4,000 gallons per day per inch diameter/mile. Flow isolation for several areas has already been completed in December 2018. During the spring of 2019, Arcadis will continue working with Flow Assessment Services to complete additional flow monitoring work, including 11 more sub-areas, and to begin manhole inspections. Investigations to identify direct inflow will occur in the summer of 2019.

You may notice within the report that sub-area 13 is specifically called out as being investigated through another project and recommendations are not provided within Appendix C. Sub-area 13 was identified as an area that would benefit from a fast-tracked investigation because Combined Sewer Overflow (CSO) #42 is located within it. Past separation projects within this sub-area have not yielded enough reduction in flow to allow for the closure of the CSO. To achieve a more expedient result utilizing the same processes as the overall Inflow and Infiltration Program, the City added a specific task simply titled CSO 42. Arcadis has implemented Inflow and Inflow Program processes in a shorter time frame that the overall program which has included flow monitoring, large building investigations, smoke testing, and flow isolation. The City will continue to work with Arcadis to investigate Inflow and Infiltration in the sub-area and to determine the most efficient

method to reduce Inflow and Infiltration in order to close the CSO. Additional funding was added to the Payable Order and Arcadis has assigned separate resources to this task to ensure that it does not take away from the broader Inflow and Infiltration Program. You will find this project title within the invoices and status report included in the Annual Report to be submitted at the end of January.

The City continues to look forward to working with Arcadis and its subcontractors to identify sources of Inflow and Infiltration throughout the collection system. Should you have any questions or want to discuss this report or the program in general, please reach out to me at your convenience.

Thank you,

Benjamin Pearson

Benjamin N. Pearson, PE
Compliance Coordinator
Water Resources Division, Department of Public Works
bnp@portlandmaine.gov
207-874-8843

City of Portland, Maine

PHASE 1 INVESTIGATION OF FLOWS – 2018 MONITORING

DECEMBER 2018

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EXECUTIVE SUMMARY

On September 29, 2012, the United States Environmental Protection Agency (US EPA) issued an Order for Compliance and Complaint to the City of Portland for sanitary sewer overflows (SSOs) from non-permitted portions of the City's sewer collection system. In accordance with that Order, the City completed a "Capacity, Management, Operation and Maintenance (CMOM) and Corrective Action Plan" Report in November of 2013. The recommendations of the CMOM Report included an Infiltration/Inflow (I/I) Removal and Monitoring Program.

This report summarizes the results of Phase 1 of the I/I Program and provides recommendations for Phase 2 flow monitoring and investigations. In conjunction with the implementation of the flow monitoring program, Phase 1 includes engineering analysis of flow data, including calculation of average daily flow, peak daily flow and peak hourly flow, and estimation of infiltration and inflow for each meter area. Meter areas were evaluated and ranked by quantities of infiltration and inflow, and follow-on investigation recommendations were developed based on these evaluations and rankings.

The two-phase flow monitoring program includes installation, maintenance and monitoring of approximately 40 flow meters over a period of 2 years. This report summarizes the results of the first 20 meters. The program was planned as a 2-year program to allow for potentially unfavorable weather conditions (low precipitation or groundwater), the ability to meter small subsections of each sub-area in Year 2 (as established by the first year of data), and time to allow for corrections to the City's collection system mapping and pipeline connectivity.

Results and Recommendations

Based on the Phase 1 metering results summarized in Section 3.1 of this report and ongoing sewer system investigations, Phase 2 follow-on recommendations were developed. Recommendations, as detailed in Section 3 of this Report, include:

- Flow isolation of 194,740 linear feet (LF) of pipe
- Closed circuit television inspection (CCTV) of 27,611 LF of pipe
- Four hundred and forty-three (443) manhole inspections
- Implementation of a Spring 2019 flow monitoring program

Individual sub-area maps showing follow-on recommendations are included in Appendix C of this report.

In accordance with the Phase 1 metering results, flow isolation was completed in December 2018 and CCTV inspections are currently being conducted. Manhole inspections will be conducted in the Spring of 2019.

Investigations to identify direct inflow (i.e., smoke testing, dye testing and large building inspections), will be conducted in the Summer of 2019 upon completion of the Spring 2019 flow metering program.

The second phase of the flow monitoring program (Spring 2019), will include eleven (11) sub-areas that were not included in the first phase of flow metering. Metering data will be evaluated in the same fashion as the 2018 metering data (as presented herein), and follow-on investigations will be developed to further identify and eliminate I/I.

1 INTRODUCTION

1.1 Scope of Work

On September 29, 2012, the EPA issued an Order for Compliance and Complaint, including a proposed civil penalty, for sanitary sewer overflows (SSOs) from non-permitted portions of the City of Portland's collection system. In accordance with that Order, the City completed a "Capacity, Management, Operation and Maintenance (CMOM) and Corrective Action Plan" Report in November of 2013. The recommendations of the CMOM Report included an Infiltration/Inflow (I/I) Removal and Monitoring Program, as well as making improvements to the City's collection system GIS by supplementing and correcting data gaps. This I/I Program will address those recommendations and set the course for I/I mitigation and the City of Portland's continuing efforts to abate SSOs from the sanitary collection system.

This report summarizes the results of Phase 1 of the I/I Program, a comprehensive flow monitoring program, and provides recommendations for Phase 2, investigation and rehabilitation. Phase 1 includes development of a flow monitoring strategy that includes review of recommended meter sites from the CMOM report, identification of other suitable sites, field verification of these sites, recommendation of initial sites, installation of flow monitoring equipment and data collection and maintenance procedures for the flow monitoring equipment. In conjunction with implementation of the flow monitoring program, Phase 1 includes engineering analysis of flow data, including calculation of average daily flow, peak daily flow, peak hourly flow, infiltration and inflow for each meter area. Meter areas were ranked by quantity of infiltration and inflow and follow-on investigation recommendations were developed.

The flow monitoring program includes installation, maintenance and monitoring of 40 flow meters over a period of 2 years. This report summarizes the results of the first 20 meters installed. The program was planned as a 2-year program to allow for potentially unfavorable weather conditions (low precipitation or groundwater), the ability to meter small subsections of each sub-area in year 2 (if required based on the first's year's data), and time to allow for corrections to the City's collection system mapping and pipeline connectivity.

1.2 Collection System Background and Description

The City of Portland's wastewater collection system, shown on Figure 1, contains approximately 240 miles of separated and combined sewers and 24 pump stations, 9 of which are owned and operated by the City. The collection system and pump stations convey wastewater to the East End Wastewater Treatment Facility (WWTF) in Portland, which is owned and operated by the Portland Water District.

THE CITY OF PORTLAND, MAINE

Phase 1: Investigation of Flows - 2018 Monitoring

0 0.25 0.5 1 Miles

December 2018

FIGURE 1 - CITY OF PORTLAND COLLECTION SYSTEM MAP

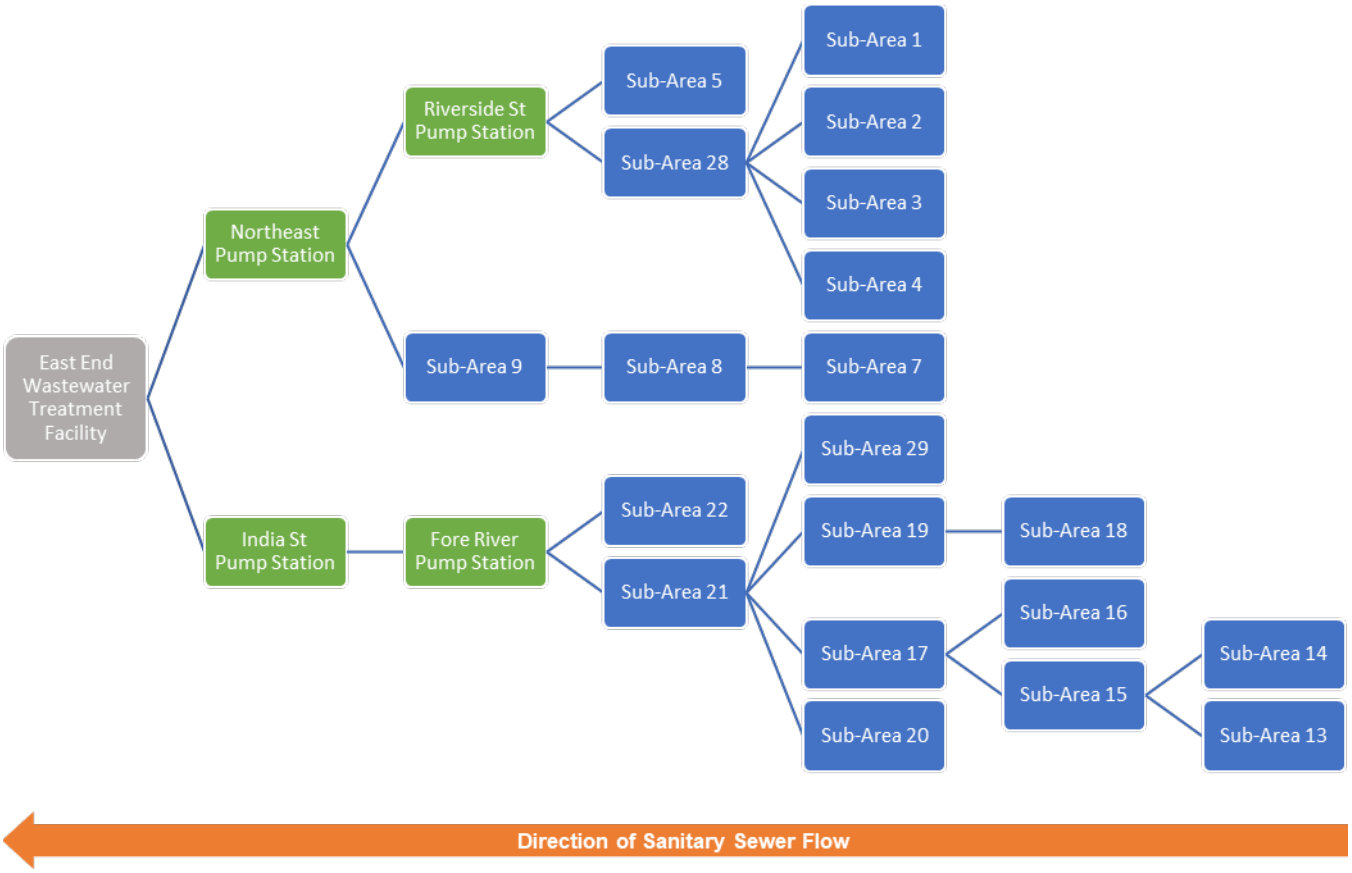
ARCADIS Design & Consultancy for natural and built assets

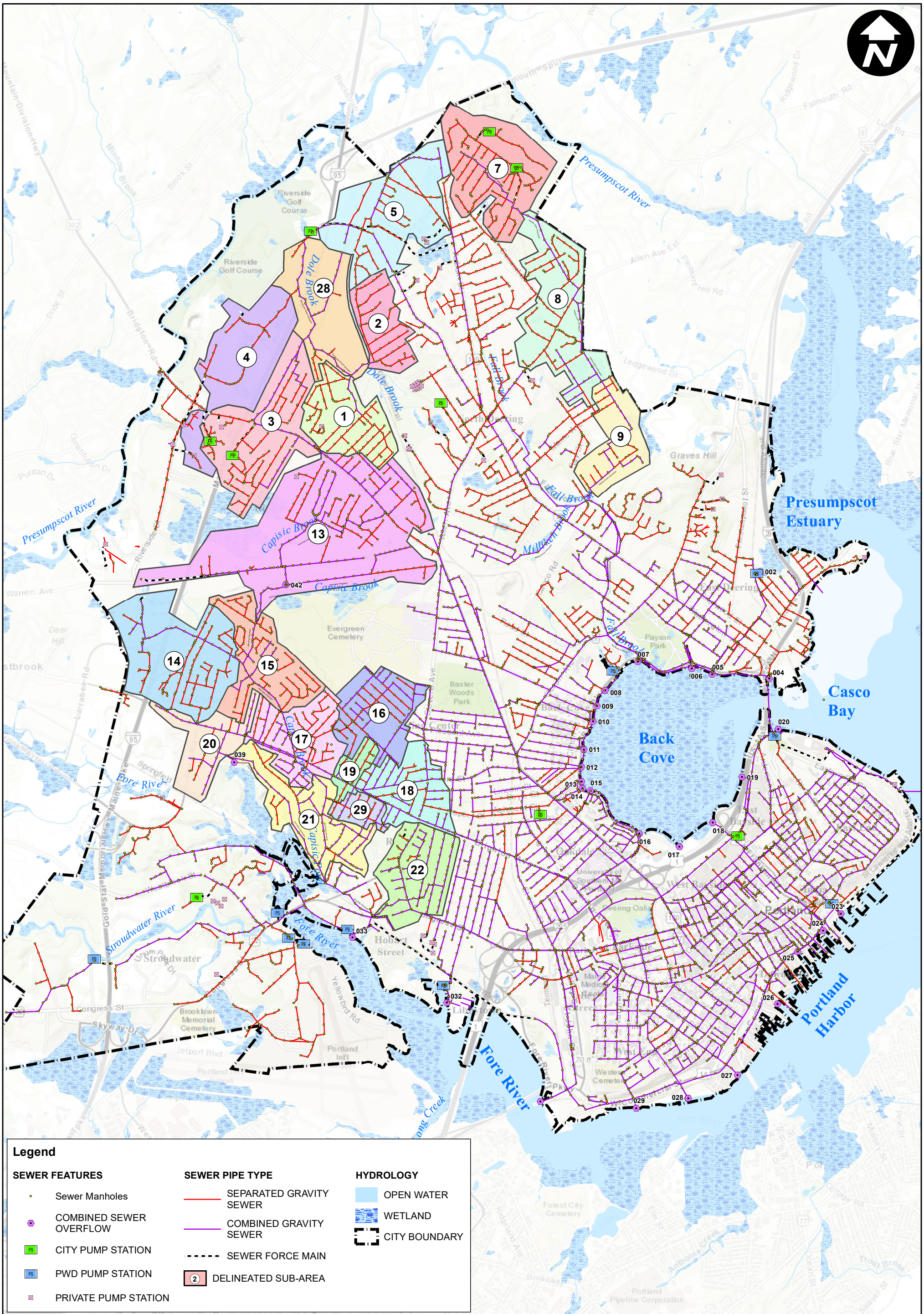
G:\GIS\Portland\2018 I-I Report\FIGURE 1 - CITYWIDE SANITARY SEWER SYSTEM.mxd

1.2.1 Sub-Area Delineation

The first phase of the metering program included the delineation of 20 sub-areas throughout the City. Due to ongoing sewer separation projects and the extent of combined sewers in the downtown area of Portland, efforts were focused on the north and west areas of the City. Prioritization of meter areas was based on recent and on-going flow monitoring and available CCTV data, historic and recently discovered problem areas where backups, surcharging and overflows occurred, areas tributary to known problem areas, areas where the hydraulic model identified potential I/I capacity issues, and areas near water bodies that could be contributing I/I to the system. Figure 2 shows a flow vector diagram for the 20 sub-areas included in the metering program. The flow vector diagram is a visual representation of tributary flow within the system. Sub-areas delineated and included in the 2018 metering program are shown on Figure 3.

Figure 2. Flow Vector Diagram





THE CITY OF PORTLAND, MAINE

Phase 1: Investigation of Flows - 2018 Monitoring

0 0.25 0.5 1 Miles

December 2018

FIGURE 3 - 2018 SUB-AREA DELINEATION

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 I-I Report\FIGURE 3 - 2018 SUB-AREA DELINEATION.mxd

2 2018 METERING ANALYSIS

In March 2018, Arcadis and its subcontractor, Flow Assessment Services (FAS) completed a 16-week flow monitoring program of 20 sub-areas throughout the City of Portland. Meters were installed by FAS in the most downstream manhole of each sub-area where hydraulic conditions were conductive for metering. Metering was performed using continuous monitoring devices incorporating depth and velocity sensors to measure velocity, depth and flow rate. Two record tipping bucket rain gauges measuring rainfall every fifteen minutes were installed on the roof of the Fore River Pump Station and the Riverton Fire Station. Rain gauge data was supplemented with data from the City-owned rainfall gauge at the Riverside Street Pump Station.

Two permanent groundwater monitoring wells were installed on May 6, 2018 at the intersection of Martin Street and Bartley Street and on Leland Street across from the Deering High School parking lot. Maintenance and data collection for the groundwater gauges, rainfall gauges and flow meters was conducted bi-weekly by Flow Assessment Services.

2.1 Wastewater Characteristics

There are three major components of wastewater flow in a sanitary sewer system, base sanitary flow (BSF), groundwater infiltration (GWI) and rainfall derived inflow and infiltration (RDII - commonly referred to as inflow). The Environmental Protection Agency's "Guide for Estimating Infiltration and Inflow", June 2014, provides the following definitions:

Base Sanitary Flow (BSF) – The portion of wastewater which includes domestic, commercial, institutional, and industrial sewage and specifically excludes infiltration and inflow.

Groundwater Infiltration (GWI) – Measured during average dry weather flow period. The average of the low nighttime flows (midnight to 6am) per day for the same time period, minus significant industrial or commercial nighttime users

Rainfall Induced Infiltration (RII) – The short term increase in infiltration which is the result of a rain event. Rainfall-induced infiltration is a portion of delayed inflow.

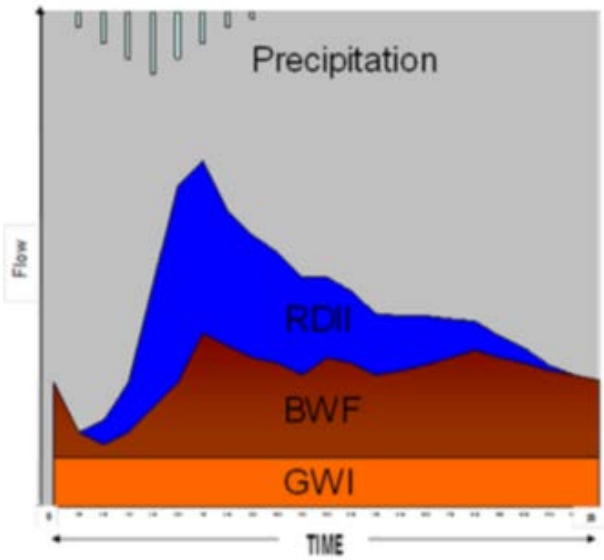
Delayed Inflow Volume – The portion of total inflow which is generated from indirect connections to the collection system or connections which produce inflow after a significant time delay from the beginning of a storm. Delayed inflow sources include: sump pumps, foundation drains, indirect sewer/drain cross connections, etc. Rainfall-induced infiltration cannot be distinguished from delayed inflow and is therefore included as part of delayed inflow. Delayed inflow sources have a gradual impact on the collection system and flow decreases gradually upon conclusion of the rainfall event, and after peak inflow caused by direct connections.

Inflow – Water other than sanitary wastewater that enters a sewer system from sources such as roof leaders, cellar/foundation drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, and catch basins. Inflow does not include infiltration.

Rainfall derived infiltration and inflow includes both rainfall-induced infiltration and inflow. Figure 4 highlights the three key components of wastewater flow during a precipitation event. The GWI (orange

line) remains constant and is not impacted by precipitation, the BWF (brown line) is a diurnal pattern based on actual usage and not impacted by precipitation, and the RDII (blue line) shows a very clear increase in flows as a direct response to precipitation.

Figure 4. Components of Wastewater Flow During Wet Weather (US EPA, 2007)



The City of Portland's collection system consists of approximately 240 miles of separated and combined sewers. A traditional infiltration and inflow analysis was conducted in the separated portion of the collection system, while a modified approach was used in the combined portion of the collection system. In the sub-areas where 75% or more of the collection system was separated, the I/I analysis focused on identifying groundwater infiltration, rainfall-induced infiltration and direct inflow. In the combined subareas, the I/I analysis focused on identifying groundwater infiltration and rainfall-induced infiltration (delayed inflow). Large volumes of direct inflow are expected in a combined system due to known cross connections between the sanitary system and the drainage system. While direct inflow values were calculated in these sub-areas, they were not used to develop follow-on investigation recommendations. Table 1 includes a summary of the total pipeline footage, percentage of combined pipes and the approach method for each sub-area.

Table 1. Sub-area Characteristics

Sub-area	Total Footage (LF)	Percent Combined (%)	Approach
Sub-Area 1	19,997	7%	Traditional
Sub-Area 2	11,918	2%	Traditional
Sub-Area 3	28,692	36%	Modified
Sub-Area 4	8,893	0%	Traditional
Sub-Area 5	21,962	16%	Traditional
Sub-Area 7	23,684	13%	Traditional
Sub-Area 8	25,297	40%	Modified
Sub-Area 9	10,989	53%	Modified
Sub-Area 13	48,470	57%	Modified
Sub-Area 14	23,488	24%	Traditional
Sub-Area 15	22,812	30%	Modified
Sub-Area 16	21,410	67%	Modified
Sub-Area 17	24,822	48%	Modified
Sub-Area 18	19,962	85%	Modified
Sub-Area 19	5,677	35%	Modified
Sub-Area 20	9,924	79%	Modified
Sub-Area 21	21,047	76%	Modified
Sub-Area 22	19,133	93%	Modified
Sub-Area 28	11,010	75%	Modified
Sub-Area 29	6,174	34%	Modified

2.2 Results and Findings

Table 2 identifies the average daily flow (ADF), peak daily flow (PDF) and peak hourly flow (PHF) measured from March 7, 2018 through July 16, 2018 for each of the twenty sub-areas. Average daily flow is calculated by summing all metered flows and dividing by the duration of the metering period. Peak daily flow is the maximum daily flow over 24-hours measured throughout the metering period. Peak hourly flow is the maximum 1-hour flow rate measured. Peaking factor is calculated by dividing the peak hourly flow by the average daily flow for each sub-area. Table 2 shows net average daily flow within each sub-area itself (with upstream tributary flows subtracted out), net peak daily flow, net peak hourly flow and the hourly peaking factor.

Table 2. Flow Metering Results – ADF, PDF, PHF

Sub-Area	Average Daily Flow (GPD)	Peak Daily Flow (GPD)	Peak Hourly Flow (GPD)	Hourly Peaking Factor
Sub-Area 1	147,060	382,063	870,000	6
Sub-Area 2	65,234	129,833	180,750	3
Sub-Area 3	170,348	296,042	570,000	3
Sub-Area 4	150,666	270,896	765,500	5
Sub-Area 5	184,123	398,698	630,750	3
Sub-Area 7	171,871	413,010	701,000	4
Sub-Area 8*	125,390	484,365	1,104,750	9
Sub-Area 9*	142,673	408,188	957,000	7
Sub-Area 13	680,228	1,779,313	2,589,750	4
Sub-Area 14	271,125	579,698	1,220,500	5
Sub-Area 15*	89,215	358,104	2,902,875	33
Sub-Area 16	425,703	1,472,542	4,129,000	10
Sub-Area 17*	67,371	319,948	1,257,500	19
Sub-Area 18	408,780	1,633,229	4,159,000	10
Sub-Area 19*	72,388	872,031	2,812,750	39
Sub-Area 20	247,097	2,416,948	7,569,000	31
Sub-Area 21*	115,428	1,489,417	1,607,250	14
Sub-Area 22	340,367	2,281,698	6,500,250	19
Sub-Area 28*	105,904	401,594	847,750	8
Sub-Area 29	112,546	865,542	2,859,000	25

*Denotes net values with tributary sub-areas subtracted.

Hyetographs showing average daily flow and rainfall for each of the 20 sub-areas are included in Appendix B.

2.3 Groundwater Infiltration

Groundwater infiltration is defined as groundwater that enters or leaks into a sanitary sewer system through defective pipes, pipe joints, service connections, or manholes. The average groundwater infiltration rate is defined as 85% of the nighttime sanitary flow measured on dry days from 12:00am to 6:00am throughout the entire metering period. Only data for days that follow a minimum of 72-hours without a rainfall event are considered “dry days” to avoid inclusion of indirect inflow and rainfall induced infiltration (RII) in the infiltration estimate.

Groundwater levels were monitored throughout the metering period using the two groundwater monitoring wells installed. The groundwater depth during the metering period was analyzed in relation to the average sewer pipe elevations in the area, as shown in Figure 5, as groundwater depth can have a significant influent on the amount of groundwater infiltration entering a collection system.

Groundwater infiltration for each sub-area is normalized by calculating the gallons per day per inch diameter mile of pipe (gpd/in-mi). The inch-diameter-mile of pipe, or inch-miles (in-mi), in a sub-area is calculated by multiplying the sum of the miles of for each diameter of pipe by its respective inch diameter. As an example, if a system contained 1 mile of 10-inch diameter, 1.5 miles of 12-inch diameter, and 0.5 miles of 25-inch diameter of gravity sewers, the calculated inch-miles would be as follows:

(10-inch x 1 mile) + (12-inch x 1.5 miles) + (24-inch x 0.5 mile) = 40 in-mi

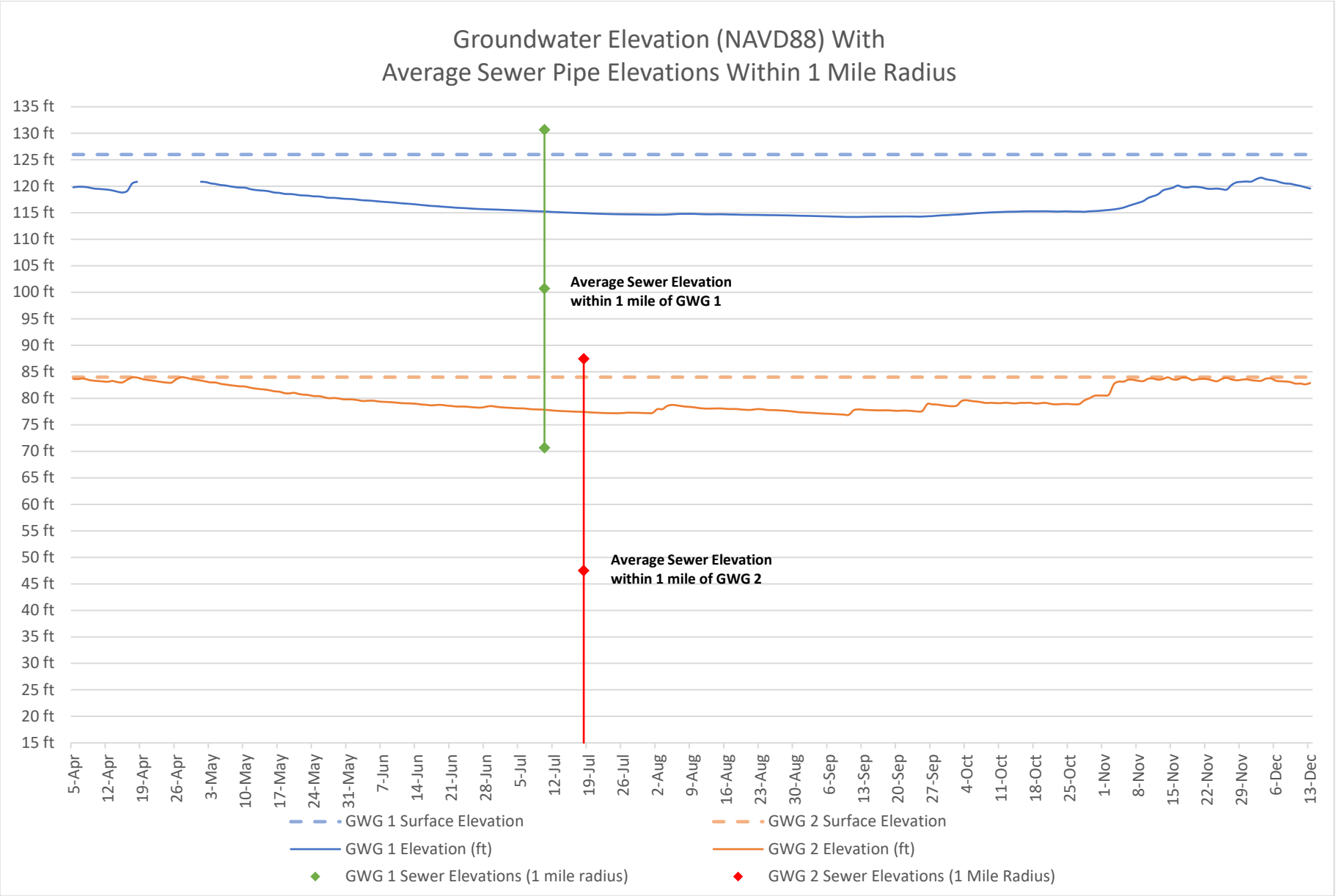
Groundwater infiltration rates for each sub-area were calculated by dividing the sub-area’s total groundwater infiltration by the number of inch-miles of sanitary sewer within the sub-area. The total groundwater infiltration rates for each sub-area during the metering period are shown in Table 3.

Table 3. Flow Metering Results – Infiltration

Sub-Area	Average Daily Flow (gpd)	Net Average Infiltration (gpd)	Infiltration GPD/Total LF (GPD/LF)	Gallons per Day per Inch-Mile (GPDIM)
Sub-Area 1	147,060	78,910	3.9	2,515
Sub-Area 2	65,234	36,879	3.1	1,884
Sub-Area 3	170,348	91,912	3.2	1,968
Sub-Area 4	150,666	83,726	9.4	6,055
Sub-Area 5	184,123	97,130	4.4	2,444
Sub-Area 7	171,871	97,191	4.1	2,505
Sub-Area 8 [1, 2]	125,390	69,114	2.7	1,355
Sub-Area 9 [1, 2]	142,673	75,325	6.9	2,427
Sub-Area 13	680,228	374,236	7.7	2,354
Sub-Area 14	271,125	152,698	6.5	3,489
Sub-Area 15 [1, 2]	89,215	66,479	2.9	1,411
Sub-Area 16	425,703	279,739	13.1	5,375
Sub-Area 17 [1, 2]	67,371	70,823	2.9	1,310
Sub-Area 18	408,780	209,635	10.5	4,487
Sub-Area 19 [1, 2]	72,388	43,517	7.7	2,469
Sub-Area 20	247,097	118,081	11.9	4,235
Sub-Area 21 [1, 2]	115,428	*N/A*	*N/A*	*N/A*
Sub-Area 22	340,367	128,450	6.7	2,367
Sub-Area 28 [1, 2]	105,904	50,821	9.6	1,527
Sub-Area 29	112,546	50,357	8.2	4,445

Notes: 1. Collects flows from tributary sub-areas 2. Flow meter results indicate some negative net flows when tributary sub-areas are subtracted. Further investigations will be done during the next phase to account for negative values.

Figure 5 - Groundwater Depth with Average Sewer Pipe Elevations



2.4 Rainfall Derived Infiltration and Inflow (RDII)

Four rainfall events from the metering period were analyzed to calculate rainfall derived infiltration and inflow. Precipitation data was used from rain gauges at the Riverside Road Pump Station, Riverton Fire Station and the Fore River Pump Station. Table 4 outlines the duration, total rainfall and peak intensity of the four selected storms. The rainfall data from the April 16, 2018 storm event was only available from the Riverside Pump Station rain gauge and therefore was used in the inflow analysis for all sub-areas for that storm event. For the additional three storm events, the analysis used rainfall data from the closest rain gauge to the flow meter. The Riverside Pump Station rain gauge serviced sub-areas 1, 2, 3, 4, 5, 7, 8 and 9. The Riverton Fire Station rain gauge serviced sub-areas 13, 14, 15, 16 and 17 and the Fore River Pump Station rain gauge serviced sub-areas 18, 19, 20, 21, 22, 28 and 29.

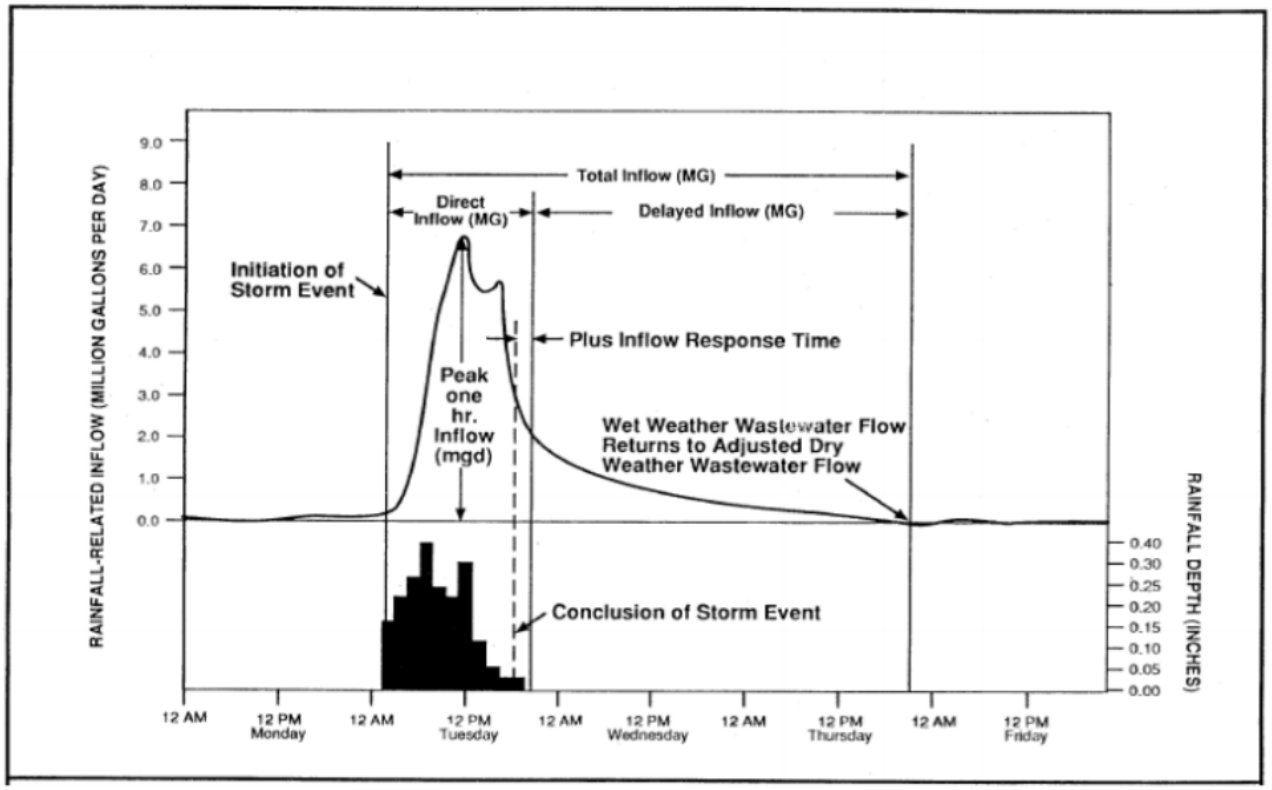
Table 4. Inflow Analysis – Selected Rainfall Events

Location	Rainfall Event	Duration (min)	Total Rainfall (in)	Peak Intensity (in/hr)
Riverside PS	4/16/18 8:00 AM	960	2.9	0.59
Riverside PS	4/25/18 12:45 PM	1215	2.59	0.48
Riverside PS	6/18/18 4:00 PM	165	1.07	0.77
Riverside PS	6/27/18 10:45 PM	1215	1.43	0.28
Riverton RG	4/25/18 12:45 PM	1230	1.67	0.29
Riverton RG	6/18/18 4:15 PM	165	1.13	0.85
Riverton RG	6/27/18 10:45 PM	1200	1.34	0.2
Fore River PS	4/25/18 12:45 PM	1245	1.76	0.28
Fore River PS	6/18/18 4:15 PM	135	0.96	0.75
Fore River PS	6/27/18 10:45 PM	1245	1.56	0.3

A wet weather hydrograph from each storm event was compared to a dry weather period on the same day of the week as each storm event. The dry weather flow is subtracted from the wet weather flow resulting in the inflow volumes presented in Table 5. The dry weather flow is calculated as an average of all dry days during the metering period for each day during the week. For example, all dry “Mondays” in the metering period are averaged together to determine the dry weather flow for each individual day.

The hydrograph shown as Figure 6 shows a typical inflow response to wet weather flow. The portion of inflow occurring during the storm event is identified as direct inflow and the portion of inflow that occurs once the storm has concluded is delayed inflow. Total inflow encompasses both direct and delayed inflow.

Figure 6. Wet Weather Hydrograph (MassDEP, 1993)



For the purposes of this study, direct inflow was calculated for all sub-areas; however, where the modified approach was used, only the delayed inflow results were used in the development of follow-on investigation recommendations.

Table 5 – Flow Metering Results - Inflow

Sub-Area	4/16/2018 Storm Event			4/25/2018 Storm Event			6/18/2018 Storm Event			6/27/2018 Storm Event		
	Direct (gal)	Delayed (gal)	Total (gal)	Direct (gal)	Delayed (gal)	Total (gal)	Direct (gal)	Delayed (gal)	Total (gal)	Direct (gal)	Delayed (gal)	Total (gal)
Sub-Area 1	**237,480**	**236,470**	**473,951**	**141,300**	**121,100**	**262,400**	**600**	**0**	**600**	**2,900**	**4,200**	**7,100**
Sub-Area 2	**42,099**	**66,764**	**108,863**	**37,500**	**46,000**	**83,500**	**0**	**0**	**0**	**1,700**	**400**	**2,100**
Sub-Area 3	138,499	**133,903**	272,402	90,600	**91,300**	181,900	6,800	**800**	7,600	15,700	**3,600**	19,300
Sub-Area 4	**30,853**	**79,721**	**110,574**	**80,500**	**61,000**	**141,500**	**11,000**	**6,200**	**17,200**	**63,100**	**11,400**	**74,500**
Sub-Area 5	**172,264**	**214,393**	**386,657**	**97,800**	**119,700**	**217,500**	**2,500**	**600**	**3,100**	**0**	**2,500**	**2,500**
Sub-Area 7	**157,521**	**246,923**	**404,444**	**132,800**	**170,100**	**302,900**	**0**	**0**	**0**	**0**	**900**	**900**
Sub-Area 8	312,306	**366,043**	678,349	134,500	**162,100**	296,600	6,300	**0**	6,300	330,000	**8,400**	338,400
Sub-Area 9	285,422	**260,439**	545,861	227,900	**211,900**	439,800	500	**2,500**	3,000	0	**4,500**	4,500
Sub-Area 13	**975,293**	**1,142,995**	**2,118,288**	**930,700**	**857,700**	**1,788,400**	**86,500**	**0**	**86,500**	**396,100**	**89,200**	**485,300**
Sub-Area 14	**300,579**	**310,003**	**610,582**	**197,500**	**220,300**	**417,800**	**9,100**	**2,300**	**11,400**	**63,700**	**20,700**	**84,400**
Sub-Area 15	*N/A*	***N/A***	*N/A*	385,900	**155,800**	541,700	32,200	**42,200**	74,400	26,200	**0**	26,200
Sub-Area 16	1,076,962	**609,352**	1,686,314	457,200	**348,800**	806,000	945,000	**0**	945,000	243,300	**25,500**	268,800
Sub-Area 17	*N/A*	***N/A***	*N/A*	283,800	**23,900**	307,700	0	**0**	0	0	**0**	0
Sub-Area 18	1,284,107	**984,596**	2,268,703	989,800	**734,400**	1,724,200	148,800	**8,800**	157,600	451,200	**64,500**	515,700
Sub-Area 19	810,736	**389,442**	1,200,178	473,000	**240,200**	713,200	63,100	**2,900**	66,000	223,300	**0**	223,300
Sub-Area 20	2,166,025	**553,500**	2,719,525	1,162,800	**393,600**	1,556,400	221,900	**15,700**	237,600	549,400	**20,300**	569,700
Sub-Area 21	398,523	**1,397,997**	1,796,520	0	**129,700**	129,700	0	**145,200**	145,200	0	**131,700**	131,700
Sub-Area 22	1,980,560	**1,400,988**	3,381,548	1,174,200	**812,100**	1,986,300	102,100	**0**	102,100	543,100	**54,800**	597,900
Sub-Area 28	249,721	**0**	249,721	0	**0**	0	300	**0**	300	88,300	**31,800**	120,100
Sub-Area 29	812,737	**443,994**	1,256,731	434,300	**246,400**	680,700	73,500	**17,500**	91,000	207,600	**37,400**	245,000

3 SUB-AREA PRIORITIZATION AND RECOMMENDATIONS

3.1 High Infiltration and High RDII Sub-Areas

Infiltration within a sanitary sewer system is considered excessive if a subarea no greater than 20,000 linear feet of pipe exceeds a dry weather infiltration rate average of 4,000 gallons per day per inch diameter mile (gpd/idm). Sub-areas with infiltration rates exceeding 4,000 gpd/in-mi (Sub-areas 4, 16, 18, 20 and 29) are highlighted in Table 6.

Table 6. High Infiltration Sub-areas

Sub-Area	Groundwater Infiltration (GWI)	Infiltration GPD/Total LF (GPDLF)	Gallons per Day per Inch-Mile (GPDIM)
Sub-Area 4	83,726	**9.4**	6,055
Sub-Area 16	279,739	**13.1**	5,375
Sub-Area 18	209,635	**10.5**	4,487
Sub-Area 29	50,357	**8.2**	4,445
Sub-Area 20	118,081	**11.9**	4,235
Sub-Area 14	152,698	**6.5**	3,489
Sub-Area 1	78,910	3.9	2,515
Sub-Area 7	97,191	**4.1**	2,505
Sub-Area 19 [1, 2]	43,517	**7.7**	2,469
Sub-Area 5	97,130	**4.4**	2,444
Sub-Area 9 [1, 2]	75,325	**6.9**	2,427
Sub-Area 22	128,450	**6.7**	2,367
Sub-Area 13	374,236	**7.7**	2,354
Sub-Area 3	91,912	3.2	1,968
Sub-Area 2	36,879	3.1	1,884
Sub-Area 28 [1, 2]	50,821	**9.6**	1,527
Sub-Area 15 [1, 2]	66,479	2.9	1,411
Sub-Area 8 [1, 2]	69,114	2.7	1,355
Sub-Area 17 [1, 2]	70,823	2.9	1,310
Sub-Area 21 [1, 2]	*N/A*	*N/A*	*N/A*

Notes: 1. Collects flows from tributary sub-areas 2. Flow meter results indicate some negative net flows when tributary sub-areas are subtracted. Further investigations will be done during the next phase to account for negative values.

The gallons per day of GWI per total liner footage of each sub-area was also calculated. Sub-areas with a total GPD/LF greater than 4 were also deemed high infiltration areas and are shown as bold in Table 6.

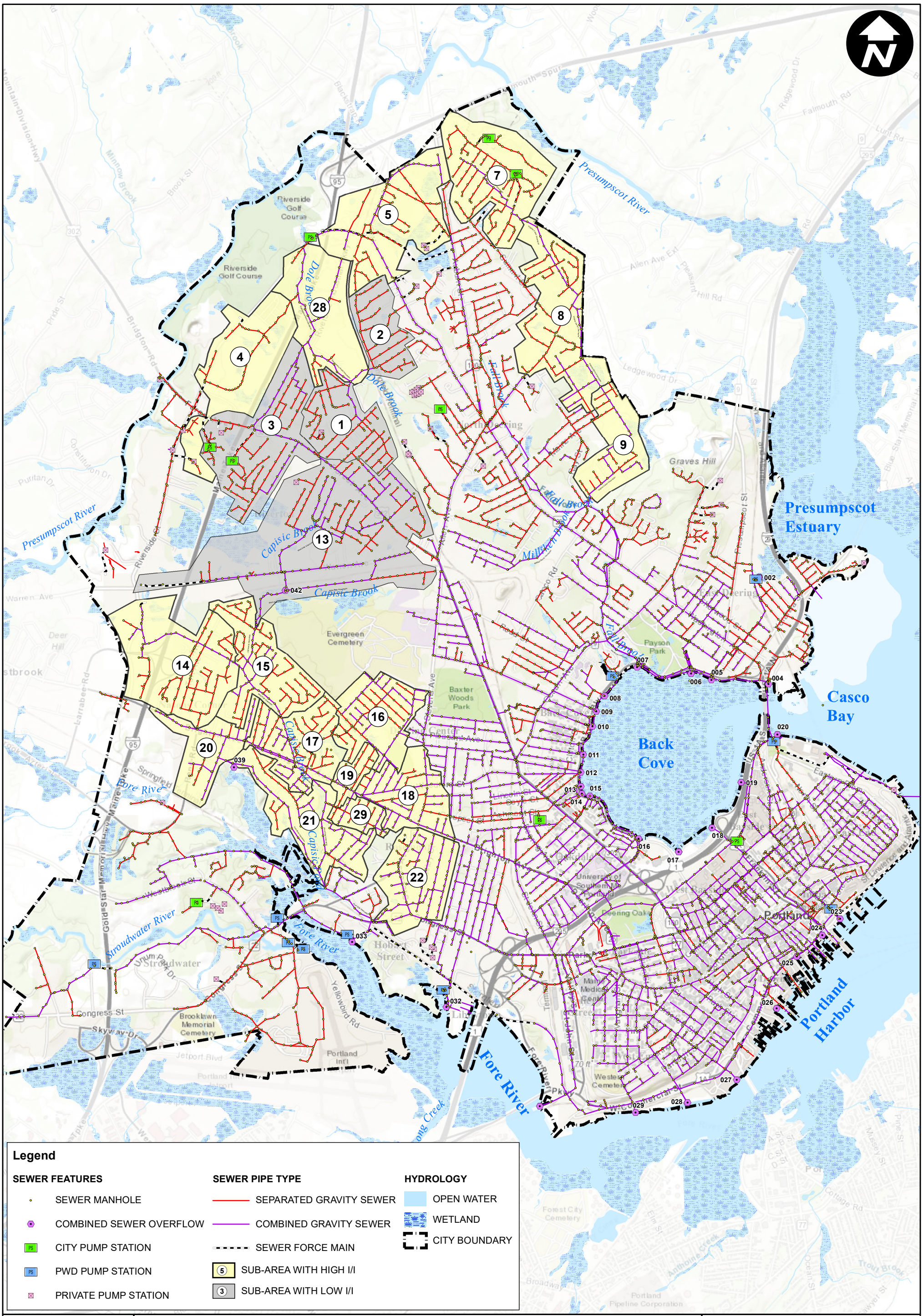
Inflow results were analyzed for the April 25, 2018 storm event to determine which sub-areas contribute excessive volumes of delayed inflow to the collection system. High delayed inflow sub-areas are shaded in Table 7.

Table 7. High Delayed Inflow Sub-areas – April 25, 2018 Storm Event

Subarea	Direct Inflow (Gal)	Delayed Inflow (Gal)	Total Inflow (Gal)
Sub-Area 13	**930,700**	**857,700**	**1,788,400**
Sub-Area 22	1,174,200	**812,100**	1,986,300
Sub-Area 18	989,800	**734,400**	1,724,200
Sub-Area 20	1,162,800	**393,600**	1,556,400
Sub-Area 16	457,200	**348,800**	806,000
Sub-Area 29	434,300	**246,400**	680,700
Sub-Area 19[1]	473,000	**240,200**	713,200
Sub-Area 14	**197,500**	**220,300**	**417,800**
Sub-Area 9[1]	227,900	**211,900**	439,800
Sub-Area 7	**132,800**	**170,100**	**302,900**
Sub-Area 8[1]	134,500	**162,100**	296,600
Sub-Area 15[1]	385,900	**155,800**	541,700
Sub-Area 21[1]	0	**129,700**	129,700
Sub-Area 1	**141,300**	**121,100**	**262,400**
Sub-Area 5	**97,800**	**119,700**	**217,500**
Sub-Area 3	90,600	**91,300**	181,900
Sub-Area 4	**80,500**	**61,000**	**141,500**
Sub-Area 2	**37,500**	**46,000**	**83,500**
Sub-Area 17[1]	283,800	**23,900**	307,700
Sub-Area 28[2]	0	**0**	0

Notes: 1. Collects flows from tributary sub-areas 2. Flow meter results indicate some negative net flows when tributary sub-areas are subtracted. Further investigations will be done during the next phase to account for negative values.

High infiltration and inflow sub-areas are highlighted in Figure 7.



THE CITY OF PORTLAND, MAINE

Phase 1: Investigation of Flows - 2018 Monitoring

0 0.25 0.5 1 Miles

December 2018

FIGURE 7 - HIGH INFILTRATION AND INFLOW SUB-AREAS

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 I-I Report\FIGURE 7 - HIGH I AND I SUB-AREAS.mxd

3.2 Investigation Recommendations

Based on the metering results summarized in Section 3.1 and ongoing investigation and construction within the City of Portland, Phase 2 follow-on recommendations were developed. Recommendations, summarized in Table 8 and shown on Figure 8 include flow isolation, CCTV and manhole inspections. Individual sub-area maps showing follow-on recommendations are included in Appendix C.

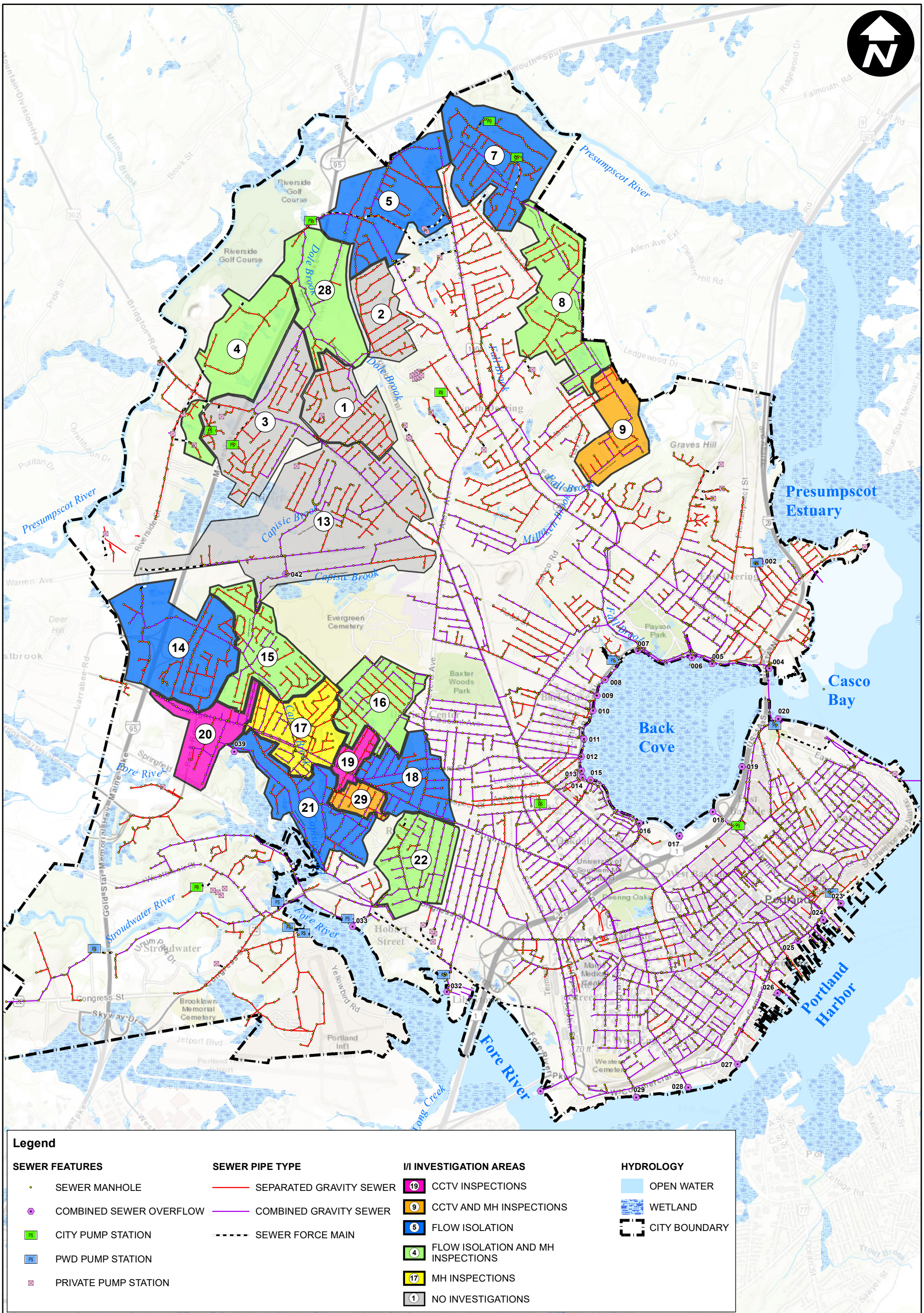
Table 8. Follow-on Investigation Recommendations

Sub-Area	High Infiltration Sub-areas	High Delayed Inflow Sub-area	Recommendations		
			Flow Isolation (LF)	CCTV (LF)	Manhole Inspections
Sub-Area 4	X		8,893		46
Sub-Area 5	X		21,962		
Sub-Area 7	X	X	23,684		
Sub-Area 8		X	19,179		26
Sub-Area 9		X		9,165	20
Sub-Area 13[1]	X	X	-	-	-
Sub-Area 14	X	X	23,488		
Sub-Area 15		X	19,404		20
Sub-Area 16	X	X	21,410		100
Sub-Area 17					28
Sub-Area 18	X	X	19,962		
Sub-Area 19	X	X		4,667	
Sub-Area 20	X	X		8,685	
Sub-Area 21		X	12,431		
Sub-Area 22	X	X	19,133		112
Sub-Area 28	X		5,164		56
Sub-Area 29	X	X		5,094	35
Total			***194,740***	***27,611***	***443***

Notes: 1. Investigation work in Sub-area 13 is ongoing through another project and therefore not included in these recommendations

Flow isolation was completed in December 2018 and CCTV is currently ongoing. Manhole inspections will be conducted in the Spring of 2019.

Investigations to identify direct inflow such as smoke testing, dye testing and large building inspections will be conducted in the summer of 2019 once the 2019 flow metering program is completed.



THE CITY OF PORTLAND, MAINE

Phase 1: Investigation of Flows - 2018 Monitoring

0 0.25 0.5 1 Miles

December 2018

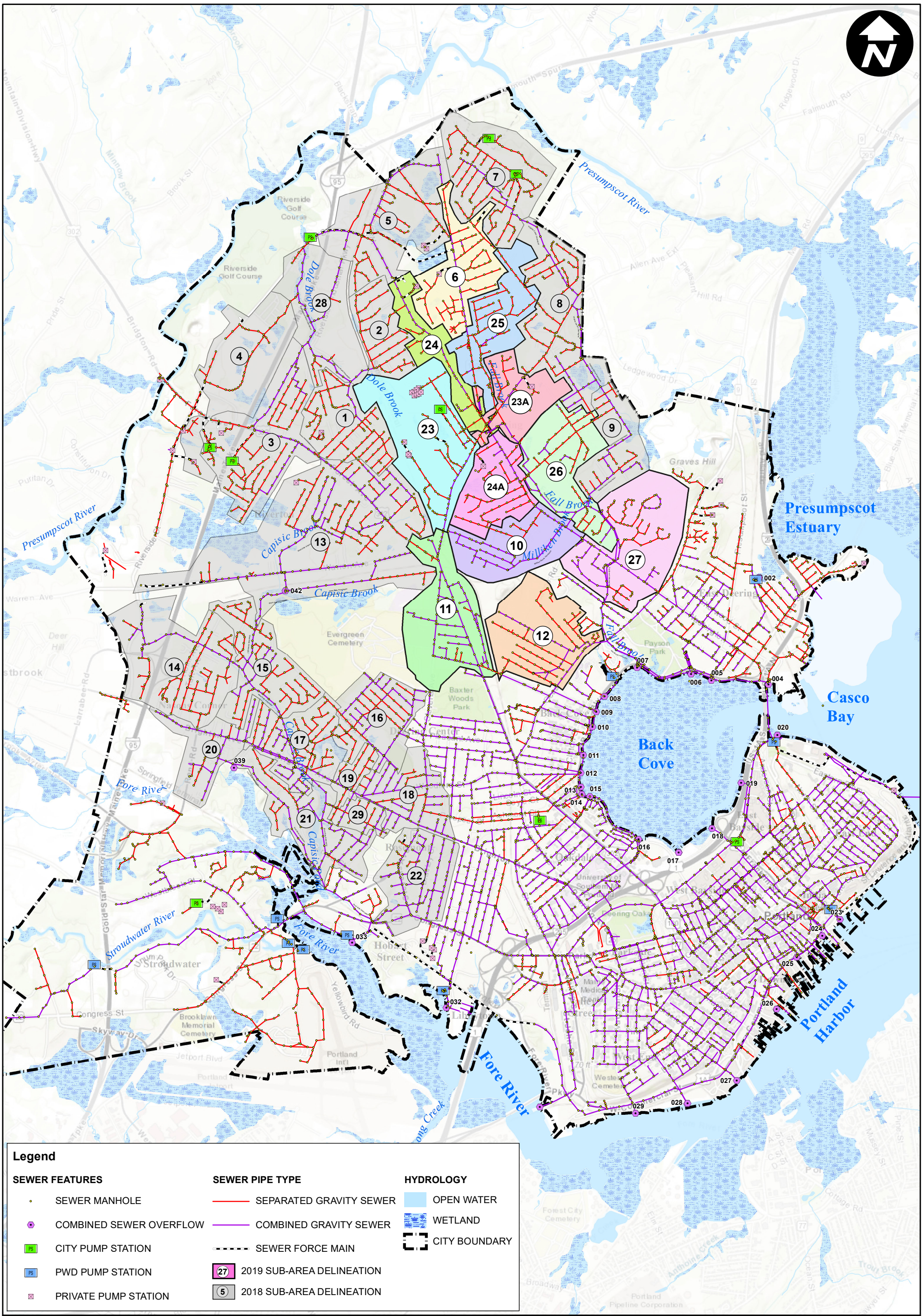
FIGURE 8 - INVESTIGATION RECOMMENDATIONS

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 I-I Report\FIGURE 8 - I AND I INVESTIGATION SUB-AREAS.mxd

3.3 2019 Flow Metering Program

A second phase of flow metering is scheduled to be conducted in April 2019 in 11 sub-areas that were not included in the first phase of flow metering. The metering program includes 11 meters, as shown on Figure 9, as well as 3 additional deduction meters in sub-areas 6, 11 and 26. Additional meters may be added to the 2019 flow metering program if results from the ongoing SSES activities identify the need for additional meter data.



THE CITY OF PORTLAND, MAINE

Phase 1: Investigation of Flows - 2018 Monitoring

0 0.25 0.5 1 Miles

December 2018

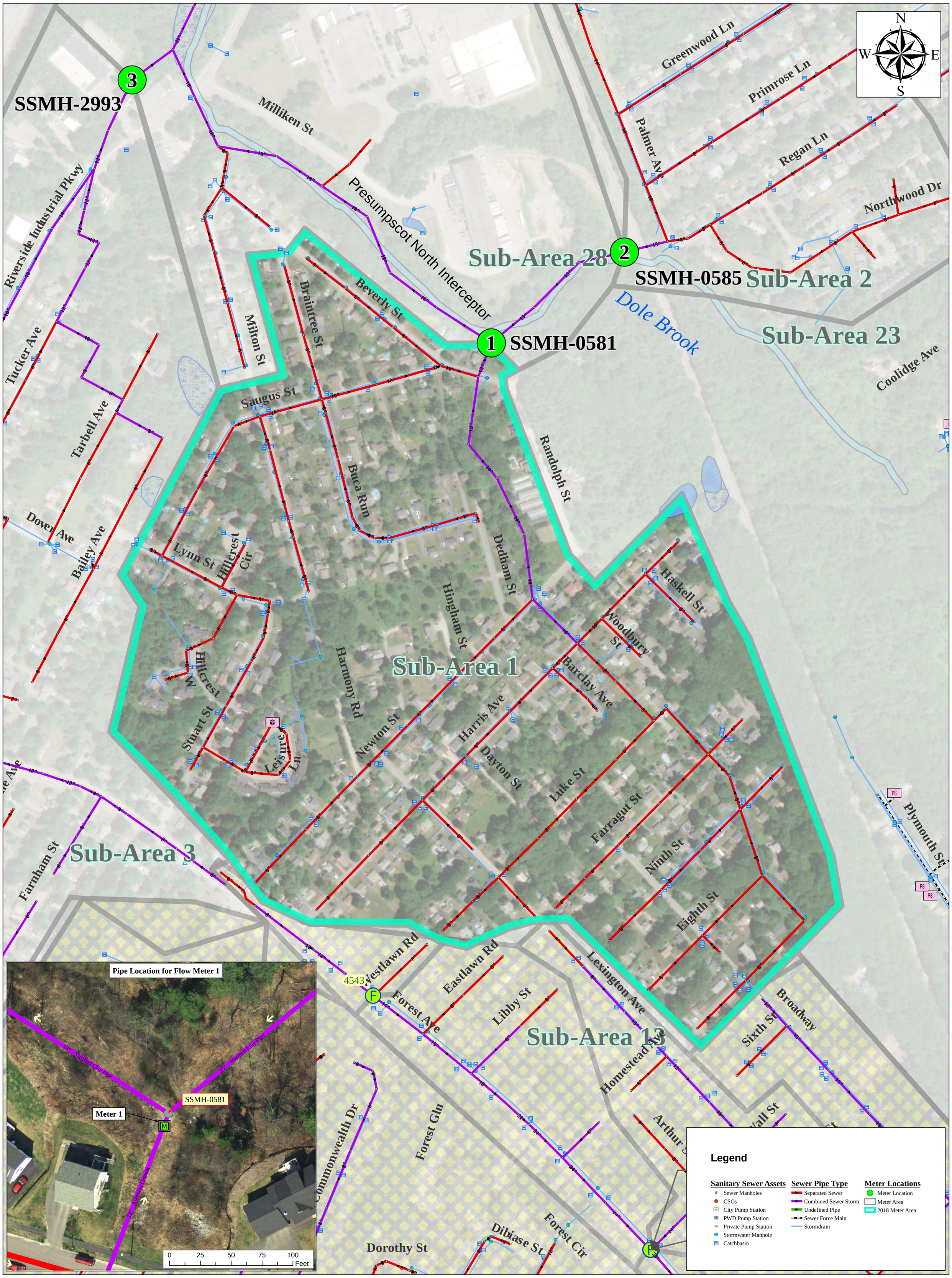
FIGURE 9 - 2019 FLOW METER LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 I-I Report\FIGURE 9 - 2019 SUB-AREA DELINEATION.mxd

APPENDIX A

2018 Meter Area Figures



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 1

ARCADIS

Sub-Area Details

Area = 124 ACRES
Length of pipe = 20,000 LF
Sewer Manholes = 102 MHs
Buildings = 371 Bldgs

March 2018

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 2

ARCADIS

Sub-Area Details

Area = 86 ACRES
Length of pipe = 11,919 LF
Sewer Manholes = 59 MHs
Buildings = 196 Bldgs

March 2018

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

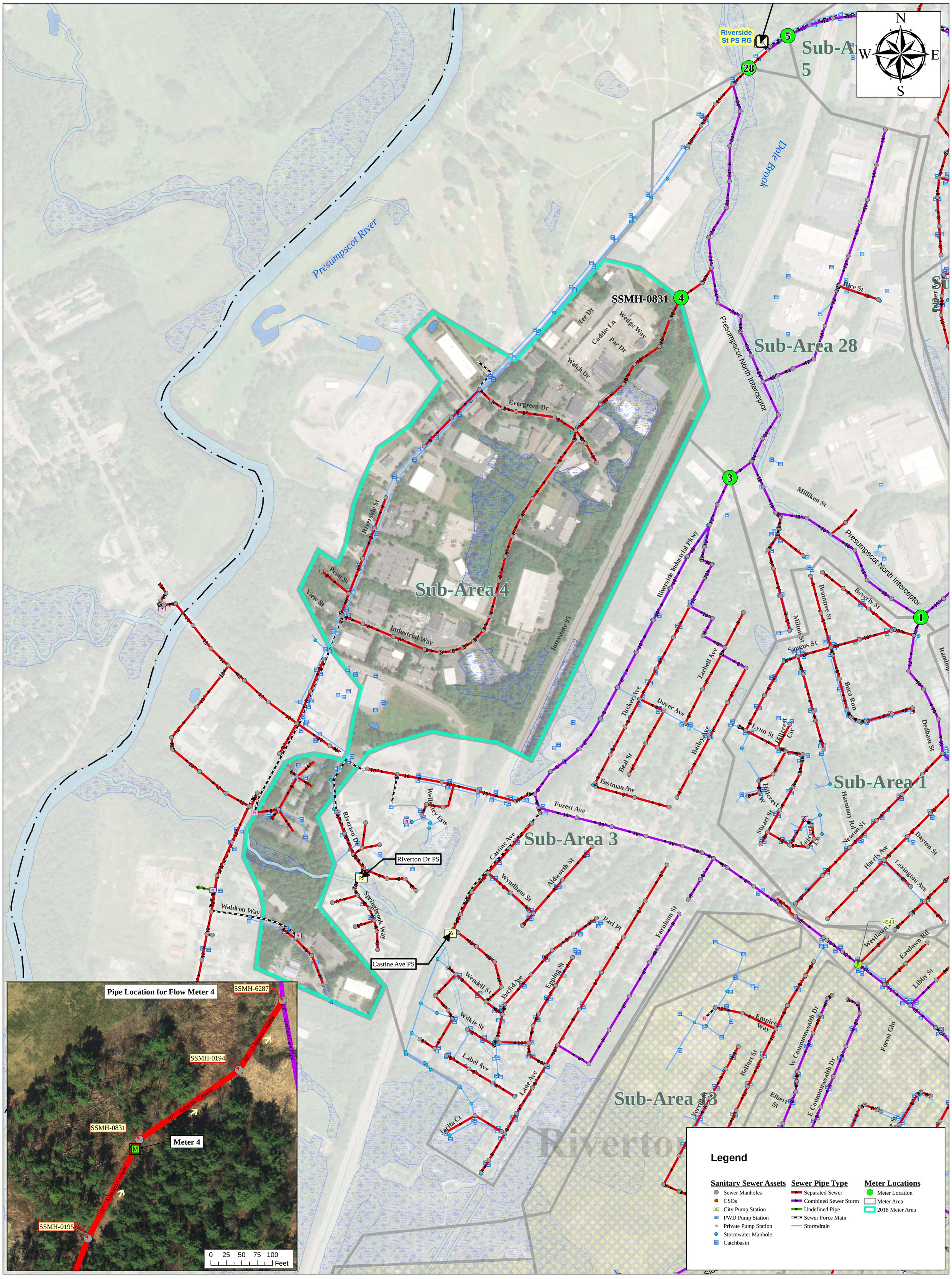
Sub-Area 3

ARCADIS

Sub-Area Details

Area = 218 ACRES
Length of pipe = 28,692 LF
Sewer Manholes = 148 MHs
Buildings = 515 Bldgs

March 2018



CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

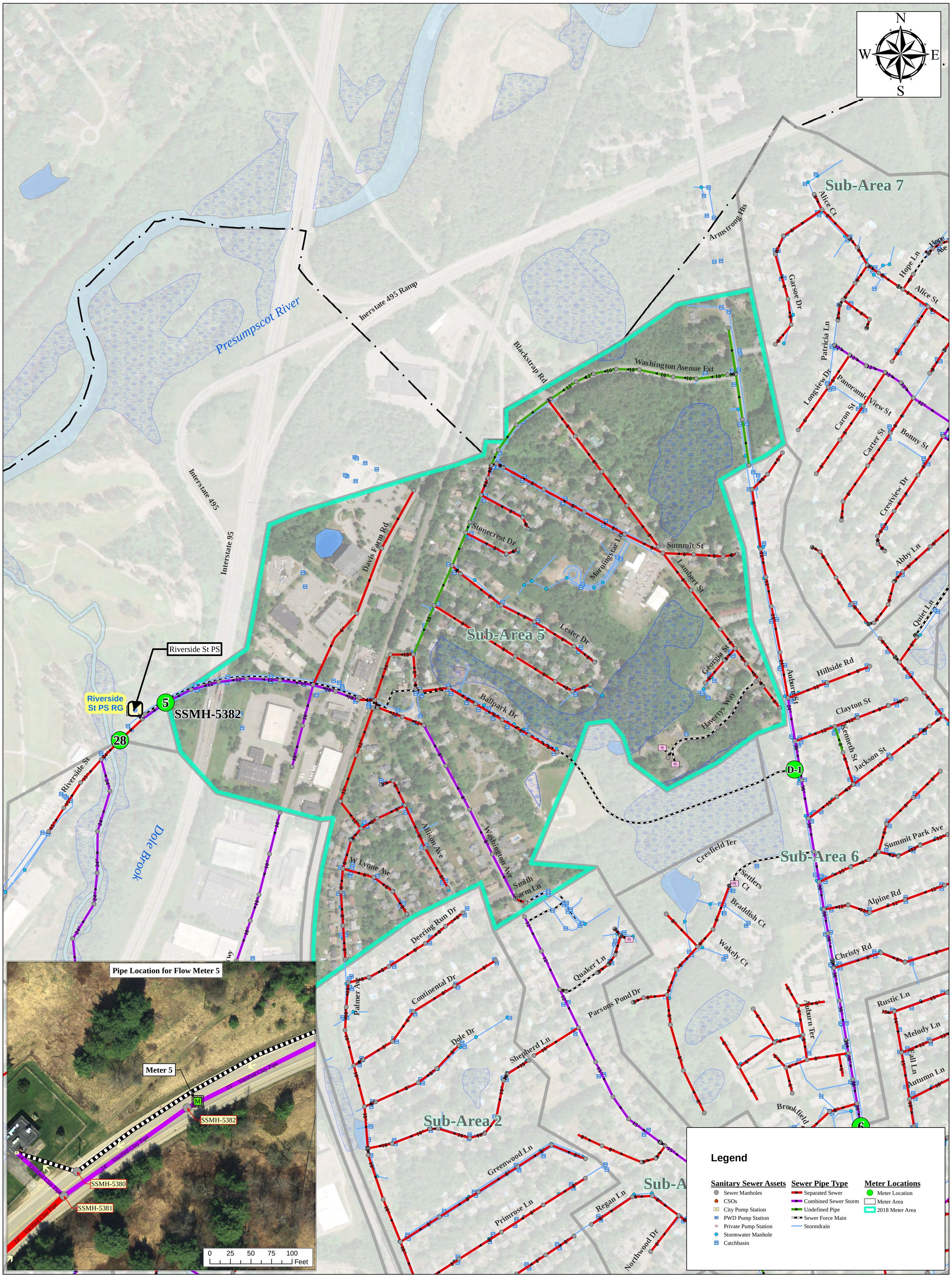
Sub-Area 4

ARCADIS

Sub-Area Details

Area = 187 ACRES
Length of pipe = 8,893 LF
Sewer Manholes = 47 MHs
Buildings = 104 Bldgs

March 2018



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 5

ARCADIS

Sub-Area Details

Area = 220 ACRES
Length of pipe = 21,962 LF
Sewer Manholes = 111 MHs
Buildings = 275 Bldgs

March 2018

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

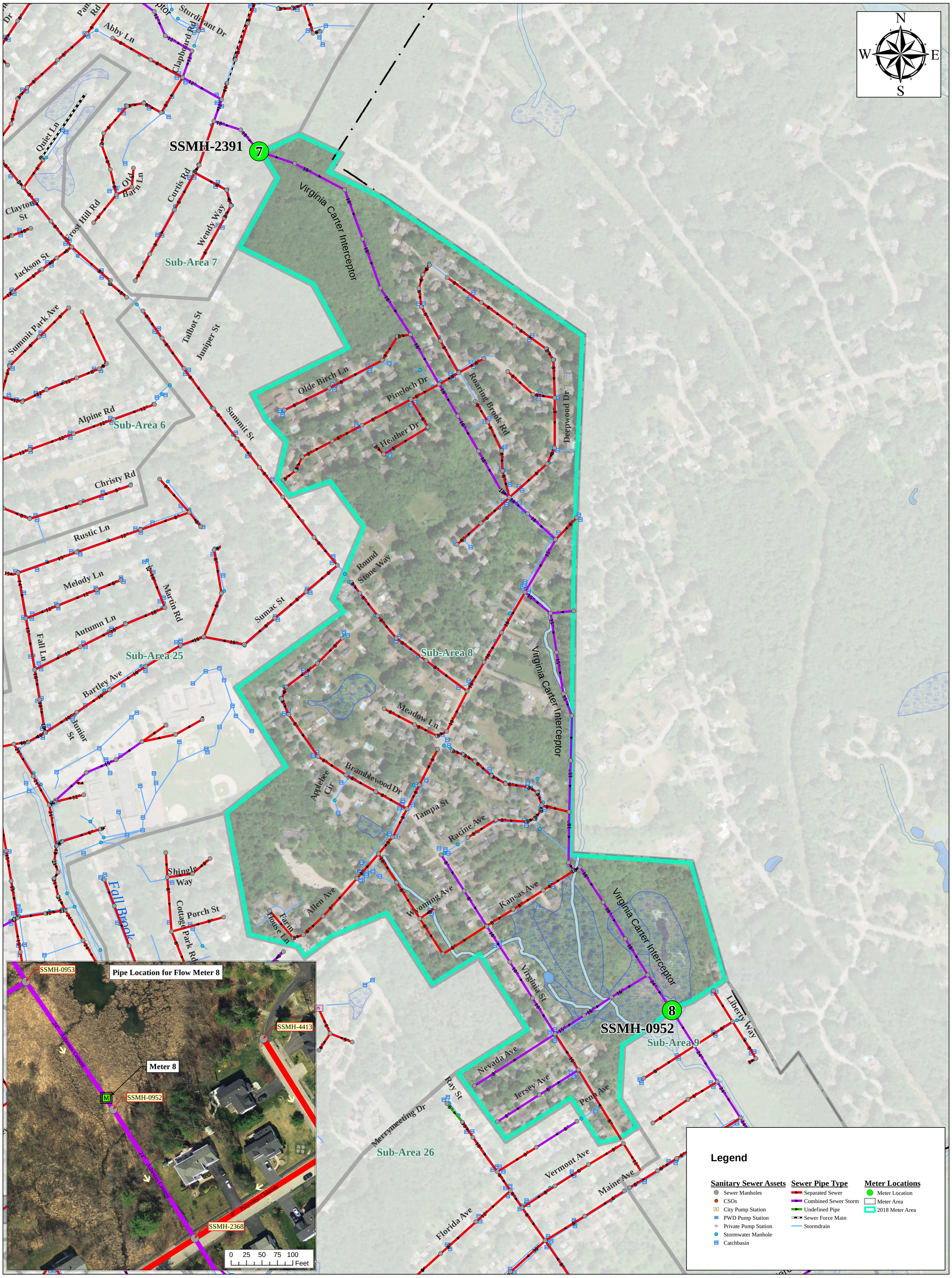
Sub-Area 7

ARCADIS

Sub-Area Details

Area = 198 ACRES
Length of pipe = 23,684 LF
Sewer Manholes = 148 MHs
Buildings = 367 Bldgs

March 2018



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

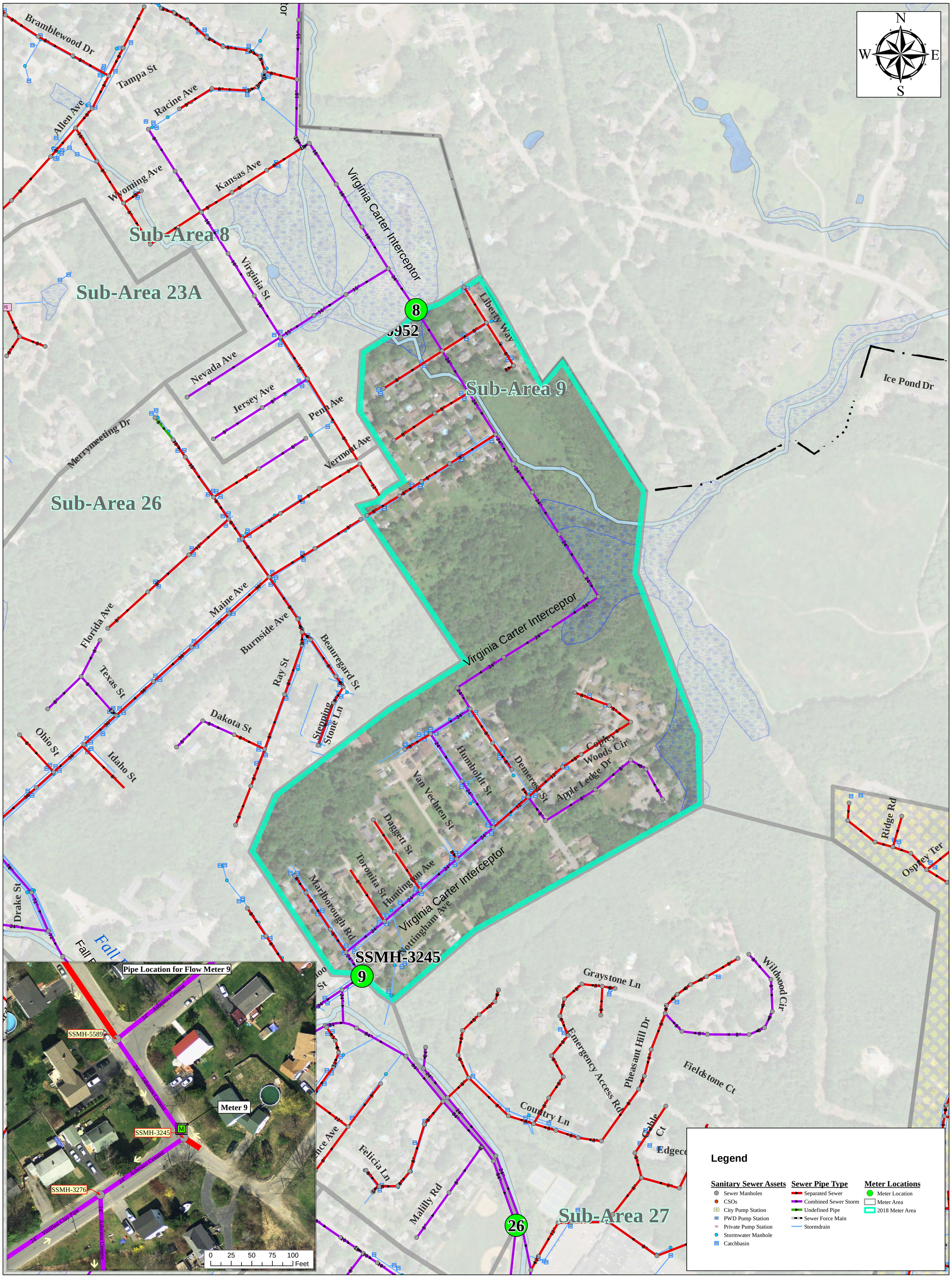
Sub-Area 8

ARCADIS

Sub-Area Details

Area = 203 ACRES
Length of pipe = 25,298 LF
Sewer Manholes = 128 MHs
Buildings = 416 Bldgs

March 2018



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

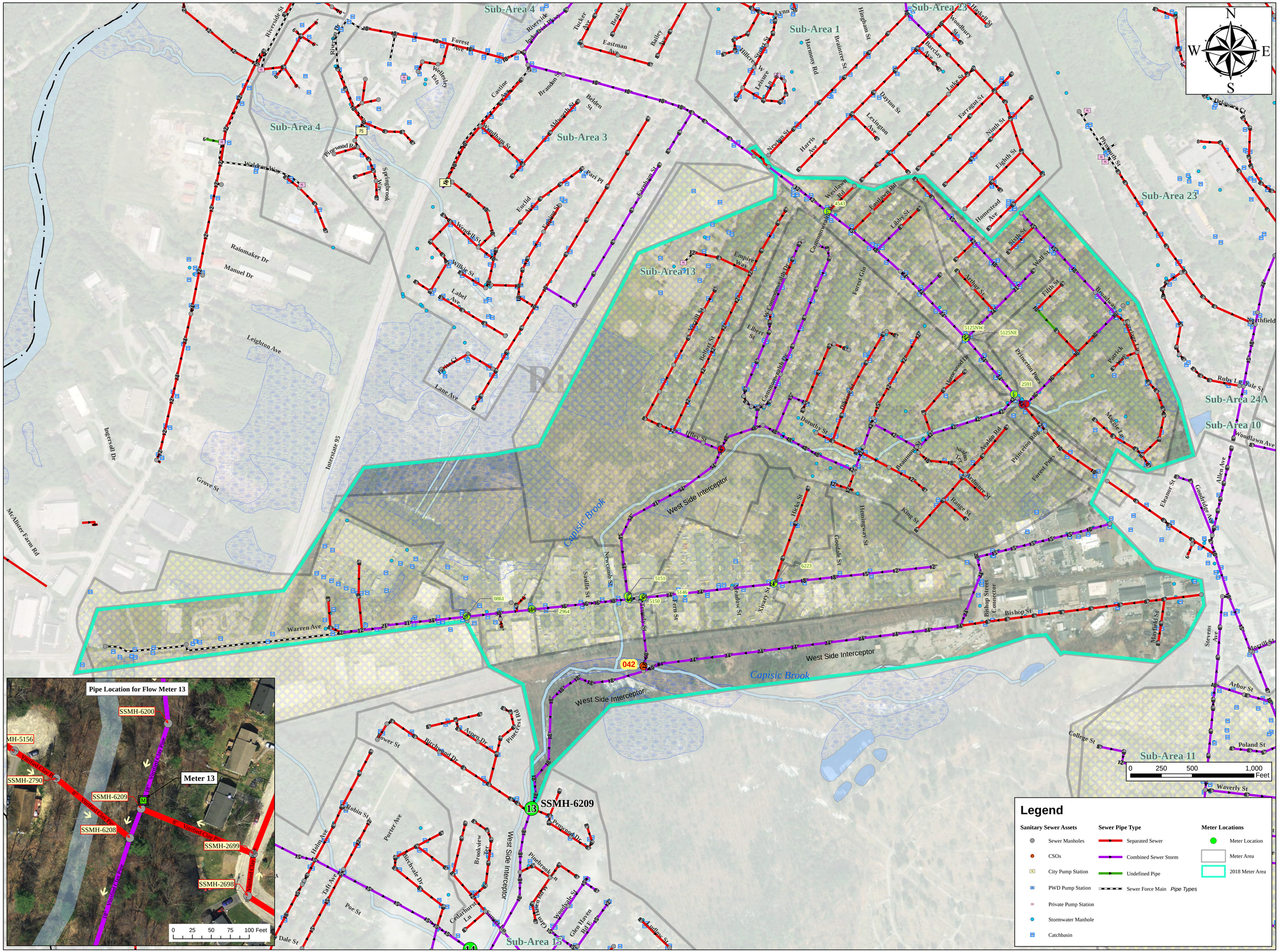
Sub-Area 9

ARCADIS

Sub-Area Details

Area = 103 ACRES
Length of pipe = 11,176 LF
Sewer Manholes = 51 MHs
Buildings = 193 Bldgs

March 2018



Sub-Area Details

Area = 499 ACRES
Length of pipe = 48,470 LF
Sewer Manholes = 270 MHs
Buildings = 774 Bldgs

March 2018

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 13

ARCADIS

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 14

ARCADIS

Sub-Area Details

Area = 234 ACRES
Length of pipe = 23,488 LF
Sewer Manholes = 124 MHs
Buildings = 319 Bldgs

March 2018

Sub-Area 13

Sub-Area 14

Sub-Area 15

Sub-Area 16

Sub-Area 17

Sub-Area 21

SSMH-6209

SSMH-5188

SSMH-0266

SSMH-5248

West Side Interceptor

Capisic Brook

Pipe Location for Flow Meter 15

SSMH-5213

SSMH-4074

Meter 15

SSMH-0266

SSMH-5203

Legend

Sanitary Sewer Assets: Sewer Manholes, CSOs, City Pump Station, PWD Pump Station, Private Pump Station, Stormwater Manhole, Catchbasin

Sewer Pipe Type: Separated Sewer, Combined Sewer Storm, Undefined Pipe, Sewer Force Main, Stormdrain

Meter Locations: Meter Location, Meter Area, 2018 Meter Area

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 15

ARCADIS

Sub-Area Details

Area = 146 ACRES
Length of pipe = 22,812 LF
Sewer Manholes = 126 MHs
Buildings = 457 Bldgs

March 2018

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

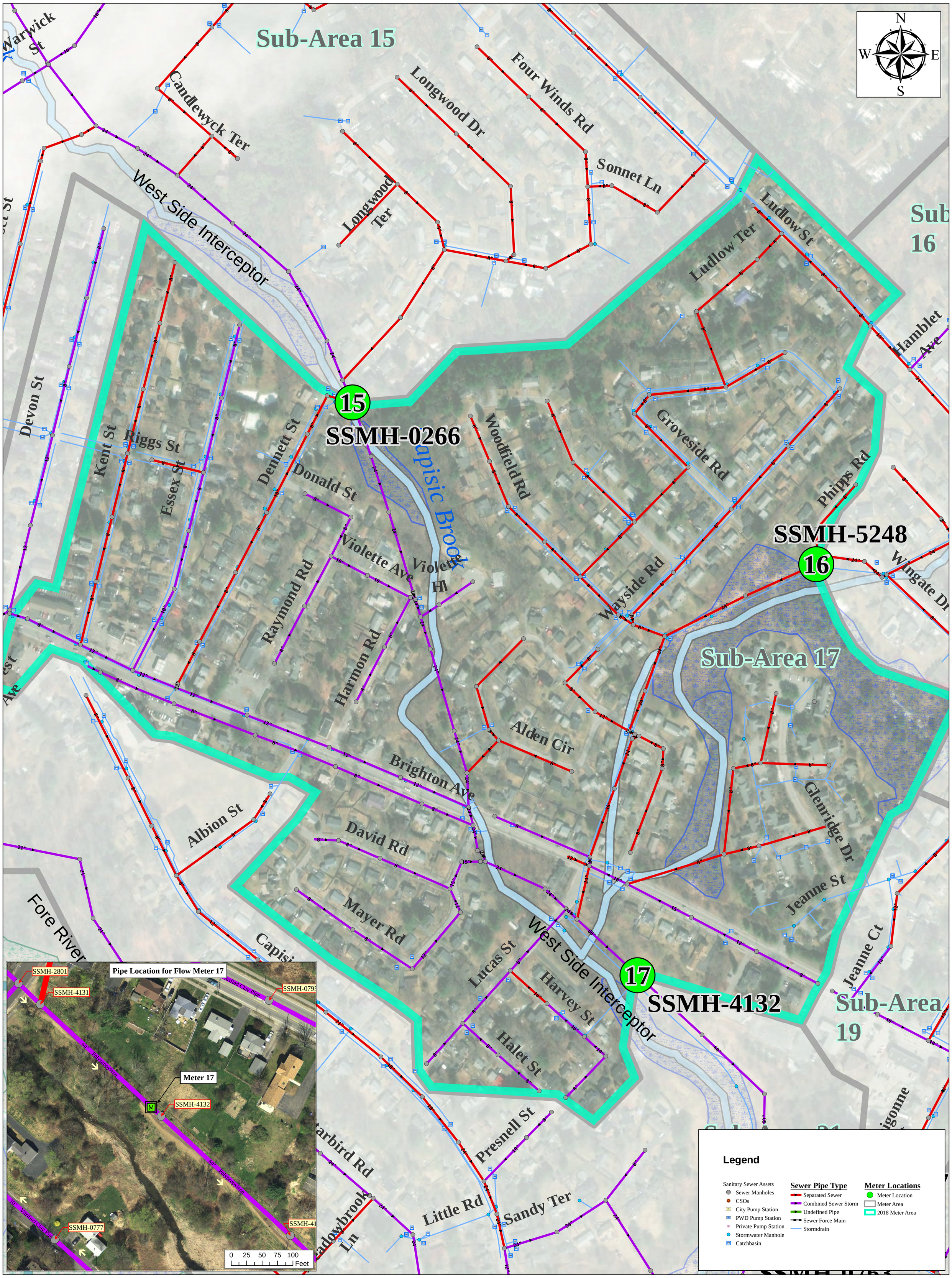
Sub-Area 16

ARCADIS

Sub-Area Details

Area = 124 ACRES
Length of pipe = 21,410 LF
Sewer Manholes = 101 MHs
Buildings = 442 Bldgs

March 2018



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 17

ARCADIS

Sub-Area Details

Area = 127 ACRES
Length of pipe = 24,822 LF
Sewer Manholes = 142 MHs
Buildings = 427 Bldgs

March 2018

Sub-Area 16

Sub-Area 19

Sub-Area 18

Sub-Area 29

Sub-Area 22

SSMH-2849

18

Pipe Location for Flow Meter 18

SSMH-4327

SSMH-2846

SSMH-5263

SSMH-5262

SSMH-2847

SSMH-2849

Meter 18

SSMH-2881

SSMH-0262

SSMH-5293

0 25 50 75 100 Feet

Legend

Sanitary Sewer Assets
- Sewer Manholes
- CSOs
- City Pump Station
- PWD Pump Station
- Private Pump Station
- Stormwater Manhole
- Catchbasin

Sewer Pipe Type
- Separated Sewer
- Combined Sewer Storm
- Undefined Pipe
- Sewer Force Main
- Stormdrain

Meter Locations
- Meter Location
- Meter Area
- 2018 Meter Area

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 18

ARCADIS

Sub-Area Details

Area = 111 ACRES
Length of pipe = 19,962 LF
Sewer Manholes = 94 MHs
Buildings = 469 Bldgs

March 2018

Sub-Area 16

Sub-Area 17

Sub-Area 18

Sub-Area 19

Sub-Area 29

SSMH-5248 16

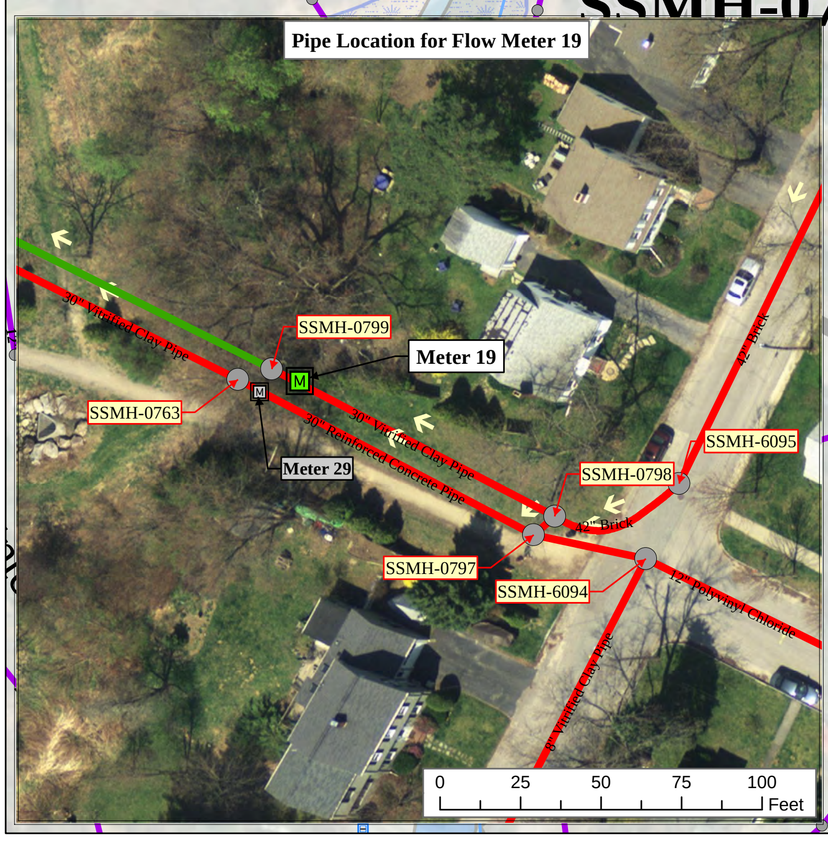
SSMH-4132 17

SSMH-2849 18

SSMH-0799 19

SSMH-0763 29

Hamblet Ave
Best St
Madeline St
Bartlett St
Hale St
Mabel St
Alba St
Groveside Rd
Woodfield Rd
Phipps Rd
Fuller St
Concord St W
Wingate Dr
Wayside Rd
Ludlow St
Leland St
Alden Cir
Jeanne St
Glenridge Dr
Edgeworth Ave
Westminster Ave
Leeman St
Merriam St
Lucas St
Columbia Rd
Columbia Ter
Rosemont Ave
Jeanne Ct
West Side Interceptor
Harvey St
Hillis St
Caldwell St
Marlow St
Gay St
Presnell St
Machigonne St
Woodford St
Brighton Ave
Montrose Ave
Sandy Ter
Fellows St
Runnells St
Rockland Ave
Fleetwood St
Hastings St
Colonial Rd
Kenilworth St
Motley St
Caroline St
Belfield St
Wolcott St
Bancroft St
Colonial Ct
Pomeroy St



Legend

Sanitary Sewer Assets	Sewer Pipe Type	Meter Locations
Sewer Manholes	Separated Sewer	Meter Location
CSOs	Combined Sewer Storm	Meter Area
City Pump Station	Undefined Pipe	
PWD Pump Station	Sewer Force Main	
Private Pump Station	Stormdrain	
Stormwater Manhole		
Catchbasin		

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

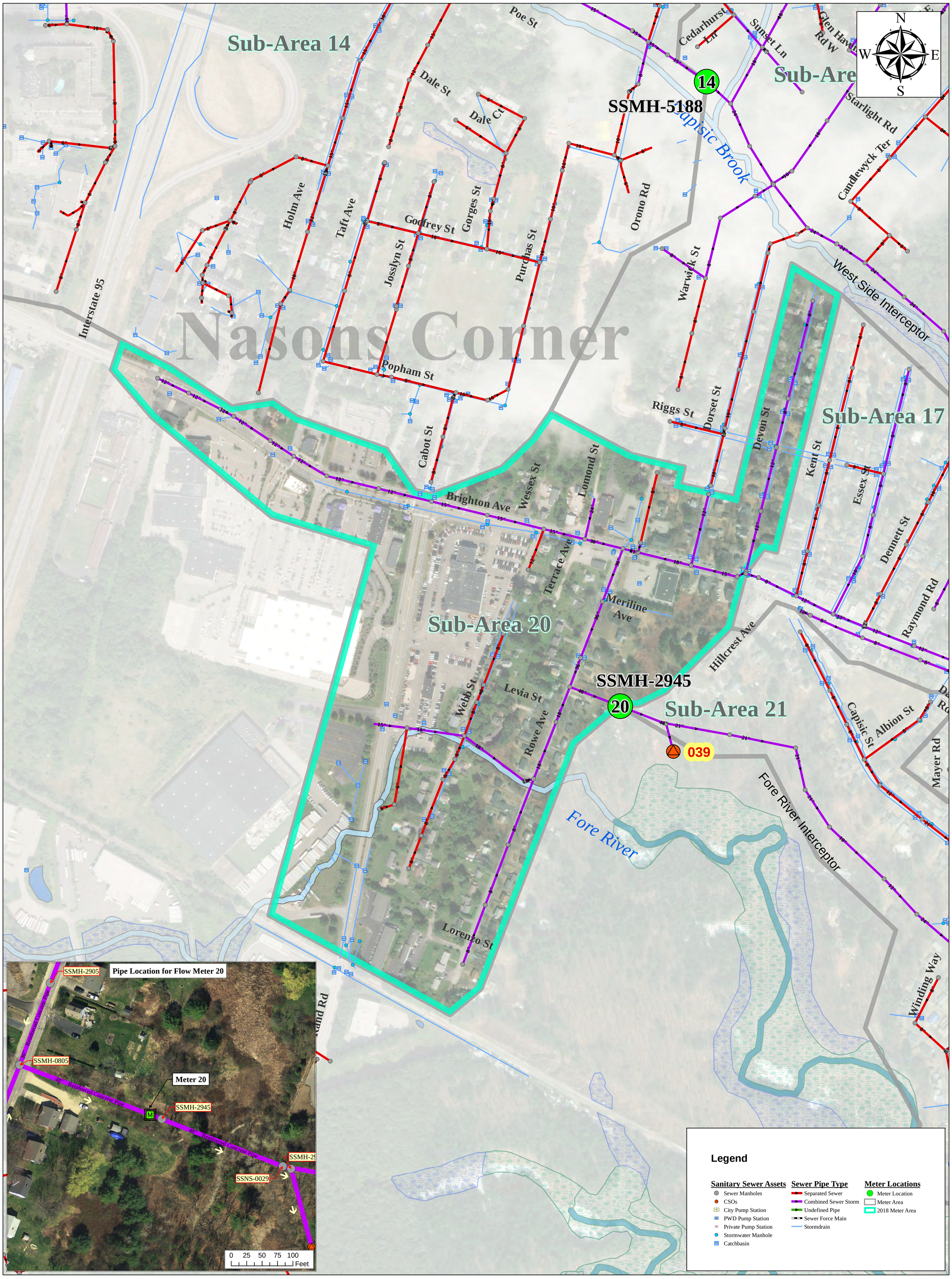
Sub-Area 19

ARCADIS

Sub-Area Details

Area = 30 ACRES
Length of pipe = 5,677 LF
Sewer Manholes = 33 MHs
Buildings = 140 Bldgs

March 2018



0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 20

ARCADIS

Sub-Area Details

Area = 93 ACRES
Length of pipe = 9,924 LF
Sewer Manholes = 47 MHs
Buildings = 185 Bldgs

March 2018

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

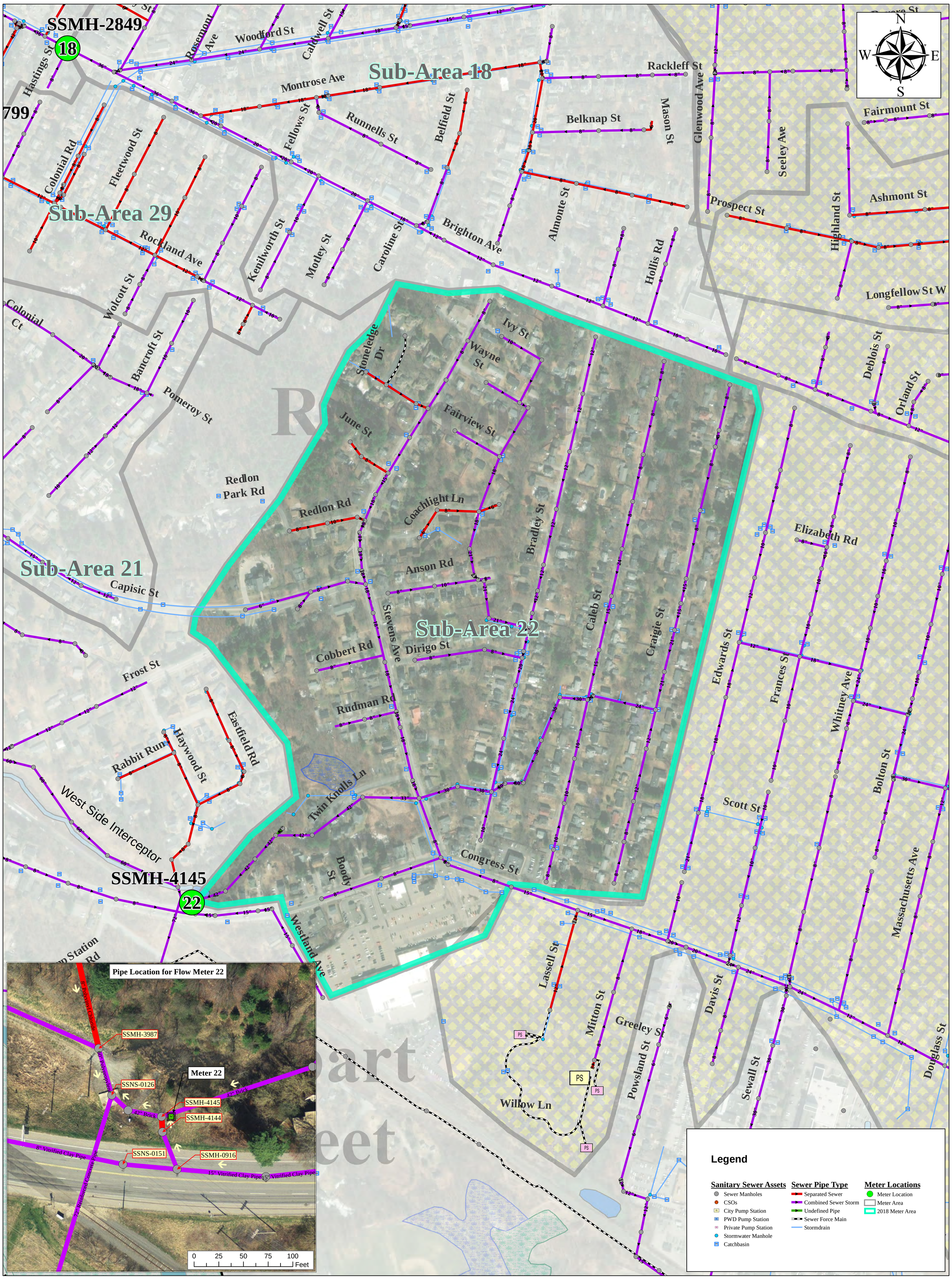
Sub-Sub-Area 21

ARCADIS

Sub-Area Details

Area = 149 ACRES
Length of pipe = 21,047 LF
Sewer Manholes = 108 MHs
Buildings = 308 Bldgs

March 2018



CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 22

Sub-Area Details

Area =
Length of pipe = 19,134 LF
Sewer Manholes = 113 MHs
Buildings = 377 Bldgs

March 2018

Riverside St PS

Riverside St PS RG

SSMH-5382

SSMH-5384

SSMH-0831

SSMH-2993

SSMH-0585

SSMH-0531

Sub-Area 5

Sub-Area 28

Sub-Area 4

Sub-Area 1

Sub-Area 2

Sub-Area 23

Pipe Location for Flow Meter 30

SSMH-5380

SSMH-5381

SSMH-5385

SSMH-5384

Meter 30

SSMH-0837

SSMH-0834

0 25 50 75 100 Feet

Legend

Sanitary Sewer Assets	Sewer Pipe Type	Meter Locations
Sewer Manholes	Separated Sewer	Meter Location
CSOs	Combined Sewer Storm	Meter Area
City Pump Station	Undefined Pipe	2018 Meter Area
PWD Pump Station	Sewer Force Main	
Private Pump Station	Stormdrain	
Stormwater Manhole		
Catchbasin		

0 250 500 1,000 Feet

CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

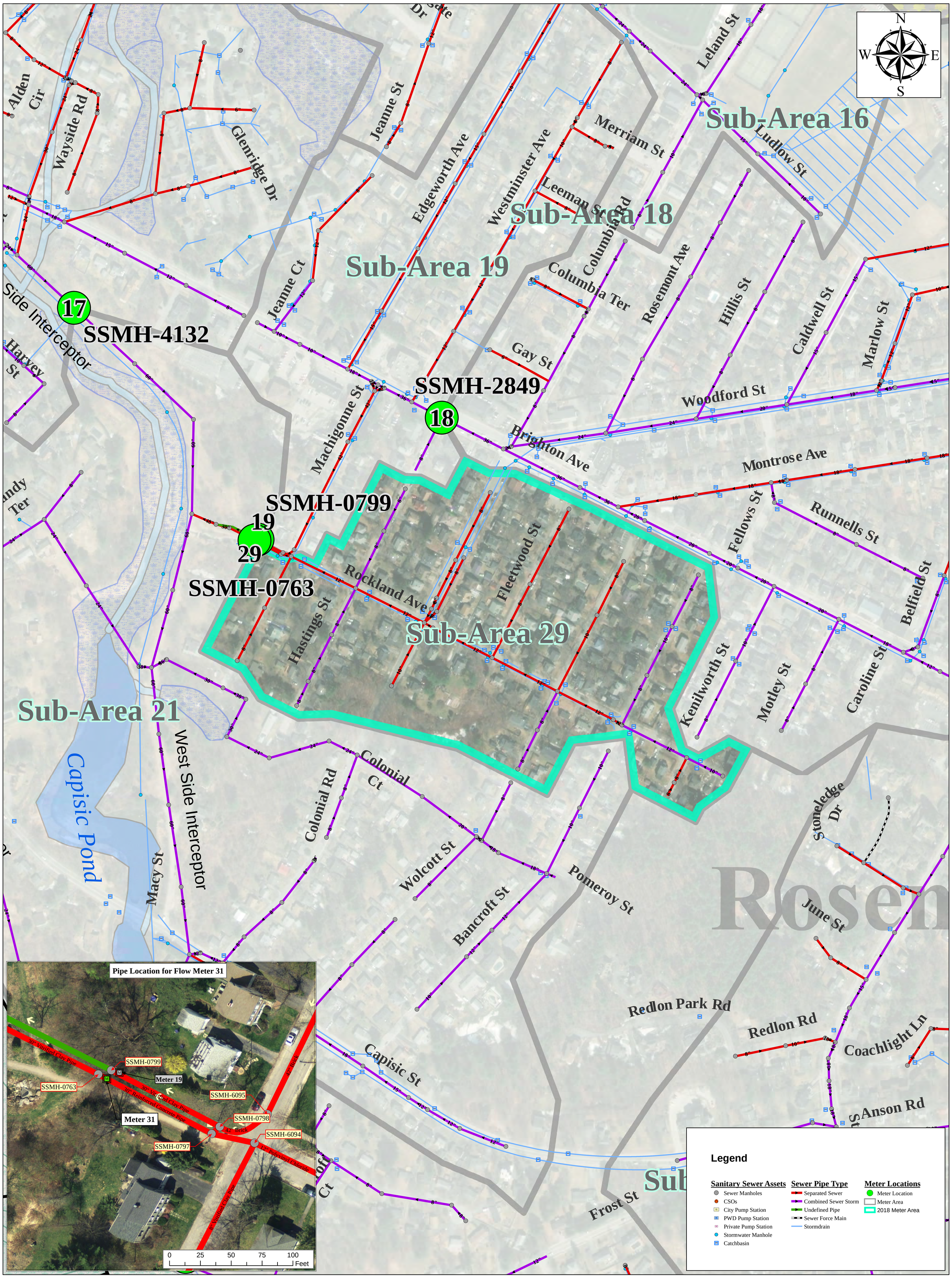
Sub-Area 28

ARCADIS

Sub-Area Details

Area = 162 ACRES
Length of pipe = 10,942 LF
Sewer Manholes = 58 MHs
Buildings = 42 Bldgs

March 2018



CITY OF PORTLAND, MAINE

Planning & Engineering Services for an Infiltration and Inflow Program of the Sanitary Sewer System

2018 Sanitary Flow Metering

Sub-Area 29

ARCADIS

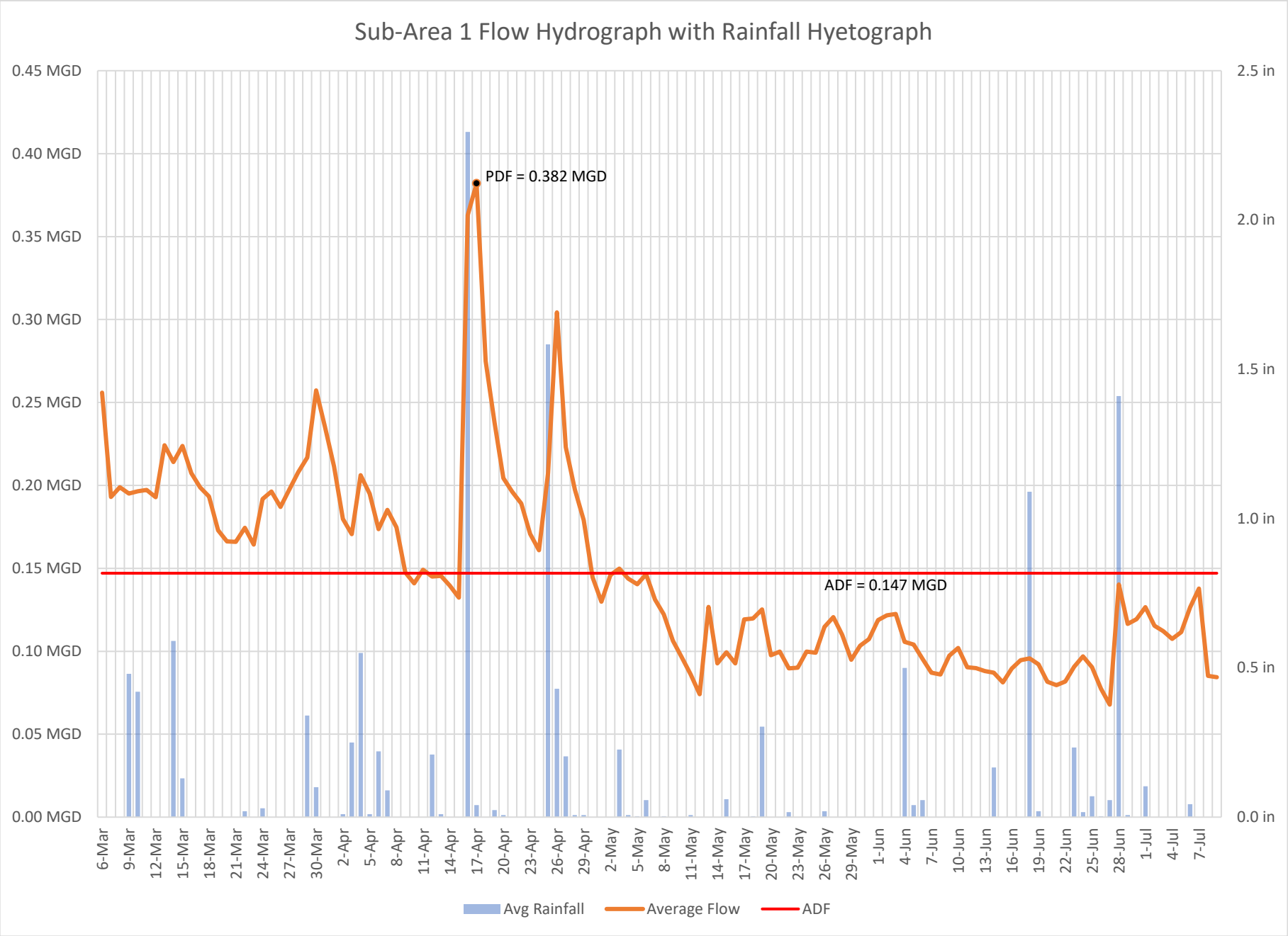
Sub-Area Details

Area = 31 ACRES
Length of pipe = 6,165 LF
Sewer Manholes = 35 MHs
Buildings = 155 Bldgs

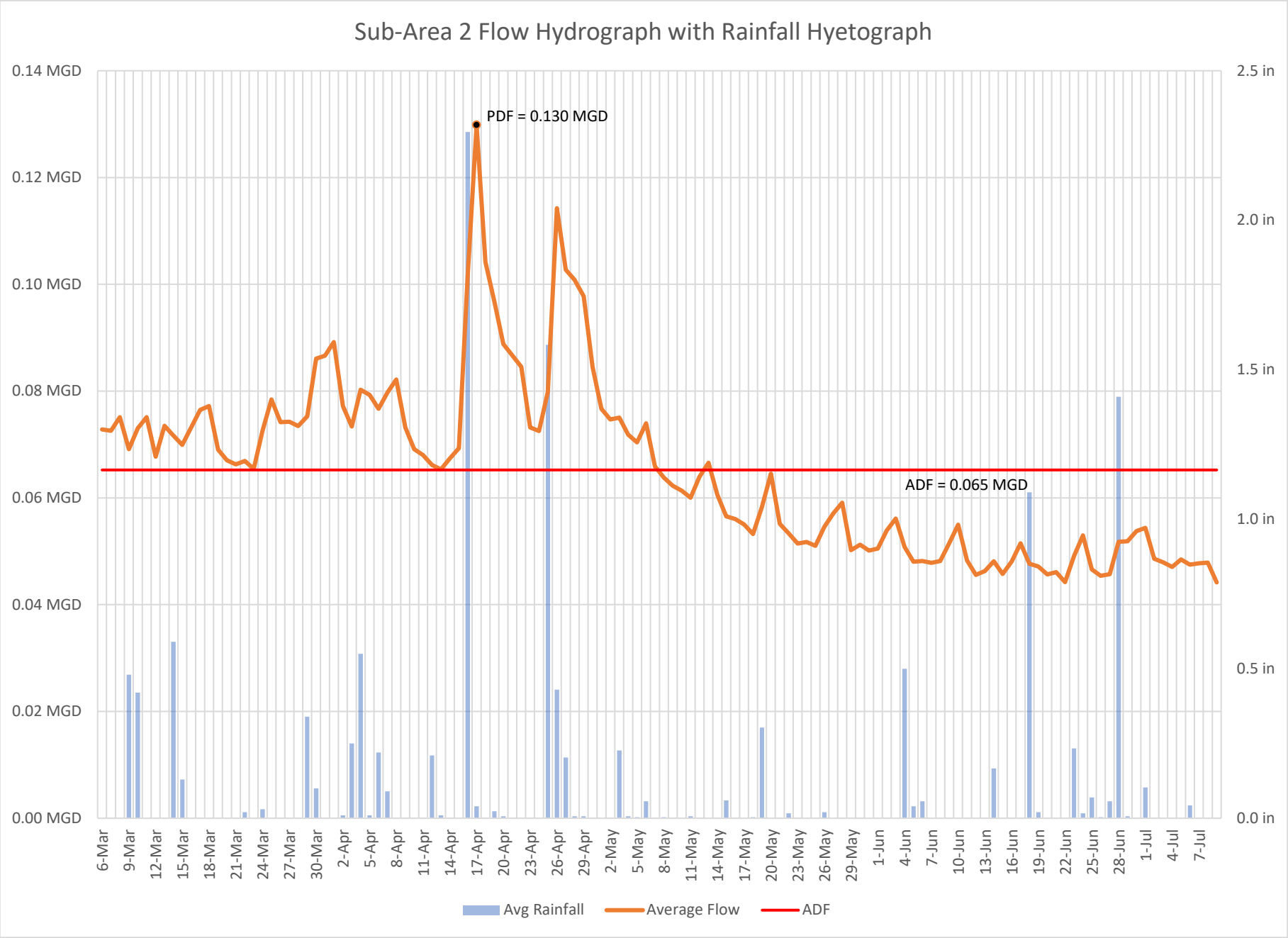
March 2018

APPENDIX B

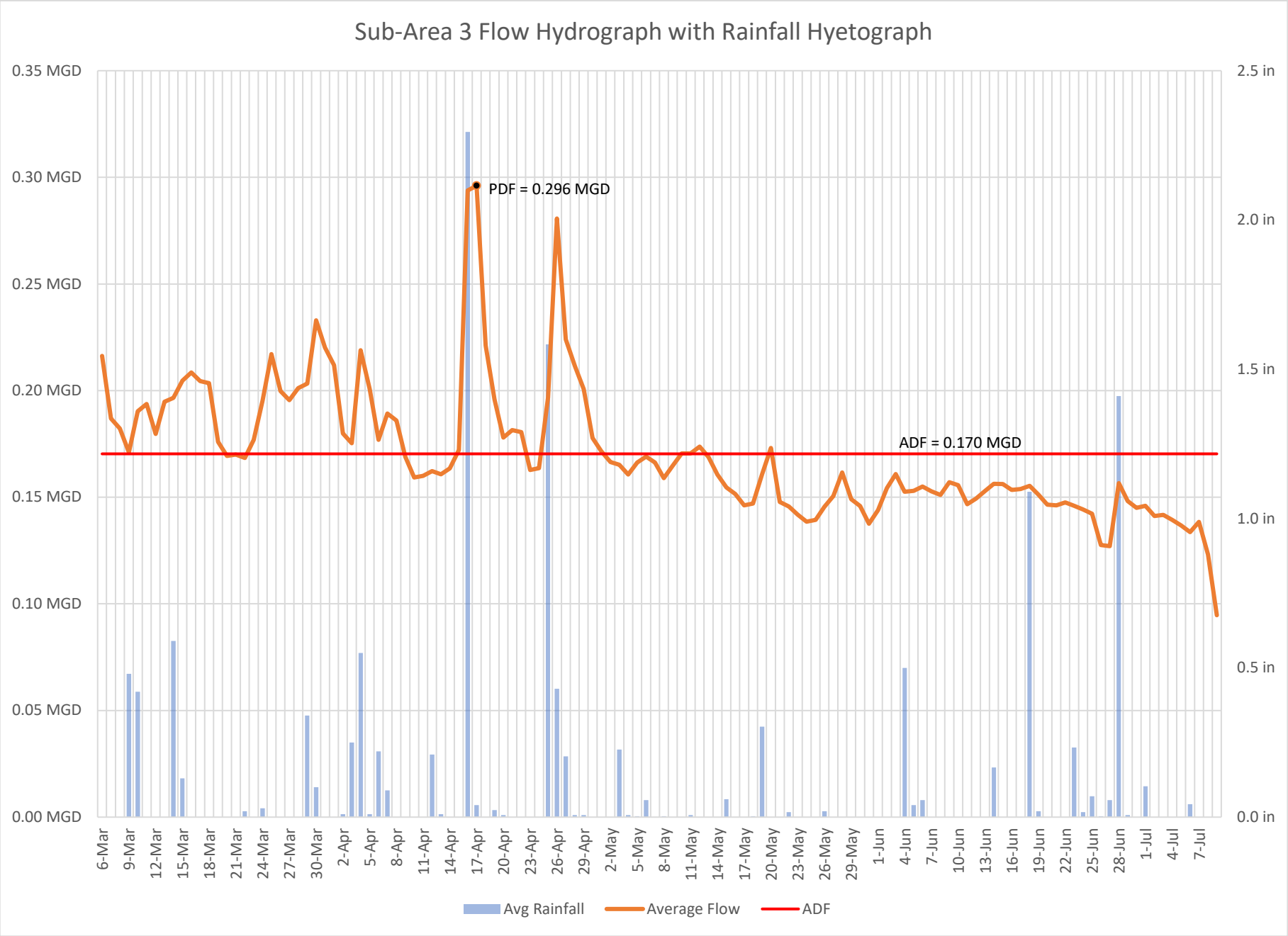
Flow Meter Hydrographs with Related Rainfall Hyetographs


Sub-Area 1 Flow Hydrograph with Rainfall Hyetograph
0.45 MGD
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.382 MGD
ADF = 0.147 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

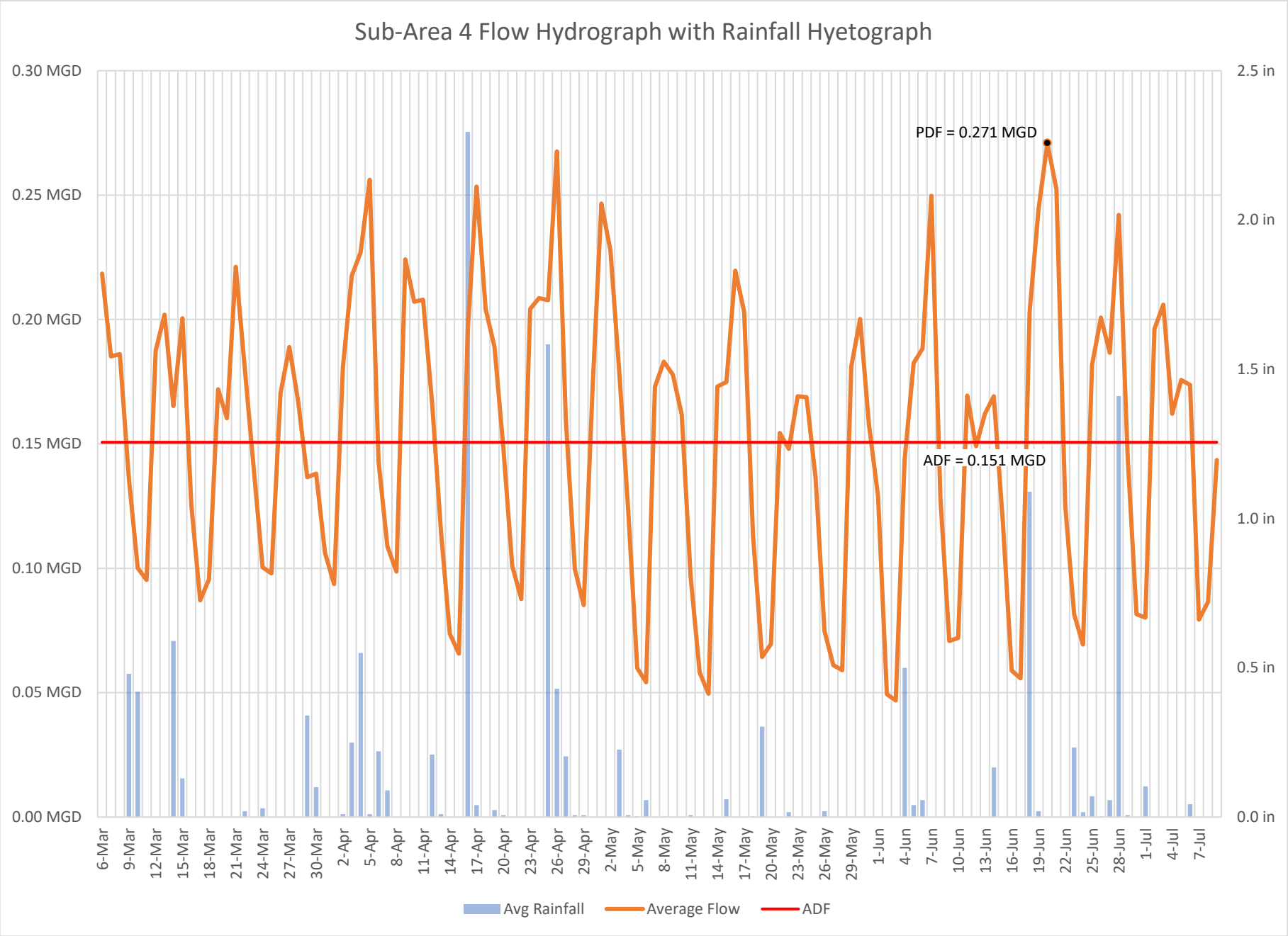
12/17/2018


Sub-Area 2 Flow Hydrograph with Rainfall Hyetograph
0.14 MGD
0.12 MGD
0.10 MGD
0.08 MGD
0.06 MGD
0.04 MGD
0.02 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.130 MGD
ADF = 0.065 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

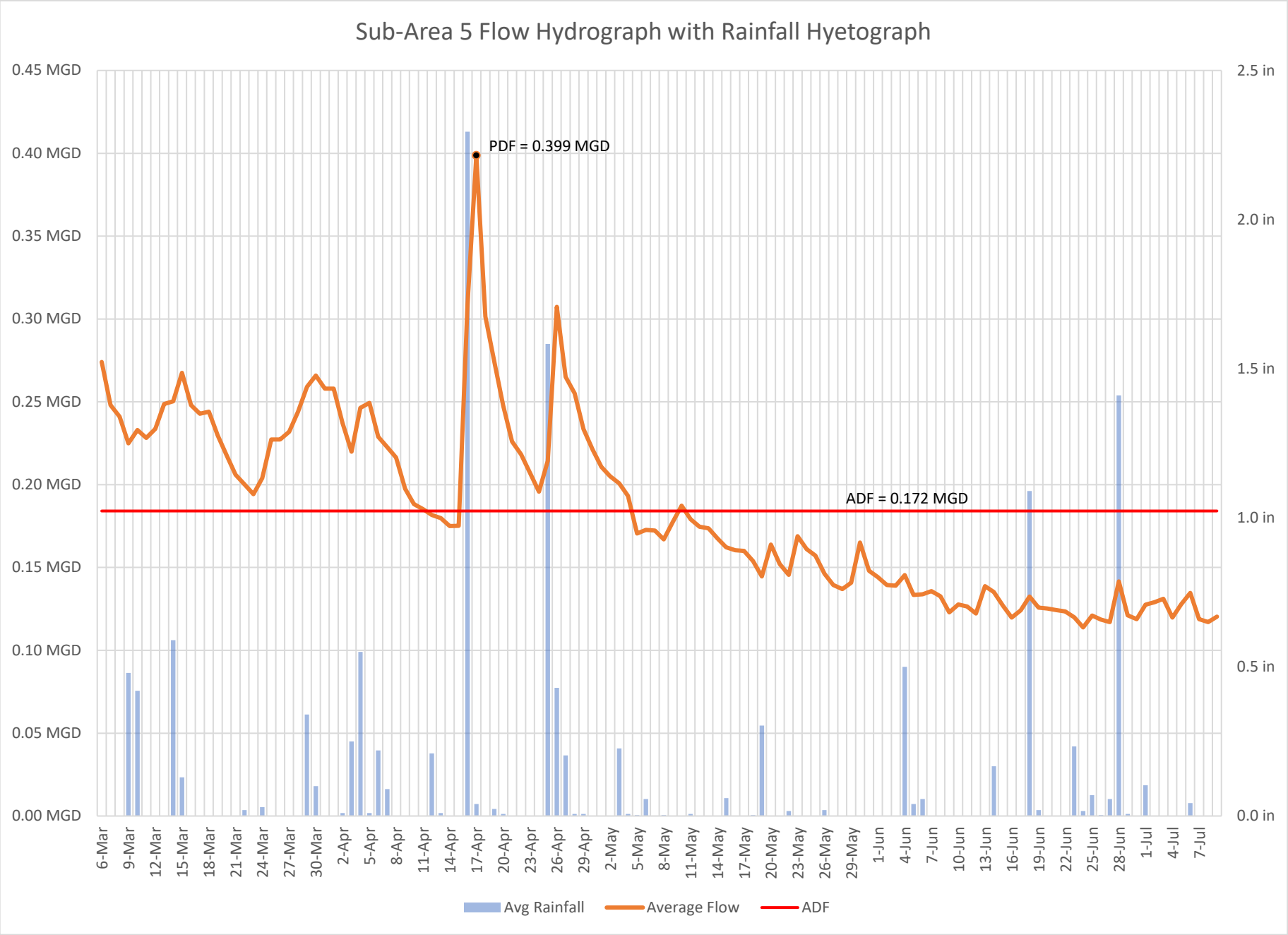
12/17/2018


Sub-Area 3 Flow Hydrograph with Rainfall Hyetograph
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.296 MGD
ADF = 0.170 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

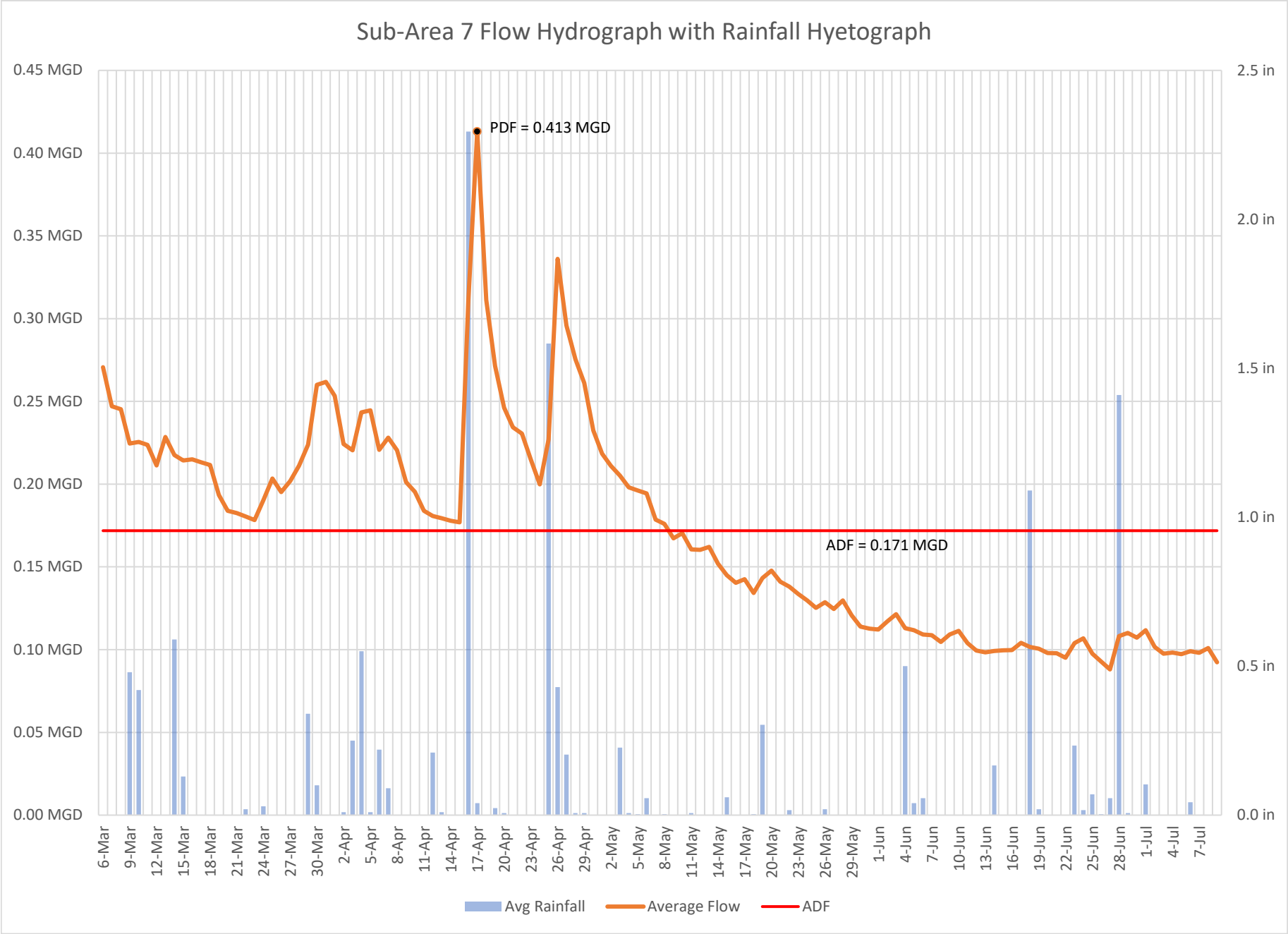
12/17/2018


Sub-Area 4 Flow Hydrograph with Rainfall Hyetograph
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.271 MGD
ADF = 0.151 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

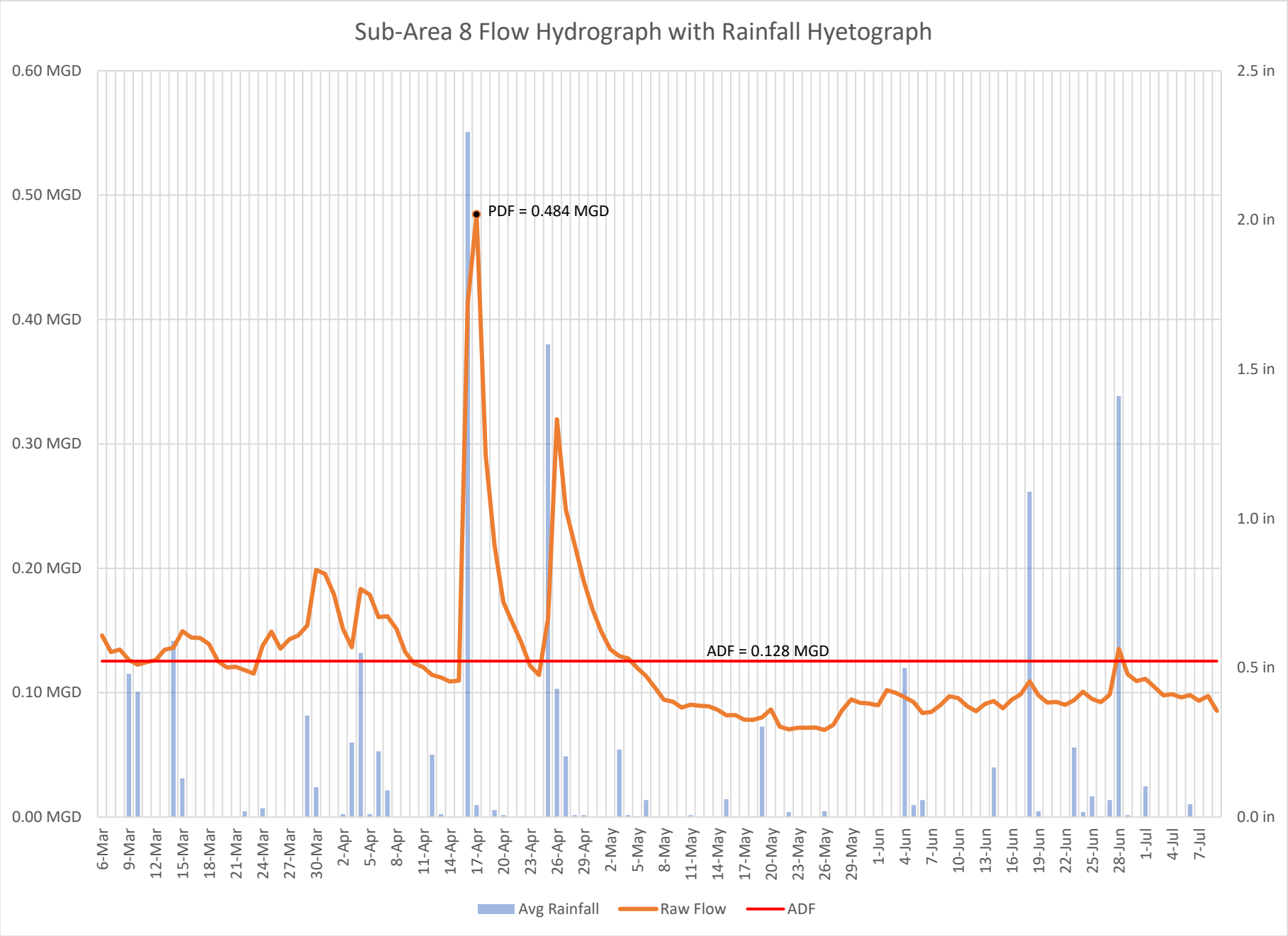
12/17/2018


Sub-Area 5 Flow Hydrograph with Rainfall Hyetograph
0.45 MGD
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.399 MGD
ADF = 0.172 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

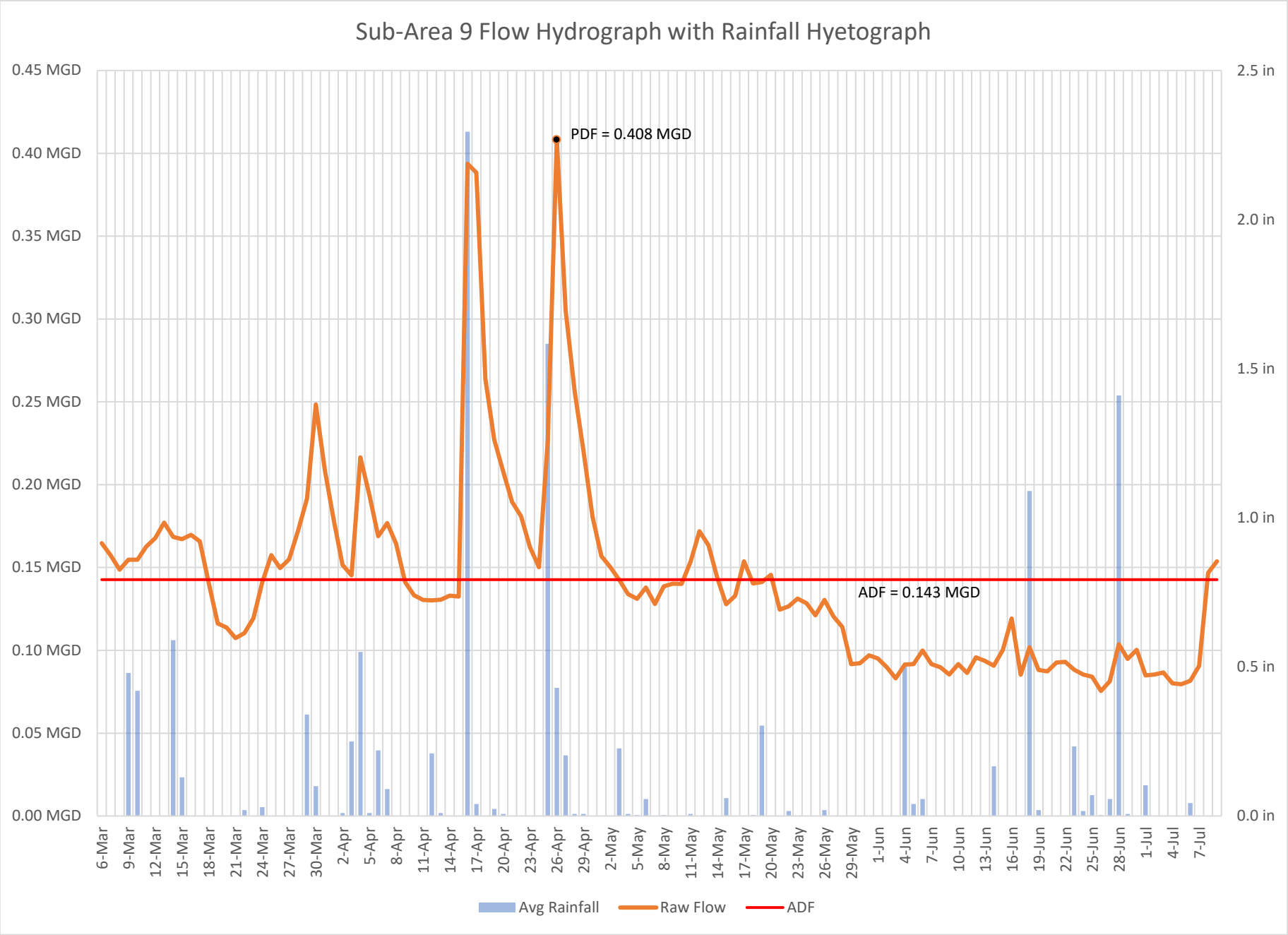
12/17/2018


Sub-Area 7 Flow Hydrograph with Rainfall Hyetograph
0.45 MGD
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.413 MGD
ADF = 0.171 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

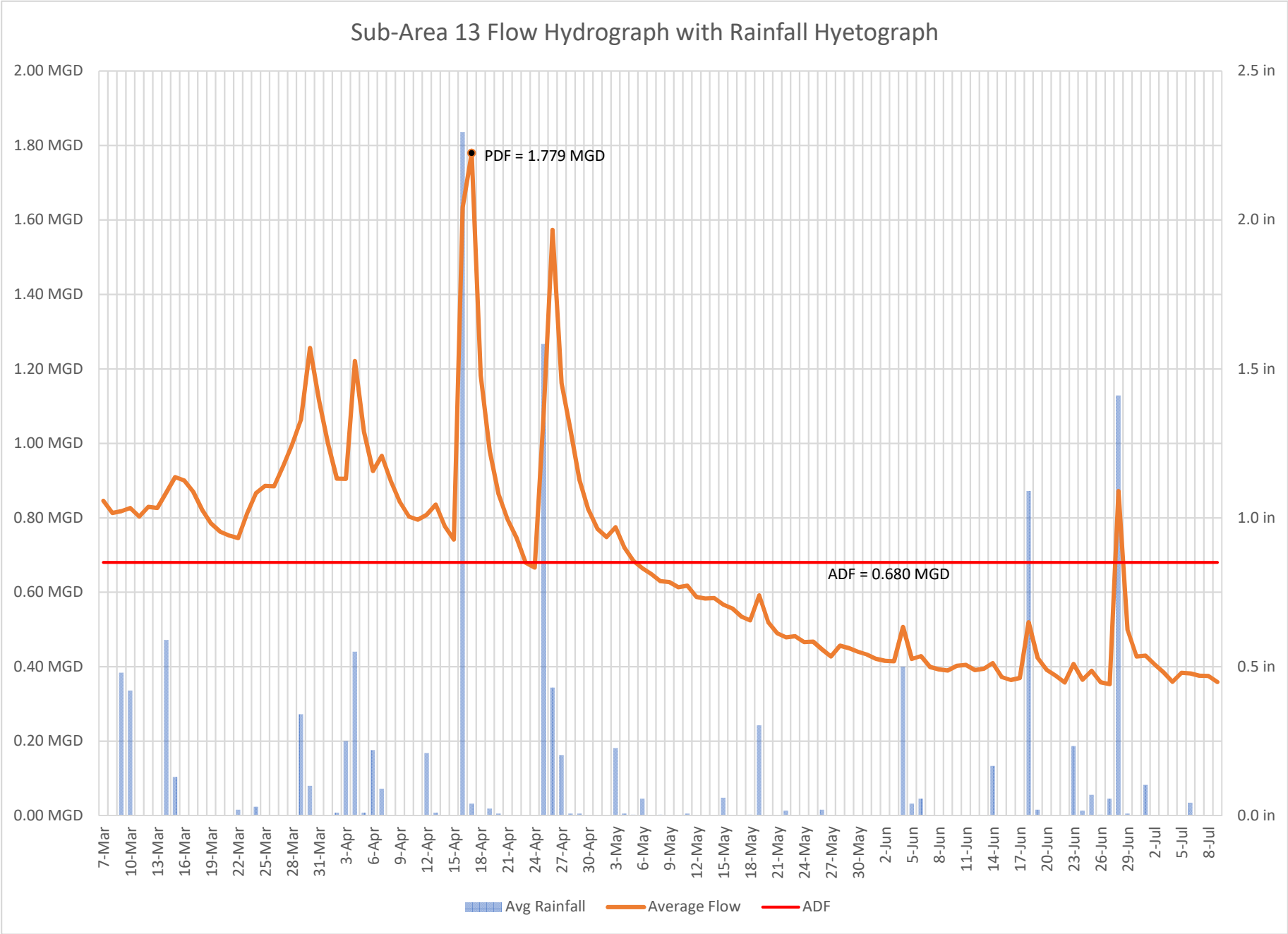
12/17/2018


Sub-Area 8 Flow Hydrograph with Rainfall Hyetograph
0.60 MGD
0.50 MGD
0.40 MGD
0.30 MGD
0.20 MGD
0.10 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.484 MGD
ADF = 0.128 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Raw Flow
ADF

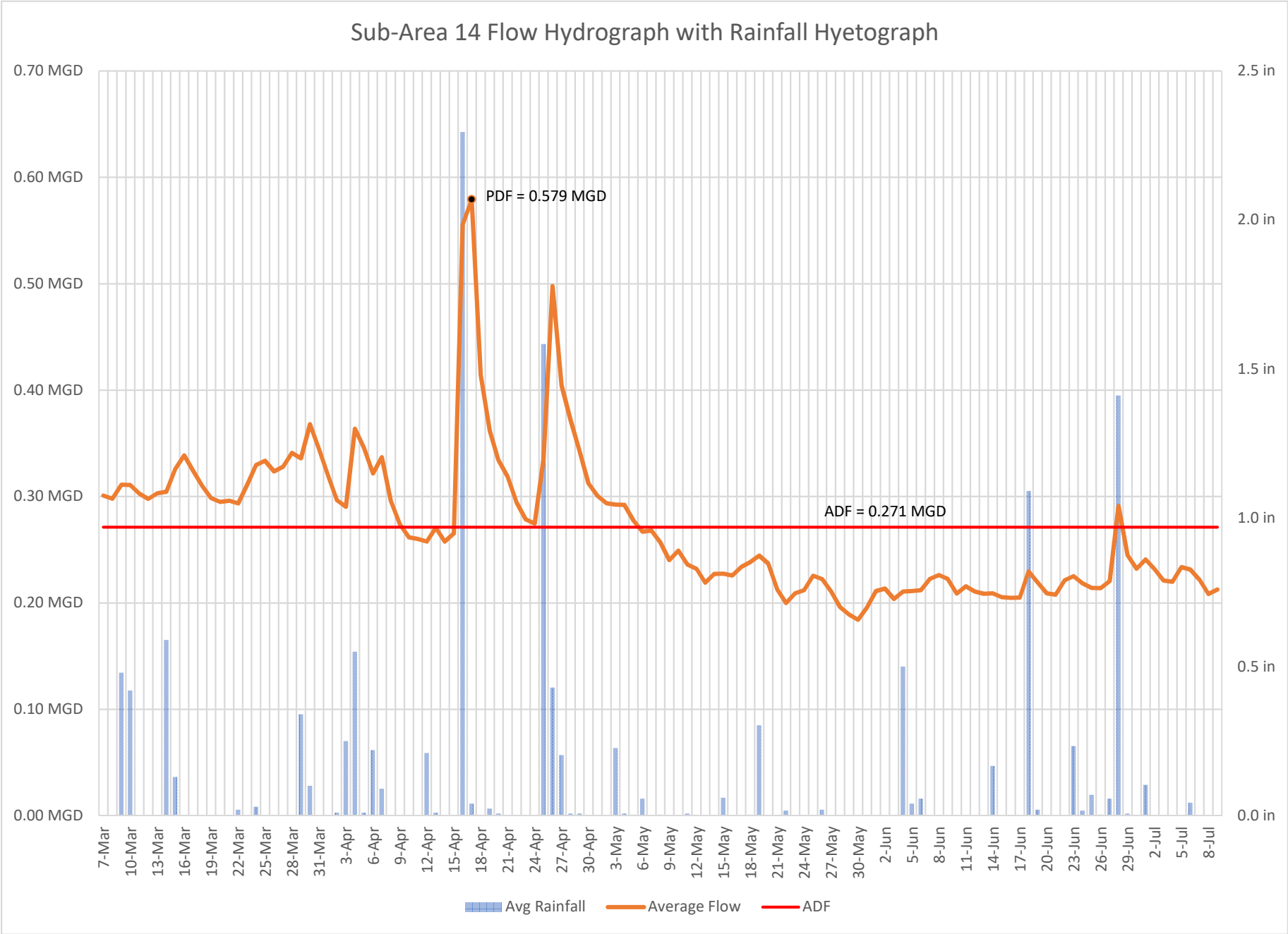
12/17/2018


Sub-Area 9 Flow Hydrograph with Rainfall Hyetograph
0.45 MGD
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.408 MGD
ADF = 0.143 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Raw Flow
ADF

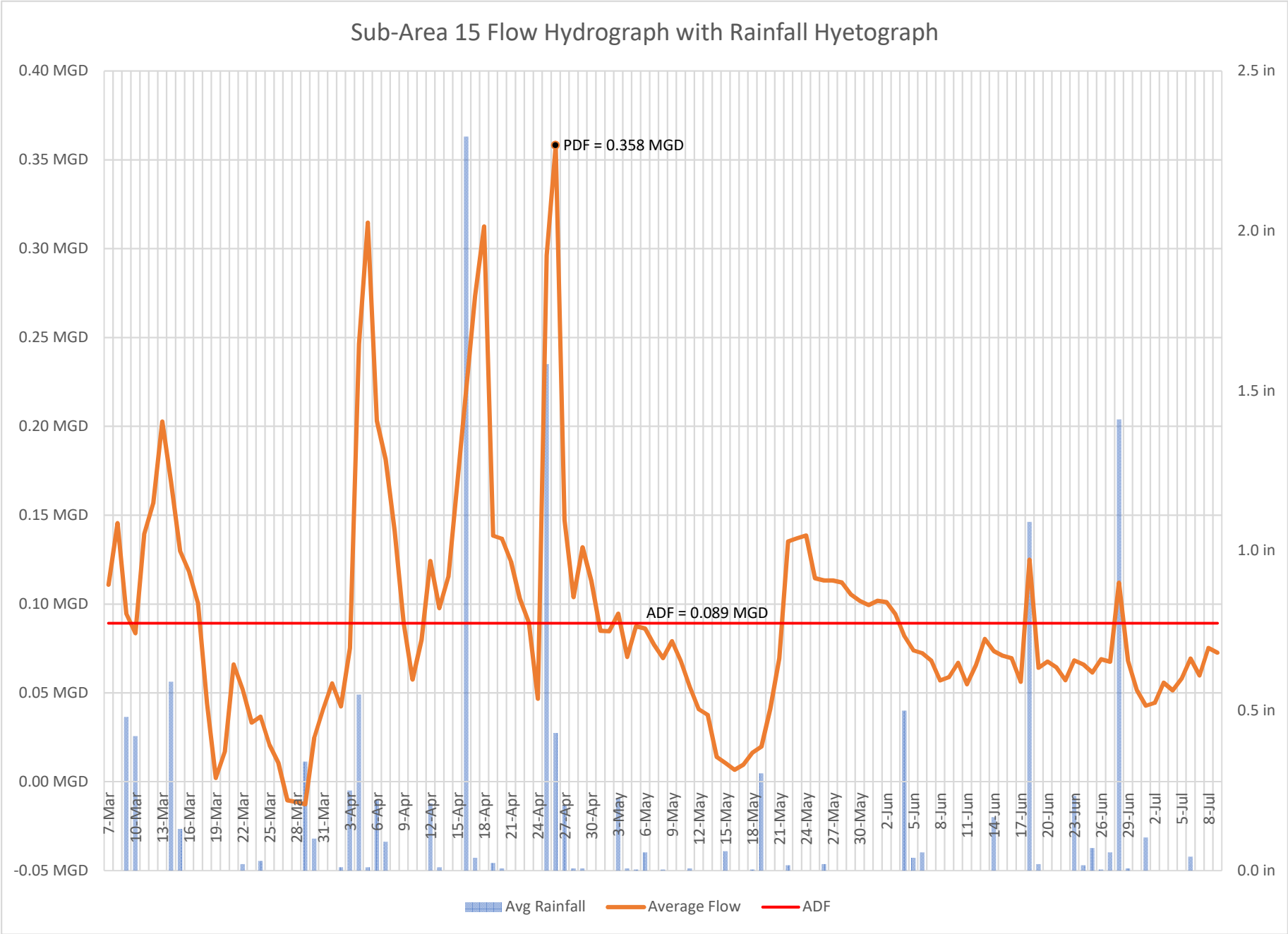
12/17/2018


Sub-Area 13 Flow Hydrograph with Rainfall Hyetograph
2.00 MGD
1.80 MGD
1.60 MGD
1.40 MGD
1.20 MGD
1.00 MGD
0.80 MGD
0.60 MGD
0.40 MGD
0.20 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 1.779 MGD
ADF = 0.680 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

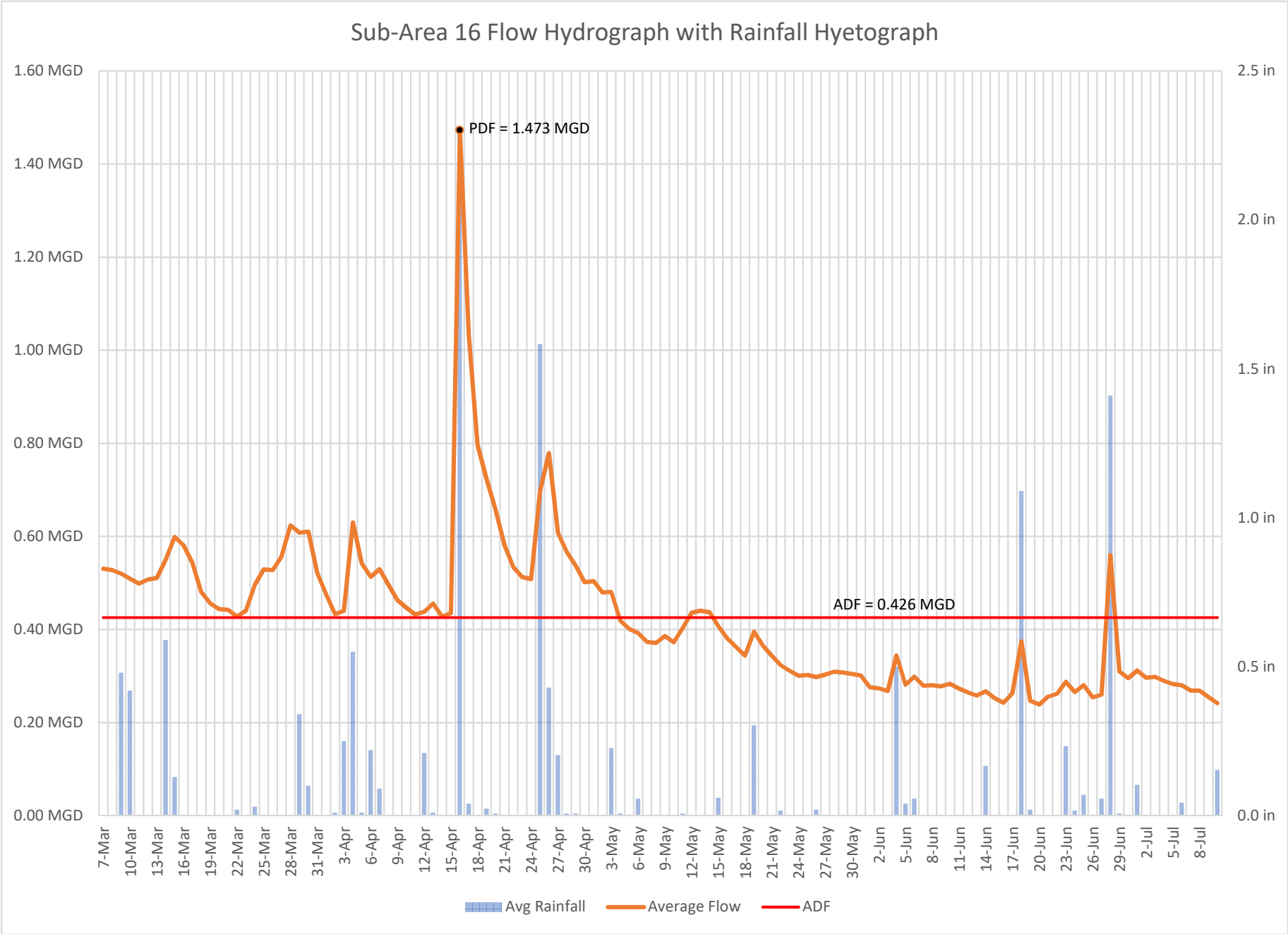
12/17/2018


Sub-Area 14 Flow Hydrograph with Rainfall Hyetograph
0.70 MGD
0.60 MGD
0.50 MGD
0.40 MGD
0.30 MGD
0.20 MGD
0.10 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.579 MGD
ADF = 0.271 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

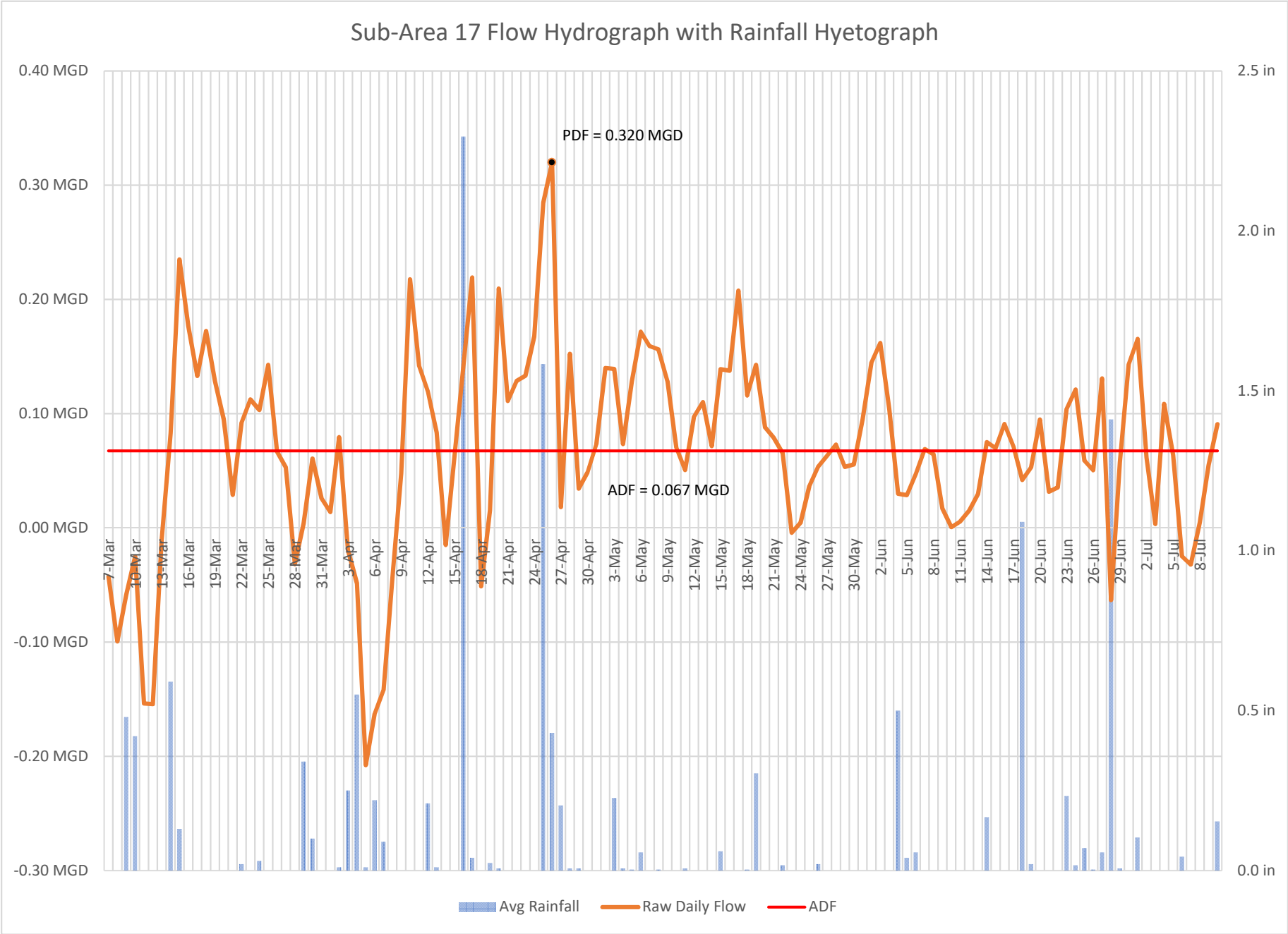
12/17/2018


Sub-Area 15 Flow Hydrograph with Rainfall Hyetograph
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
-0.05 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.358 MGD
ADF = 0.089 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

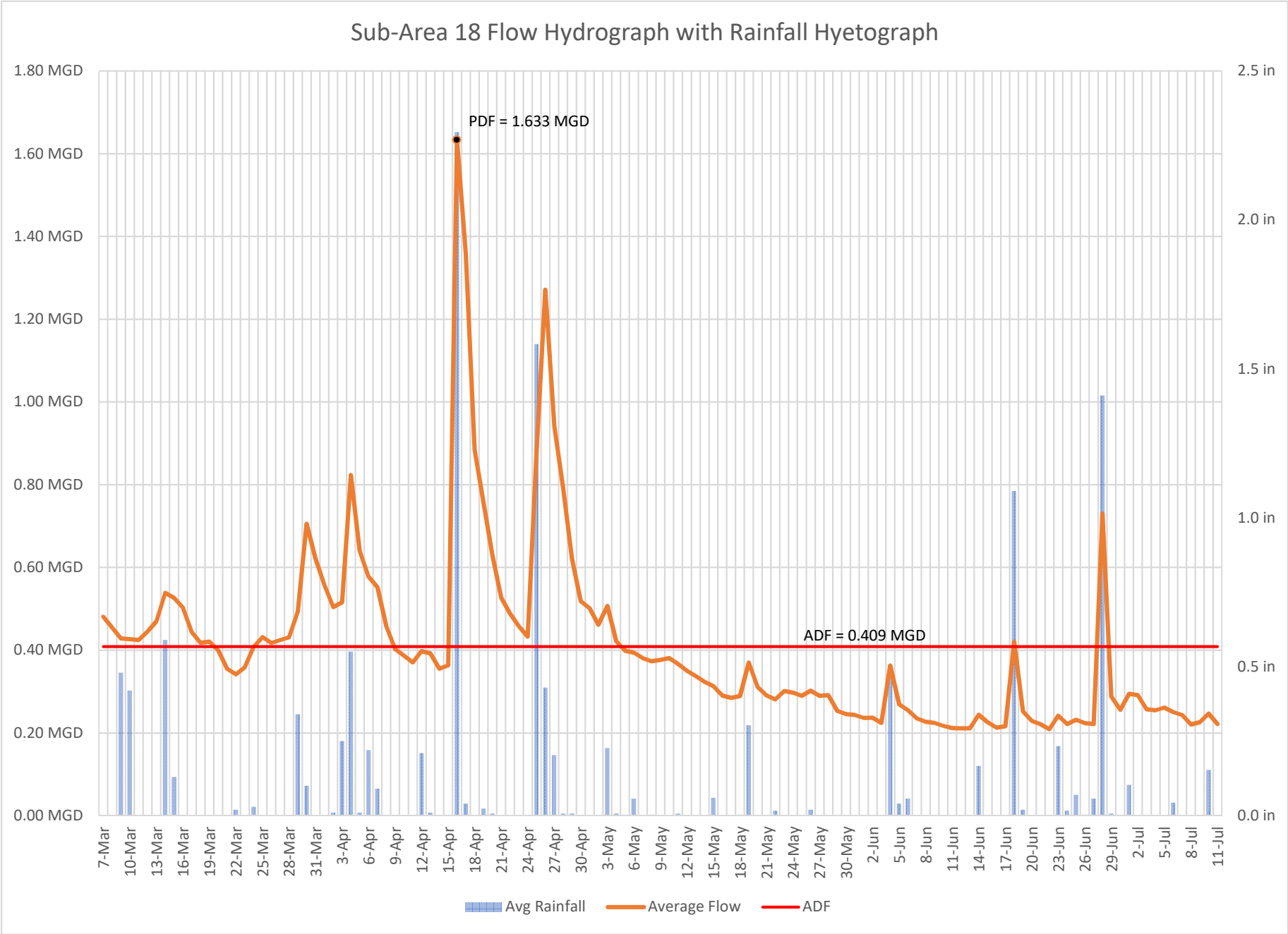
12/17/2018


Sub-Area 16 Flow Hydrograph with Rainfall Hyetograph
1.60 MGD
1.40 MGD
1.20 MGD
1.00 MGD
0.80 MGD
0.60 MGD
0.40 MGD
0.20 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 1.473 MGD
ADF = 0.426 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

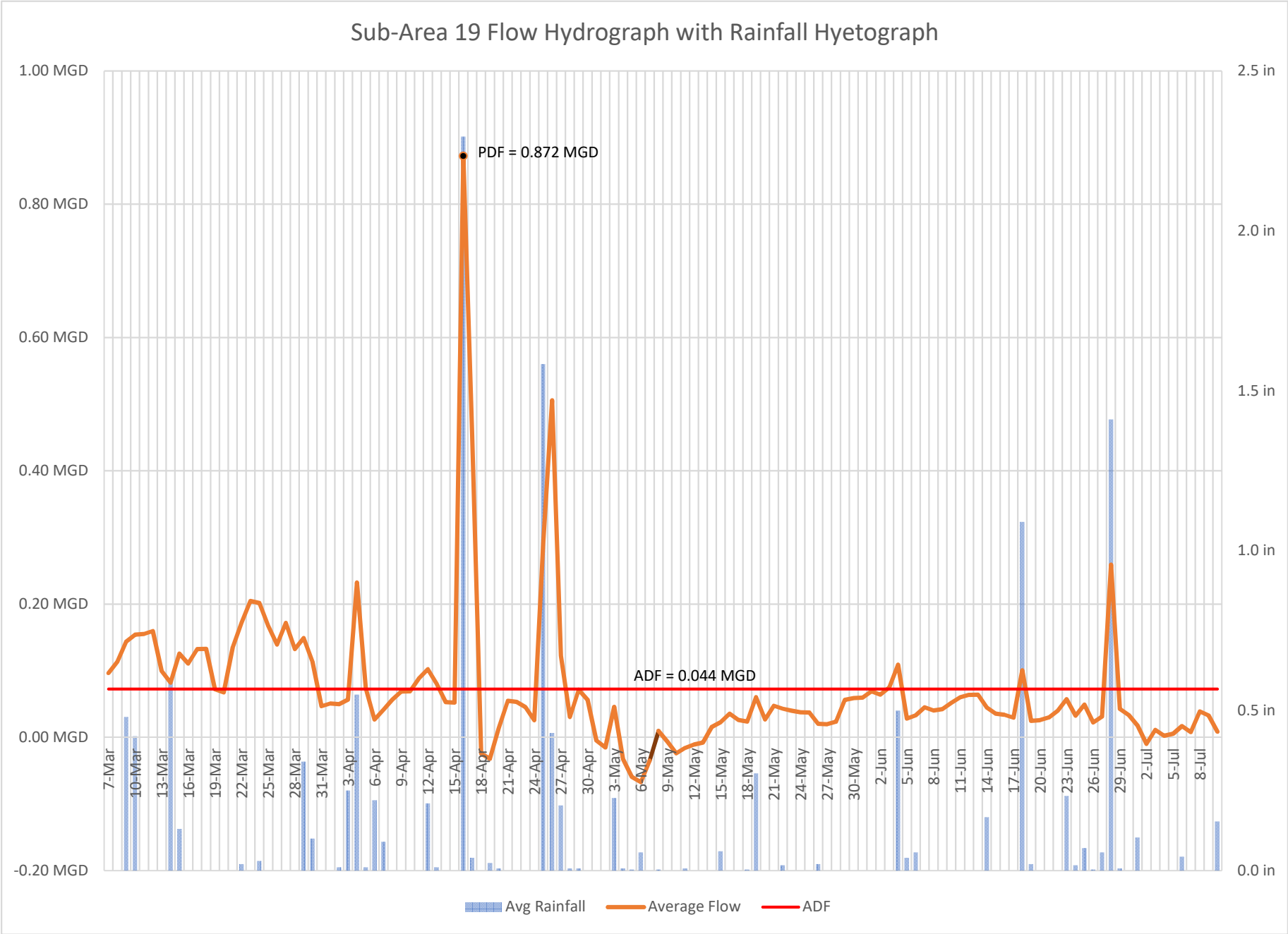
12/17/2018


Sub-Area 17 Flow Hydrograph with Rainfall Hyetograph
0.40 MGD
0.30 MGD
0.20 MGD
0.10 MGD
0.00 MGD
-0.10 MGD
-0.20 MGD
-0.30 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.320 MGD
ADF = 0.067 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Raw Daily Flow
ADF

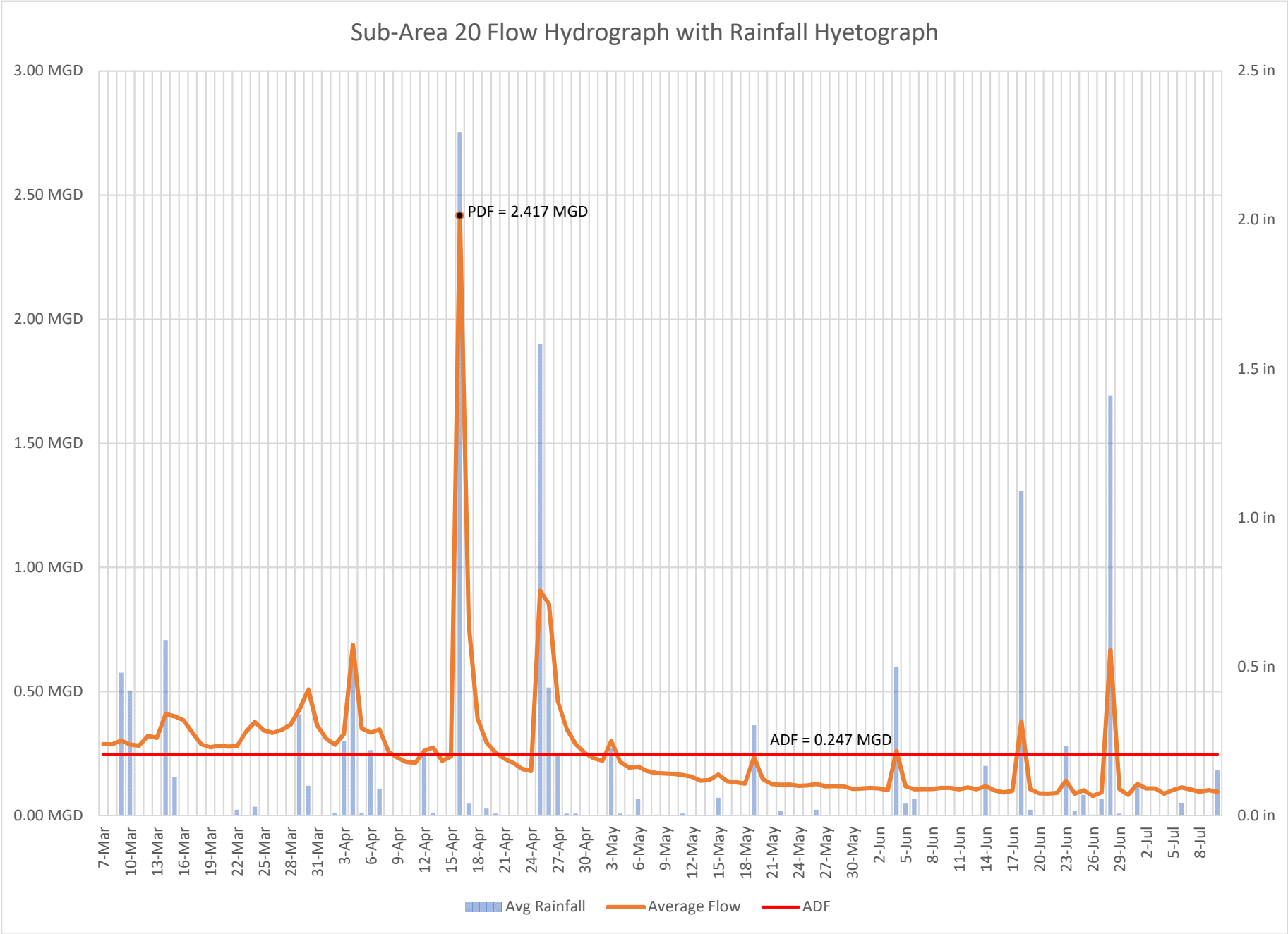
12/17/2018


Sub-Area 18 Flow Hydrograph with Rainfall Hyetograph
1.80 MGD
1.60 MGD
1.40 MGD
1.20 MGD
1.00 MGD
0.80 MGD
0.60 MGD
0.40 MGD
0.20 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 1.633 MGD
ADF = 0.409 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
11-Jul
Avg Rainfall
Average Flow
ADF

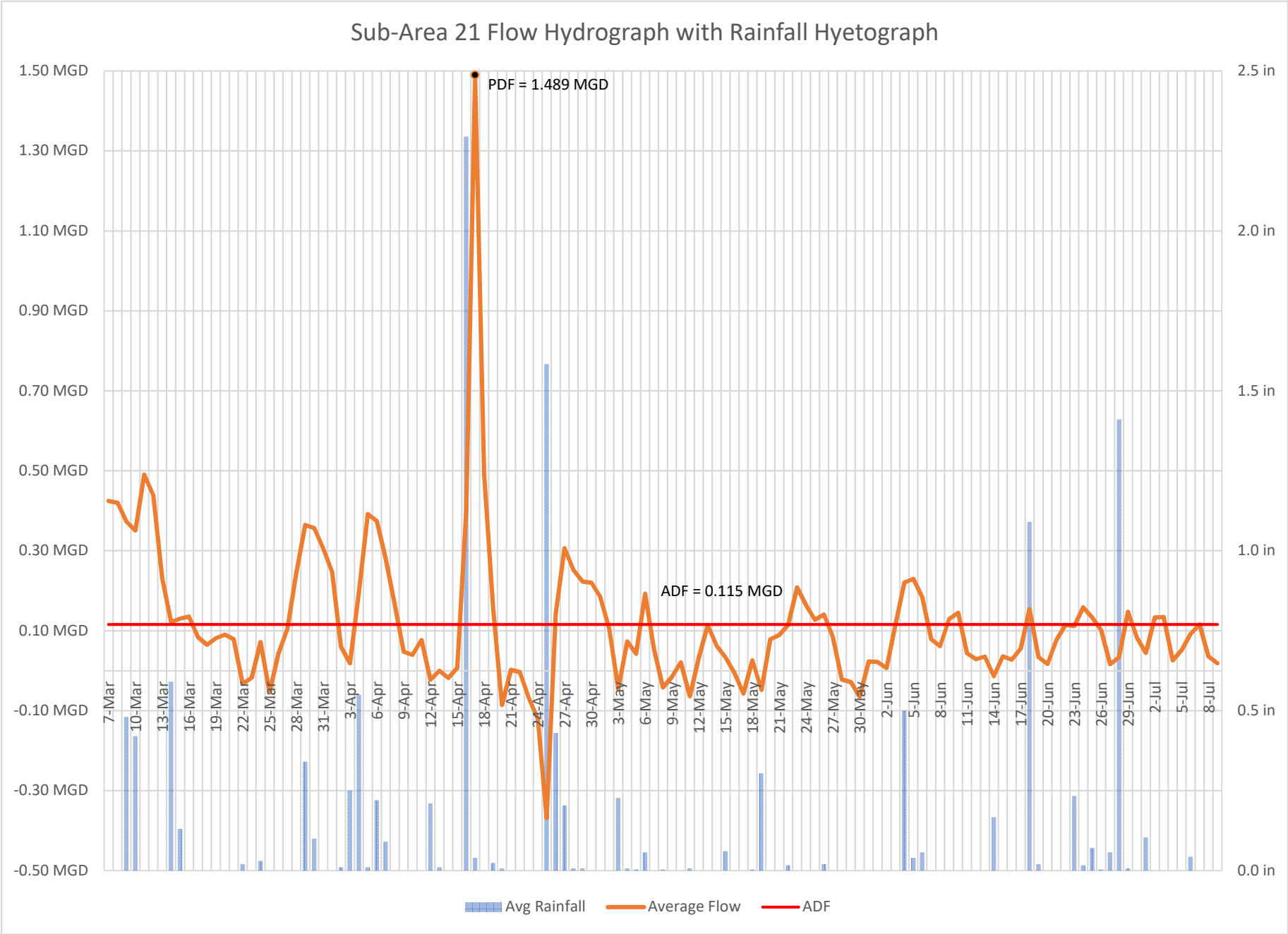
12/17/2018


Sub-Area 19 Flow Hydrograph with Rainfall Hyetograph
1.00 MGD
0.80 MGD
0.60 MGD
0.40 MGD
0.20 MGD
0.00 MGD
-0.20 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.872 MGD
ADF = 0.044 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

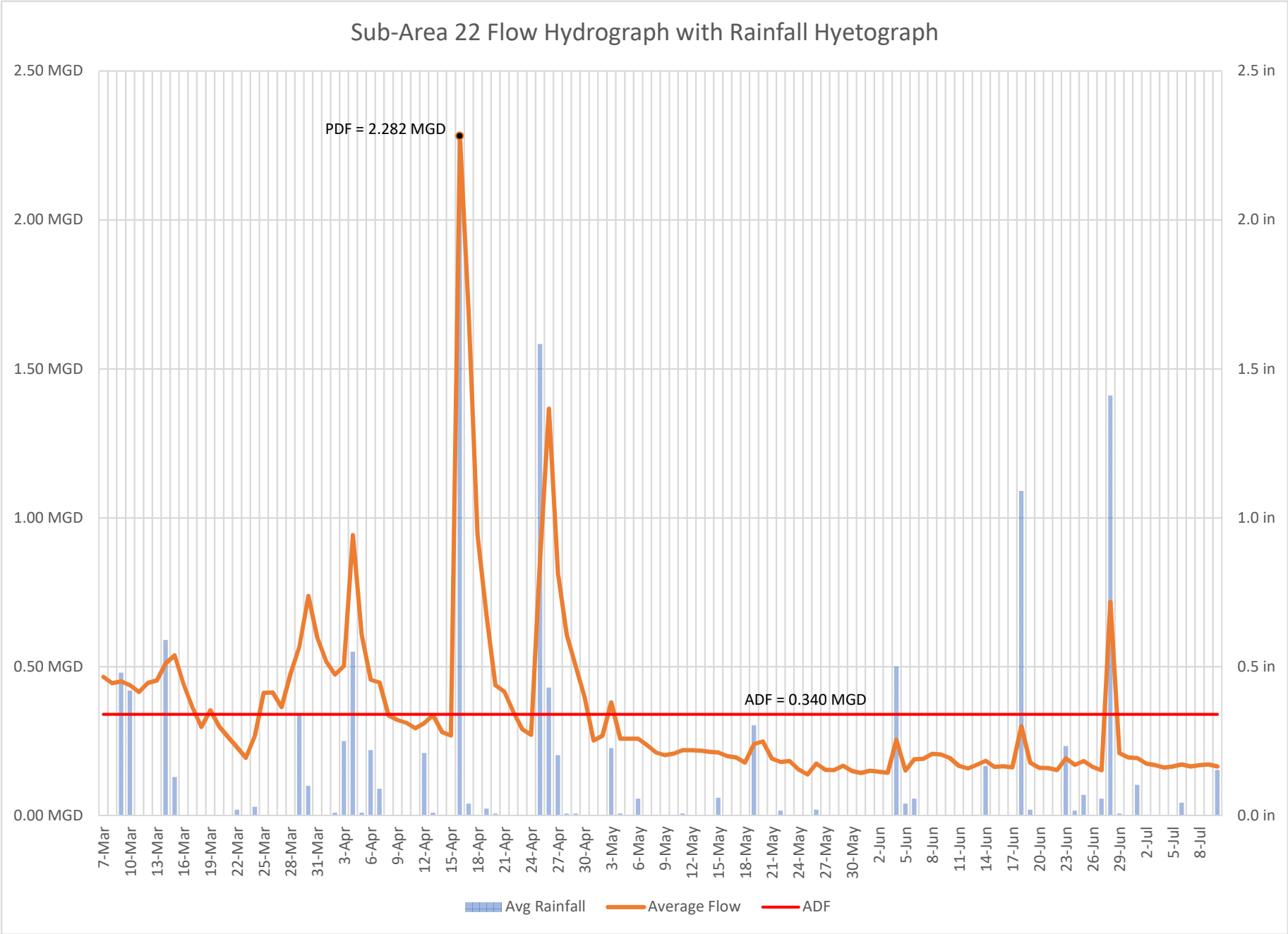
12/17/2018


Sub-Area 20 Flow Hydrograph with Rainfall Hyetograph
3.00 MGD
2.50 MGD
2.00 MGD
1.50 MGD
1.00 MGD
0.50 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 2.417 MGD
ADF = 0.247 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

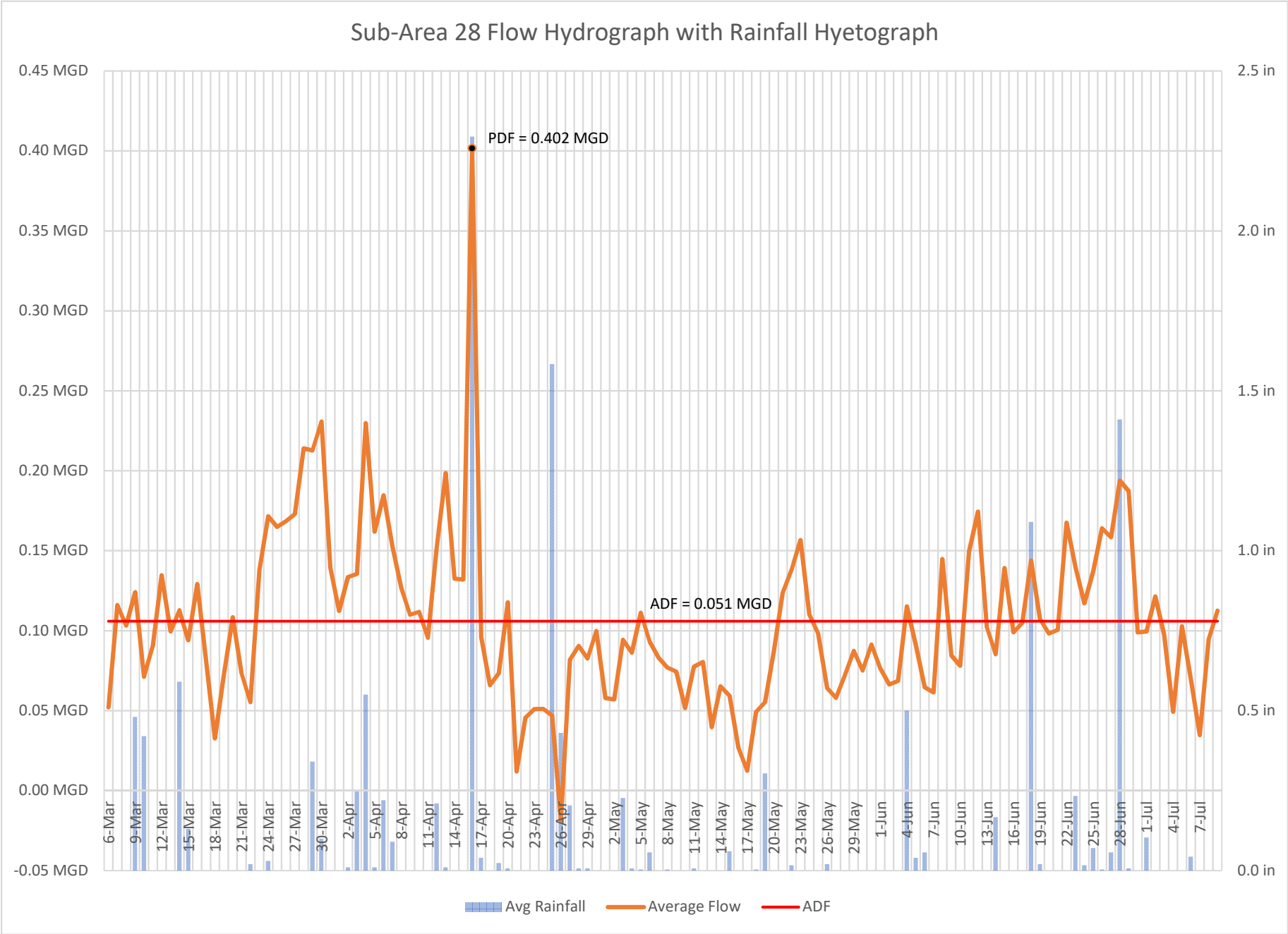
12/17/2018


Sub-Area 21 Flow Hydrograph with Rainfall Hyetograph
PDF = 1.489 MGD
ADF = 0.115 MGD
1.50 MGD
1.30 MGD
1.10 MGD
0.90 MGD
0.70 MGD
0.50 MGD
0.30 MGD
0.10 MGD
-0.10 MGD
-0.30 MGD
-0.50 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

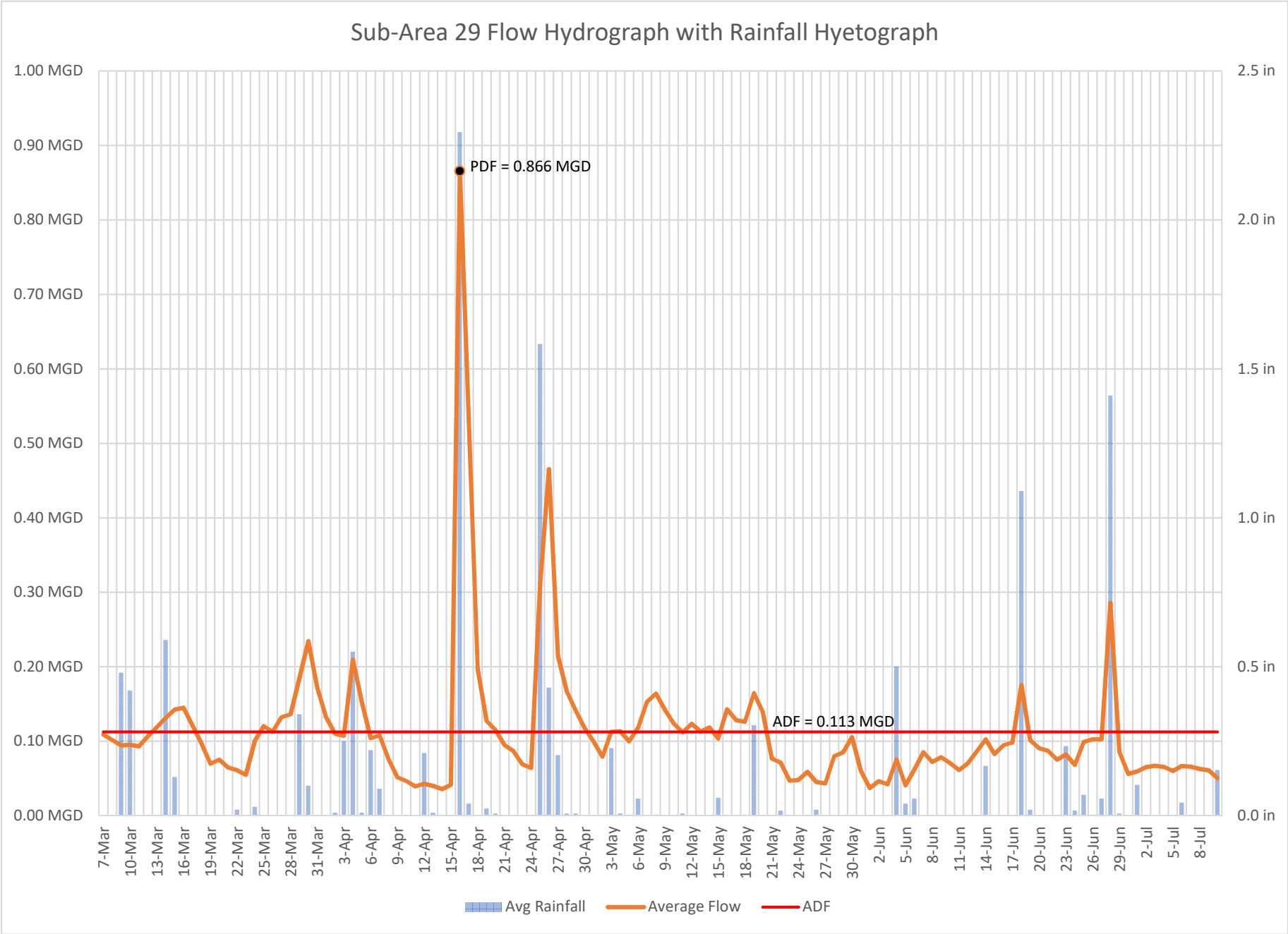
12/17/2018


Sub-Area 22 Flow Hydrograph with Rainfall Hyetograph
2.50 MGD
2.00 MGD
1.50 MGD
1.00 MGD
0.50 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 2.282 MGD
ADF = 0.340 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

12/17/2018


Sub-Area 28 Flow Hydrograph with Rainfall Hyetograph
0.45 MGD
0.40 MGD
0.35 MGD
0.30 MGD
0.25 MGD
0.20 MGD
0.15 MGD
0.10 MGD
0.05 MGD
0.00 MGD
-0.05 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.402 MGD
ADF = 0.051 MGD
6-Mar
9-Mar
12-Mar
15-Mar
18-Mar
21-Mar
24-Mar
27-Mar
30-Mar
2-Apr
5-Apr
8-Apr
11-Apr
14-Apr
17-Apr
20-Apr
23-Apr
26-Apr
29-Apr
2-May
5-May
8-May
11-May
14-May
17-May
20-May
23-May
26-May
29-May
1-Jun
4-Jun
7-Jun
10-Jun
13-Jun
16-Jun
19-Jun
22-Jun
25-Jun
28-Jun
1-Jul
4-Jul
7-Jul
Avg Rainfall
Average Flow
ADF

12/17/2018


Sub-Area 29 Flow Hydrograph with Rainfall Hyetograph
1.00 MGD
0.90 MGD
0.80 MGD
0.70 MGD
0.60 MGD
0.50 MGD
0.40 MGD
0.30 MGD
0.20 MGD
0.10 MGD
0.00 MGD
2.5 in
2.0 in
1.5 in
1.0 in
0.5 in
0.0 in
PDF = 0.866 MGD
ADF = 0.113 MGD
7-Mar
10-Mar
13-Mar
16-Mar
19-Mar
22-Mar
25-Mar
28-Mar
31-Mar
3-Apr
6-Apr
9-Apr
12-Apr
15-Apr
18-Apr
21-Apr
24-Apr
27-Apr
30-Apr
3-May
6-May
9-May
12-May
15-May
18-May
21-May
24-May
27-May
30-May
2-Jun
5-Jun
8-Jun
11-Jun
14-Jun
17-Jun
20-Jun
23-Jun
26-Jun
29-Jun
2-Jul
5-Jul
8-Jul
Avg Rainfall
Average Flow
ADF

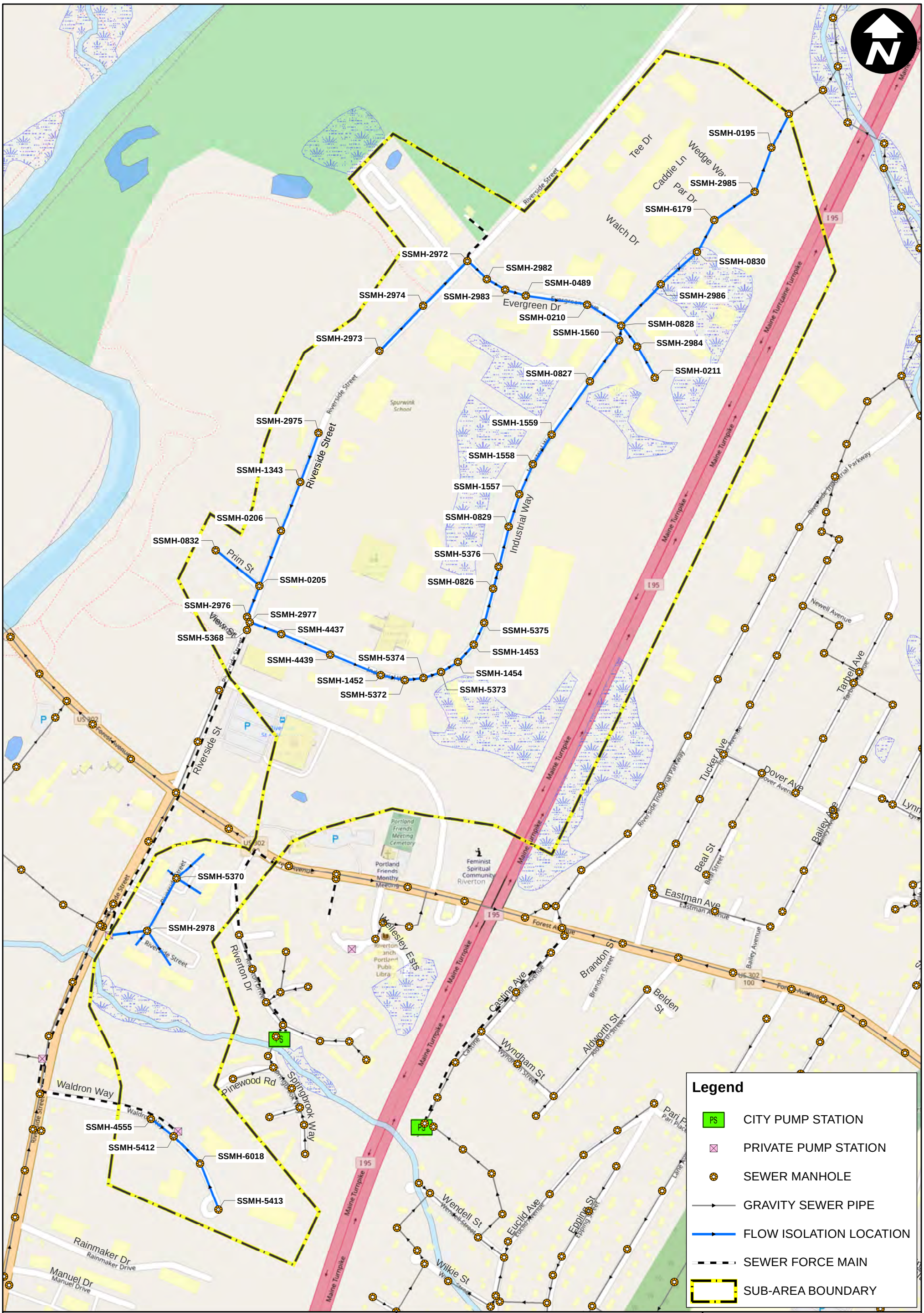
12/17/2018

APPENDIX C

Follow-on Investigation Sub-Area Figures

INFILTRATION AND INFLOW INVESTIGATIONS:

FLOW ISOLATION LOCATIONS



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

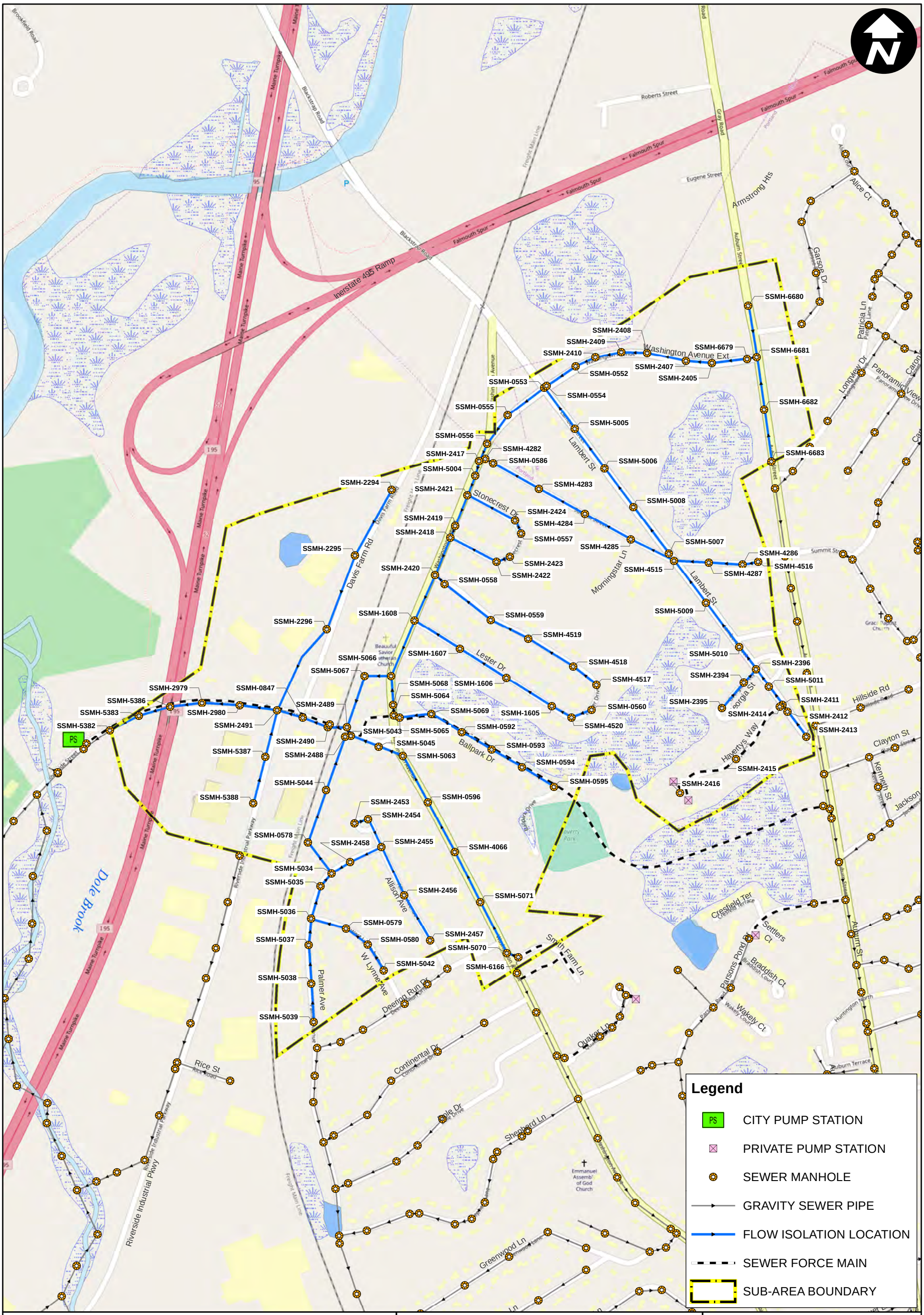
Sub-Area 4

Flow Isolation Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 4.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 5

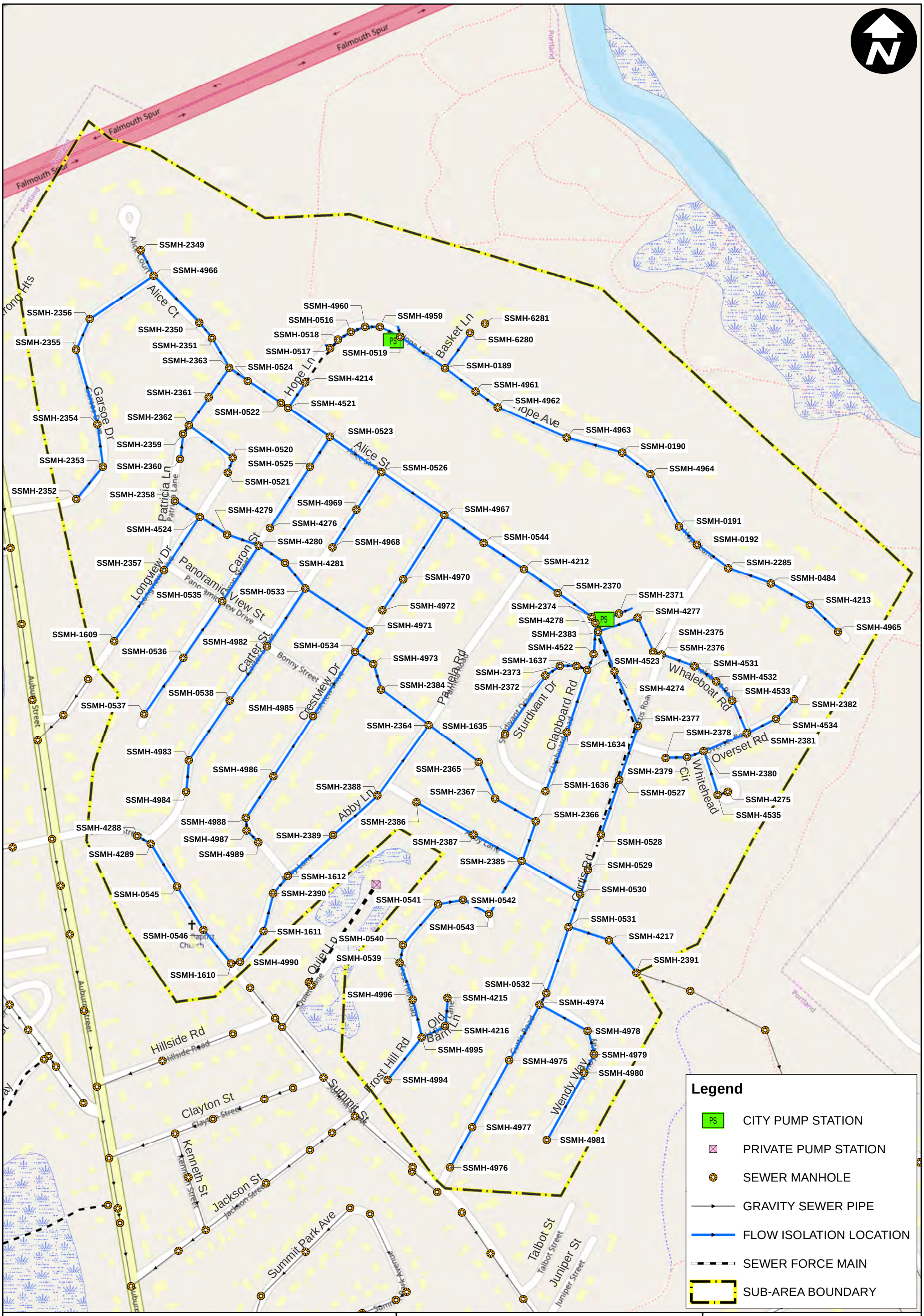
Flow Isolation Locations

0 200 400 600 800 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 5.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 7

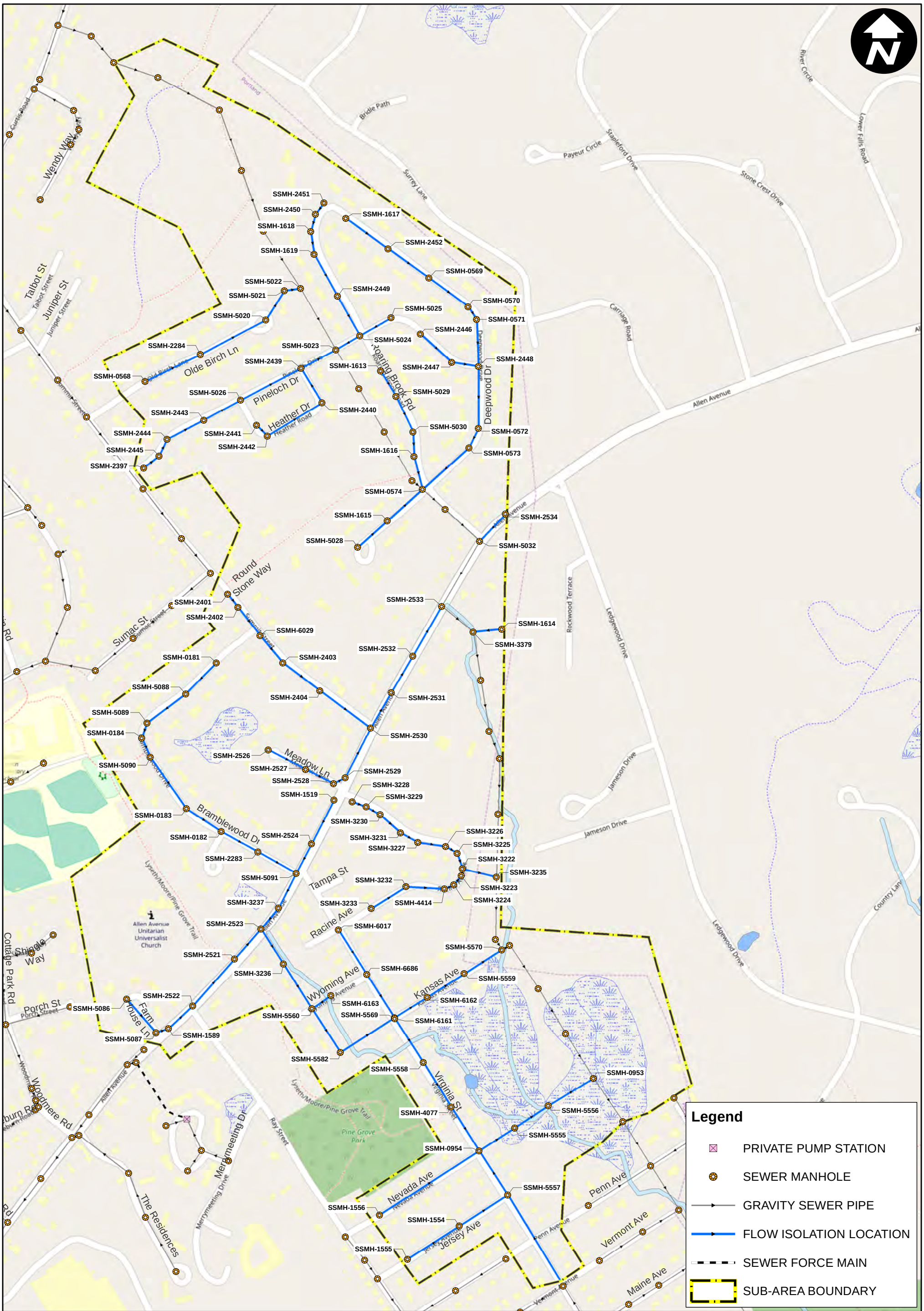
Flow Isolation Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 7.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 8

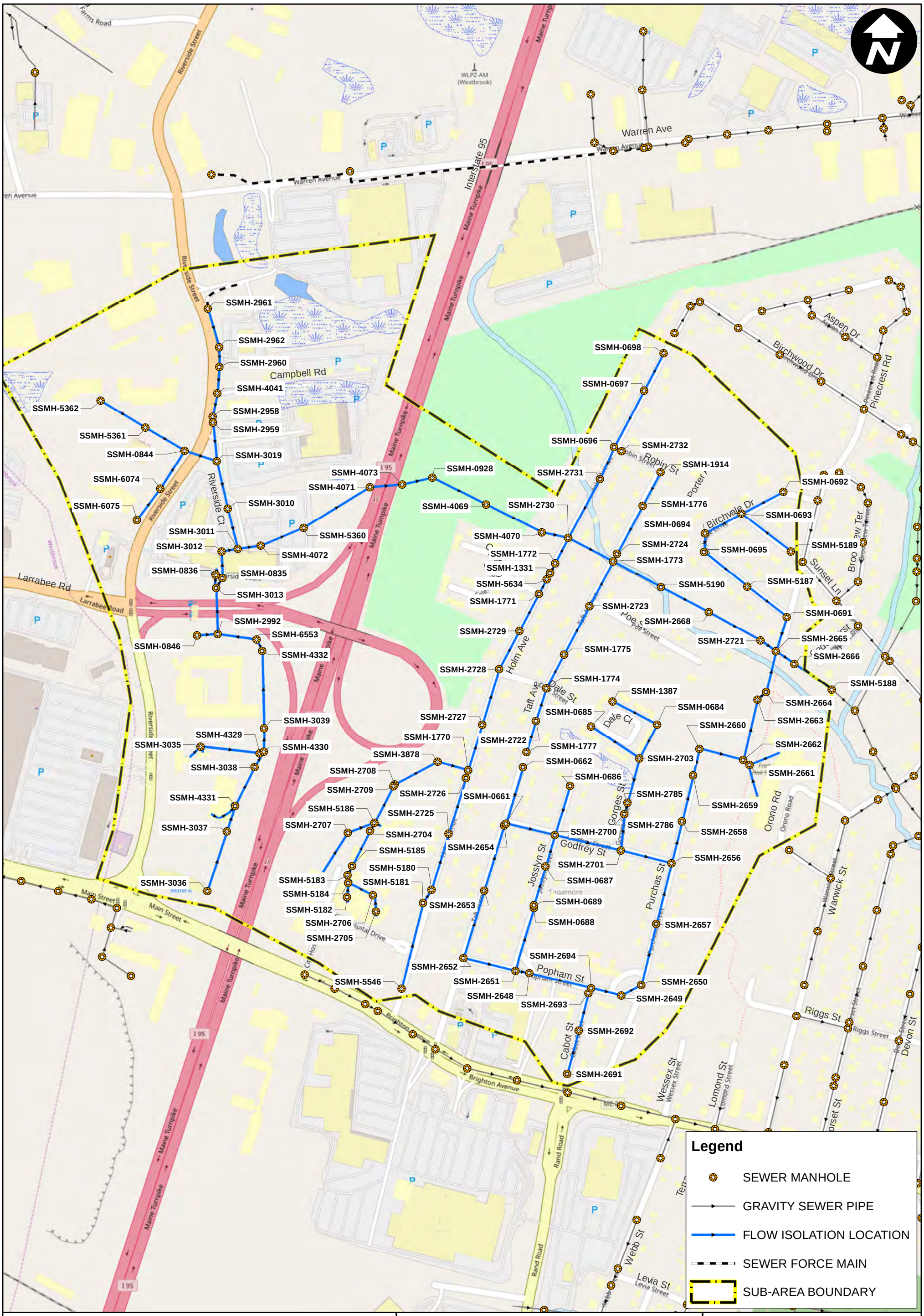
Flow Isolation Locations

0 200 400 600 800 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 8.mxd



City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 14

Flow Isolation Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

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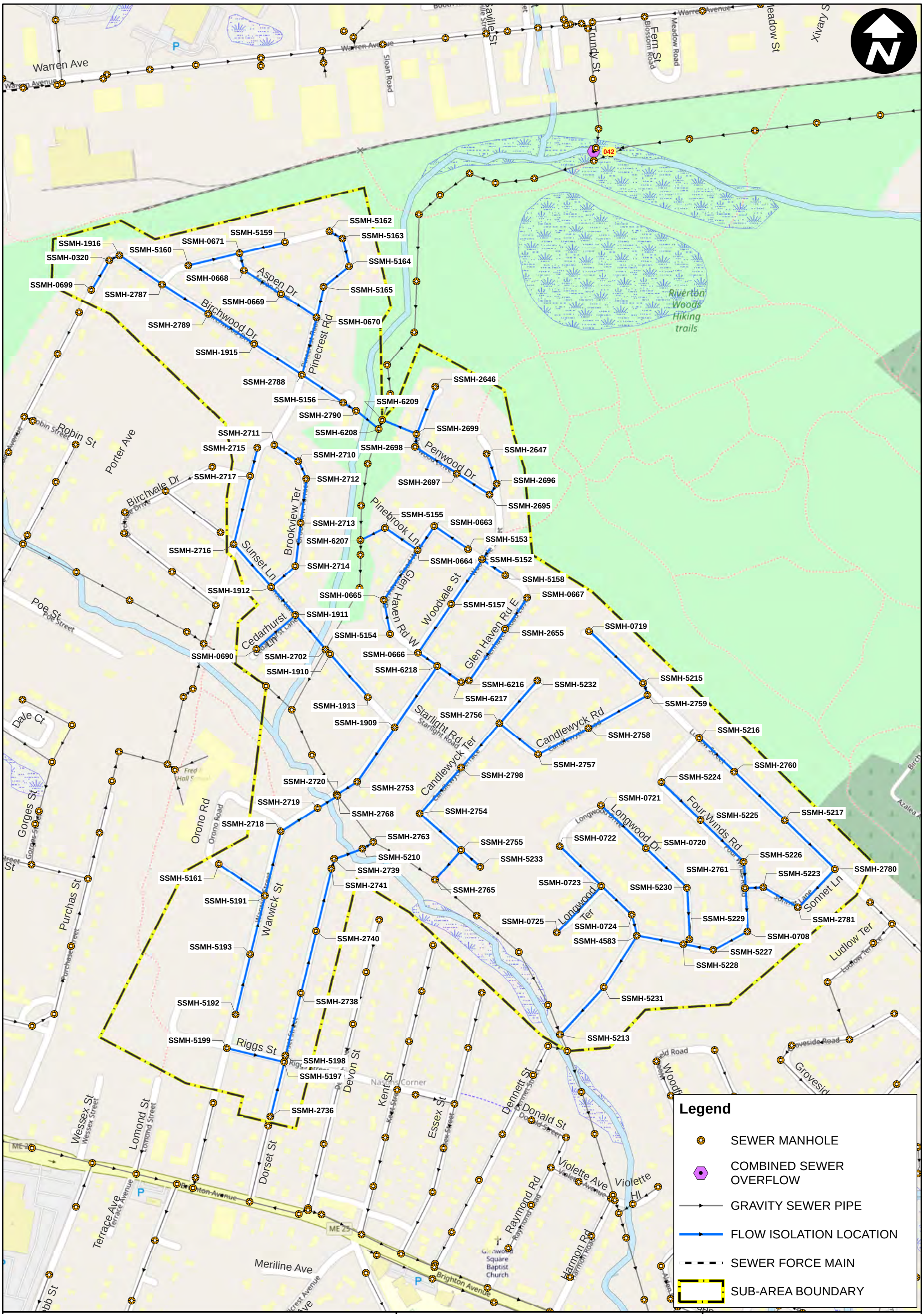

City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 15

Flow Isolation Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

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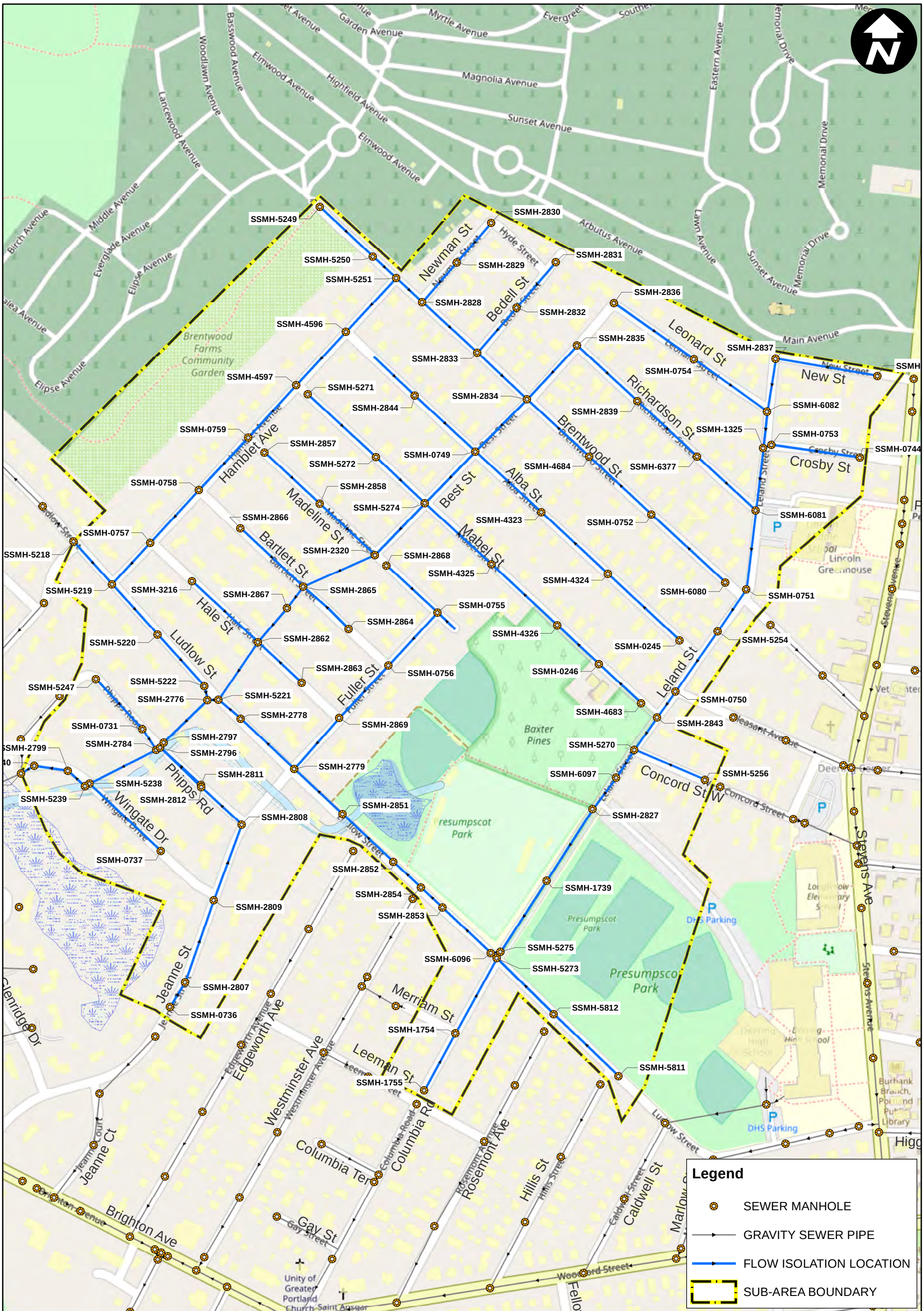

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 16

Flow Isolation Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

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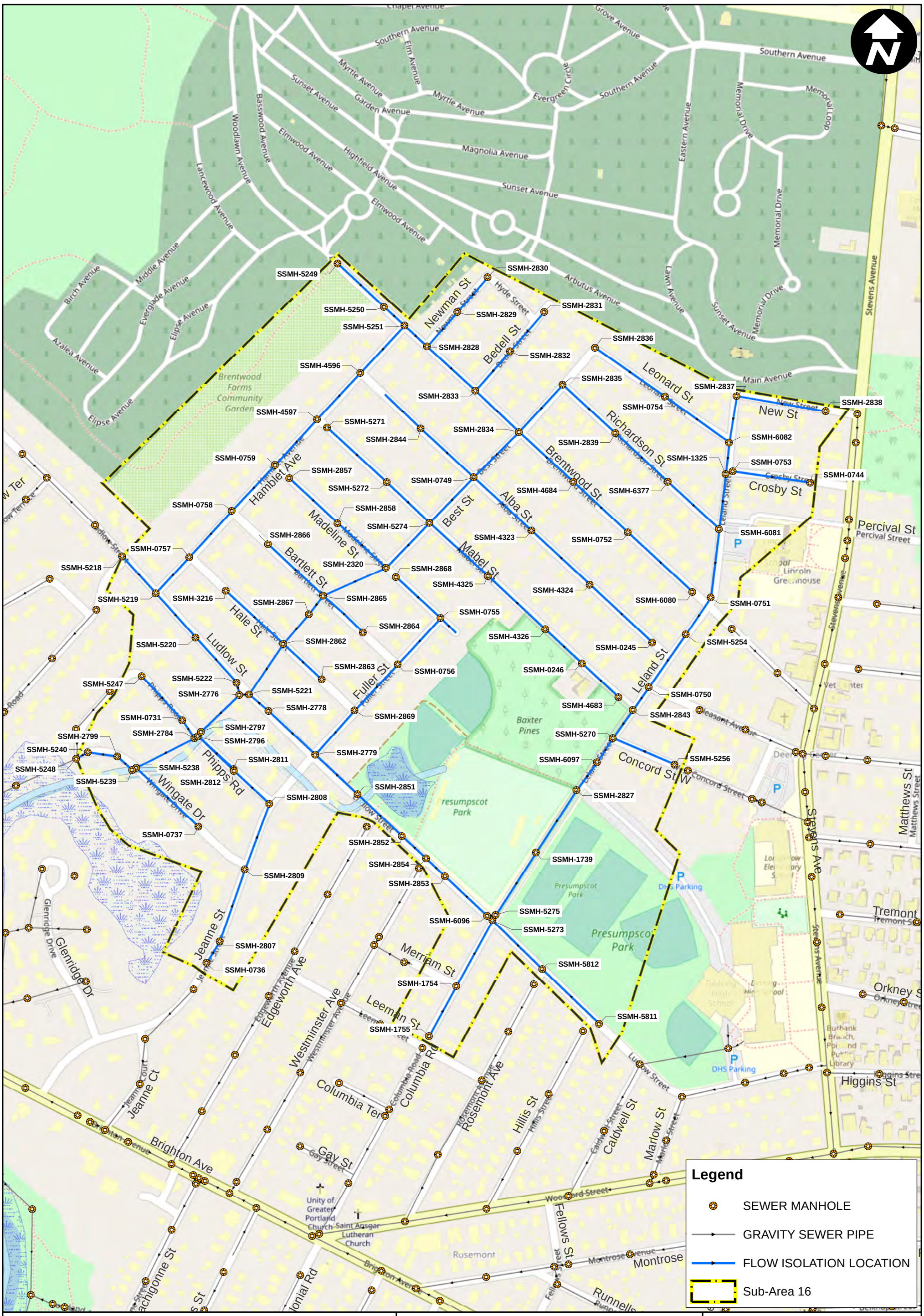


City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 16

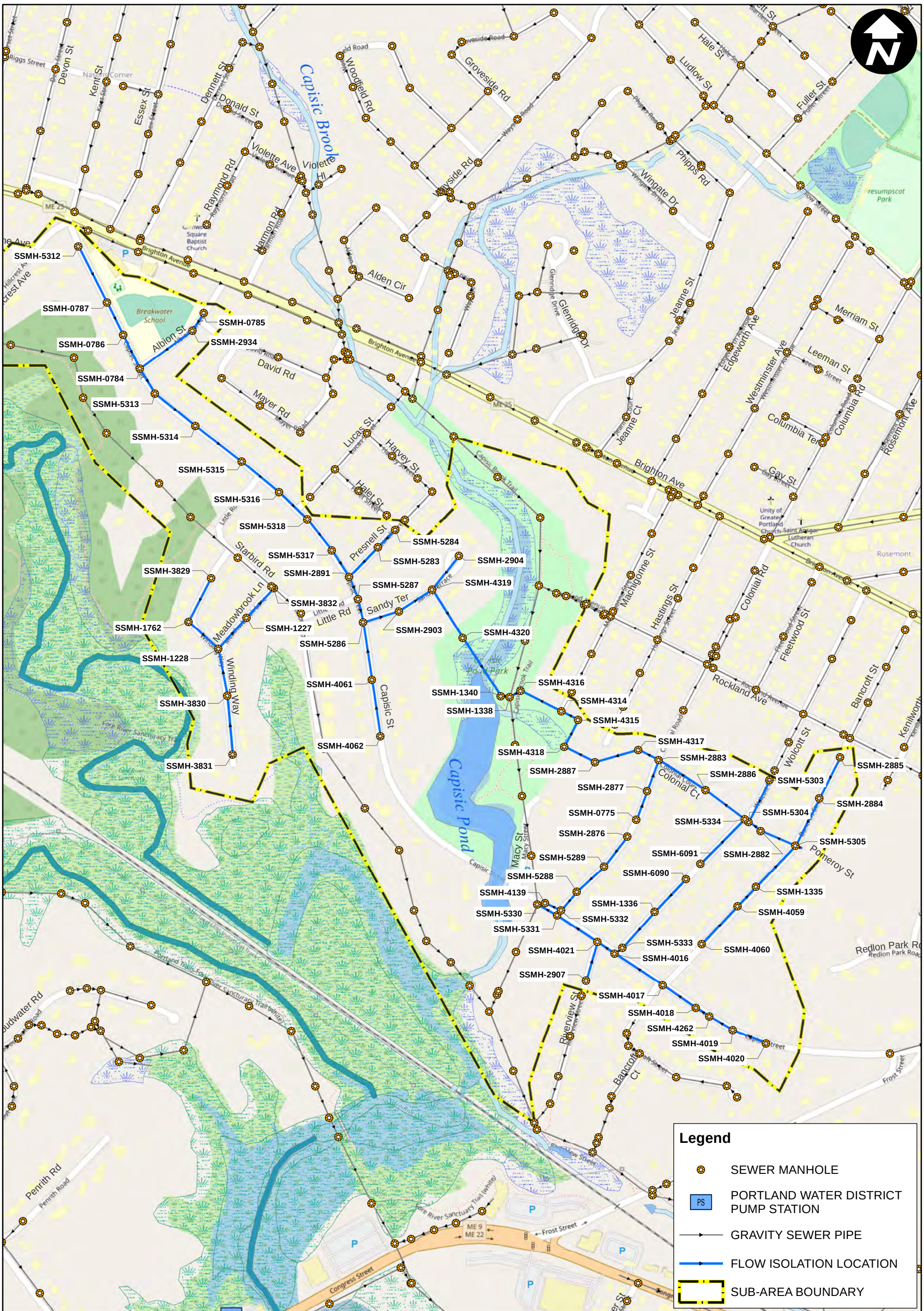
Flow Isolation Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 18.mxd



City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 21

Flow Isolation Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 21.mxd

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 22

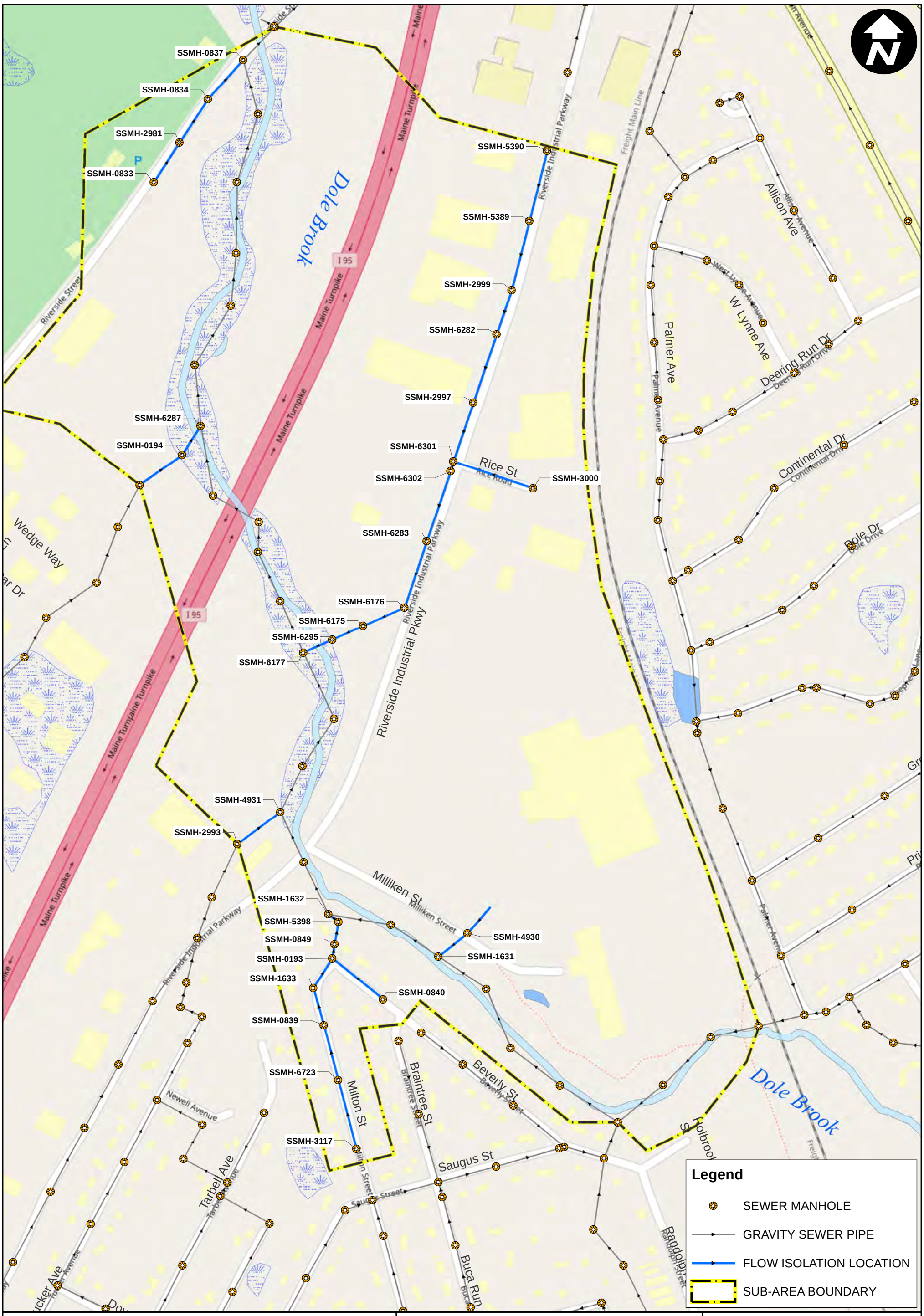
Flow Isolation Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 FLOW ISOLATION SUB AREA 22.mxd



City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 28

Flow Isolation Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

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INFILTRATION AND INFLOW INVESTIGATIONS:

CCTV INSPECTION LOCATIONS

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 9

Closed-Circuit Televised Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 CCTV SUB-AREA 9.mxd

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 19

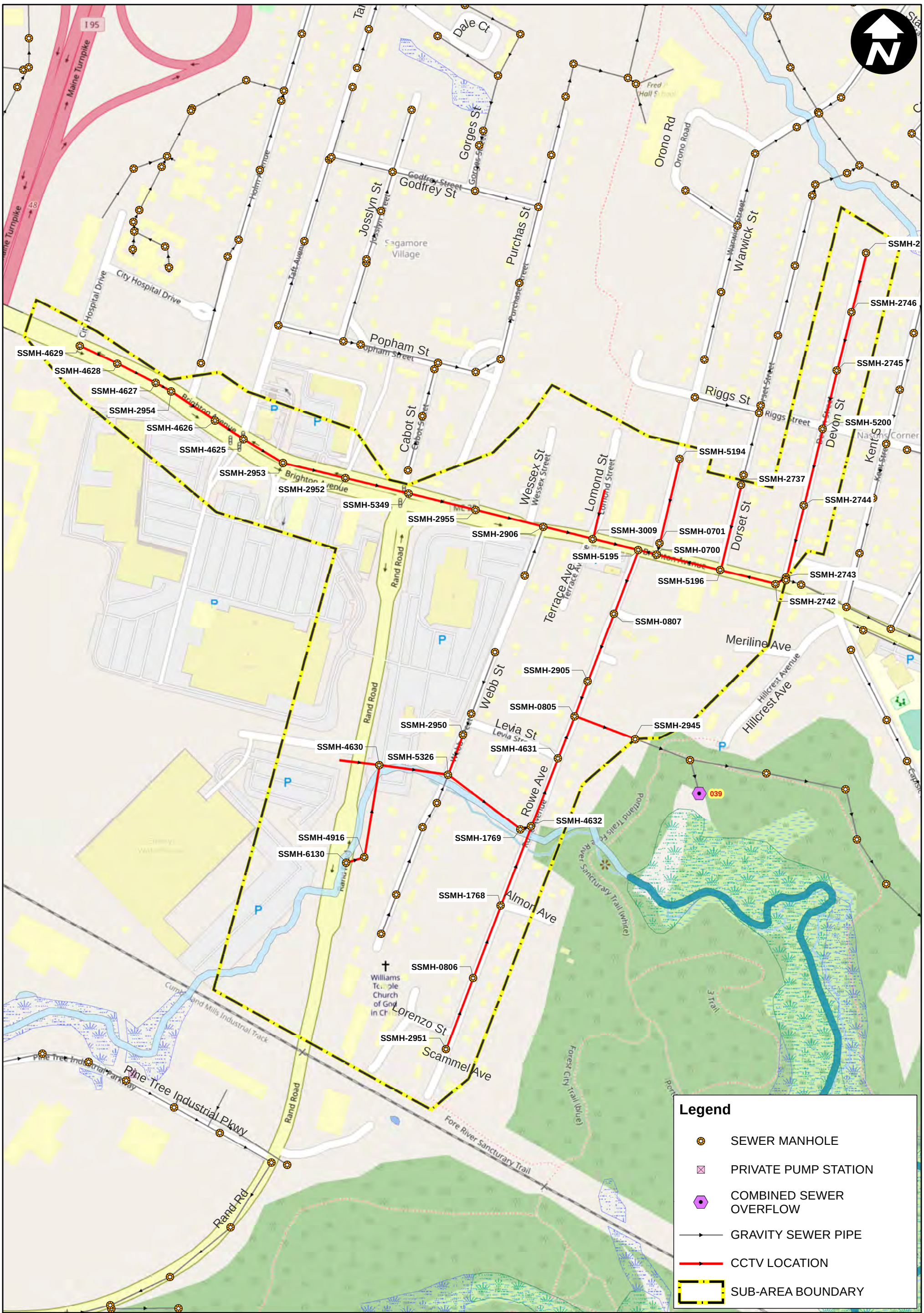
Closed-Circuit Televised Inspection Locations

0 100 200 300 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 CCTV SUB-AREA 19.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 20

Closed-Circuit Televised Inspection Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 CCTV SUB-AREA 20.mxd

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 29

Closed-Circuit Televised Inspection Locations

0 100 200 300 400 Feet

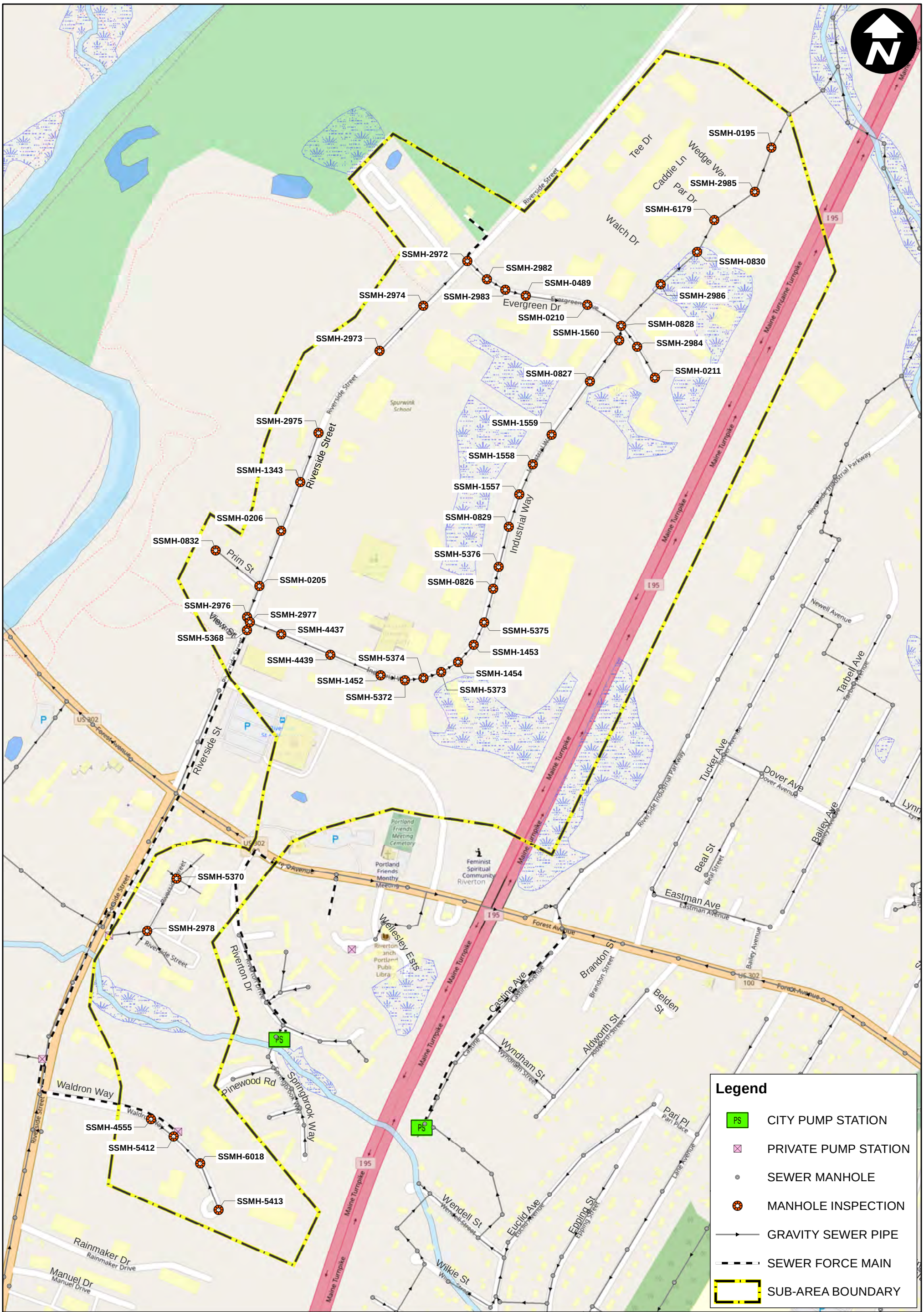
December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 CCTV SUB-AREA 29.mxd

INFILTRATION AND INFLOW INVESTIGATIONS:

MANHOLE INSPECTION LOCATIONS



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

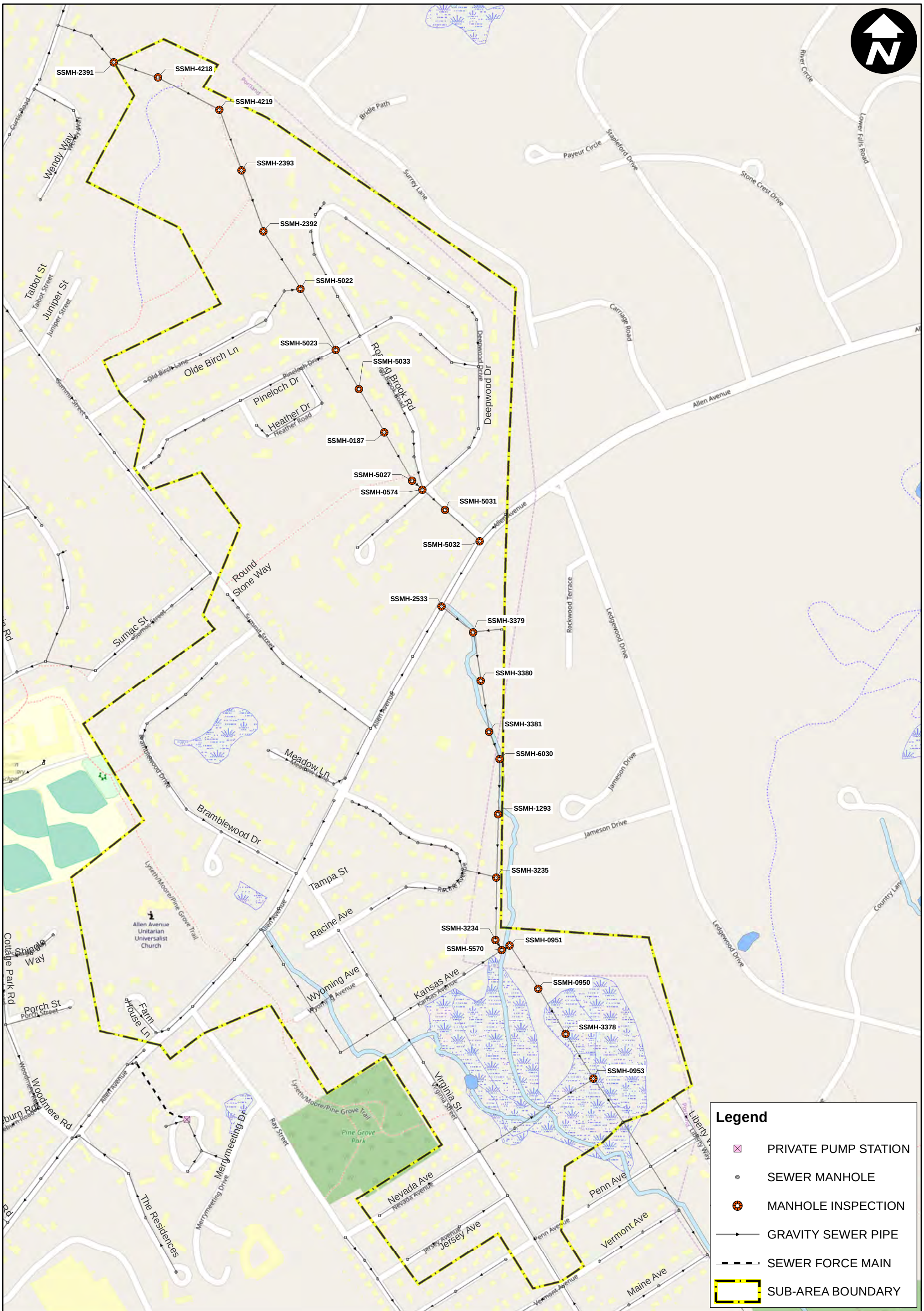
Sub-Area 4

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 MANHOLE INSPECTION SUB-AREA 4.mxd



City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 8

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 MANHOLE INSPECTION SUB-AREA 8.mxd

City of Portland, Maine

Planning & Engineering Sewer System Evaluation Survey

Sub-Area 9

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

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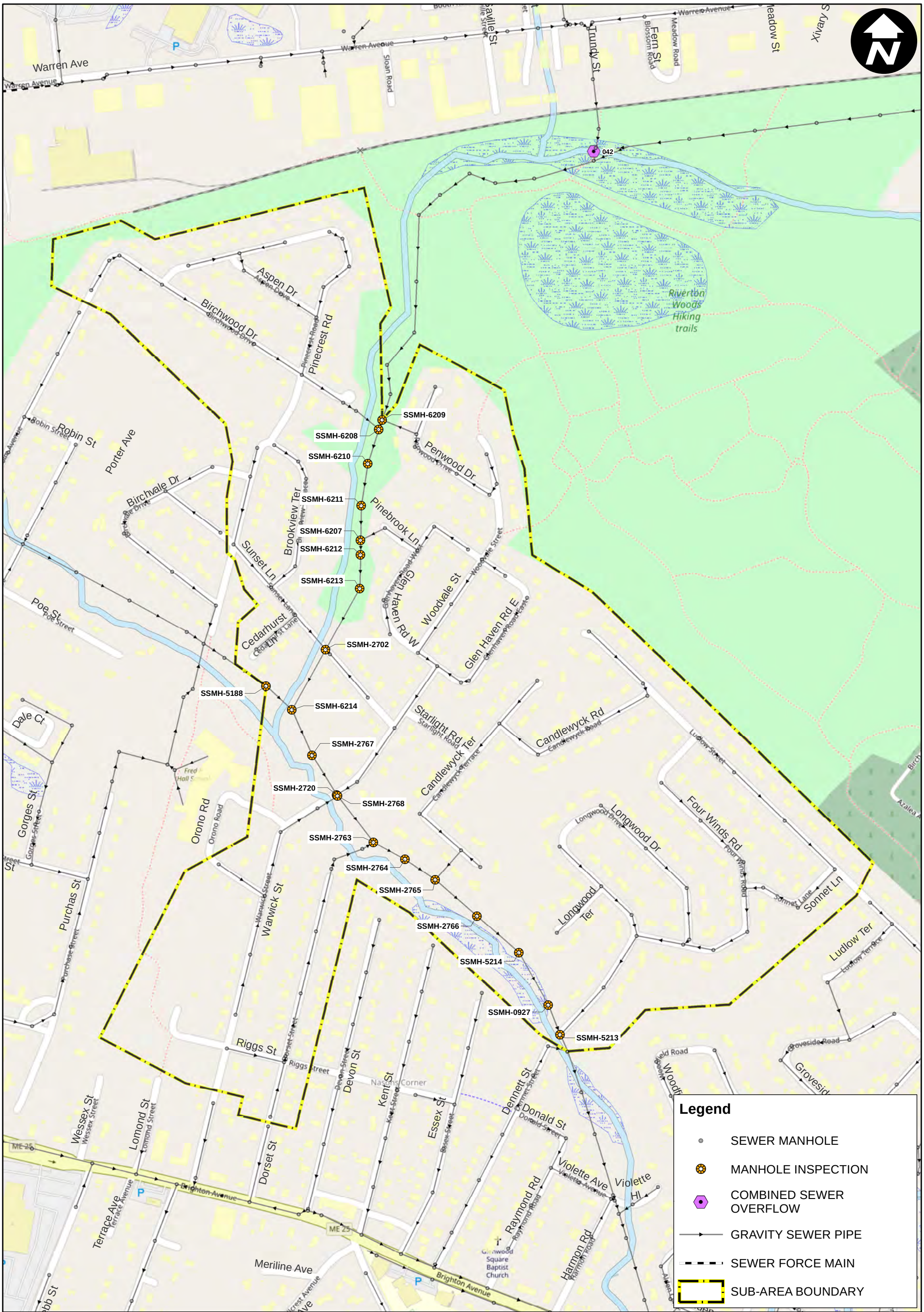

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 15

Manhole Inspection Locations

0 200 400 600 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

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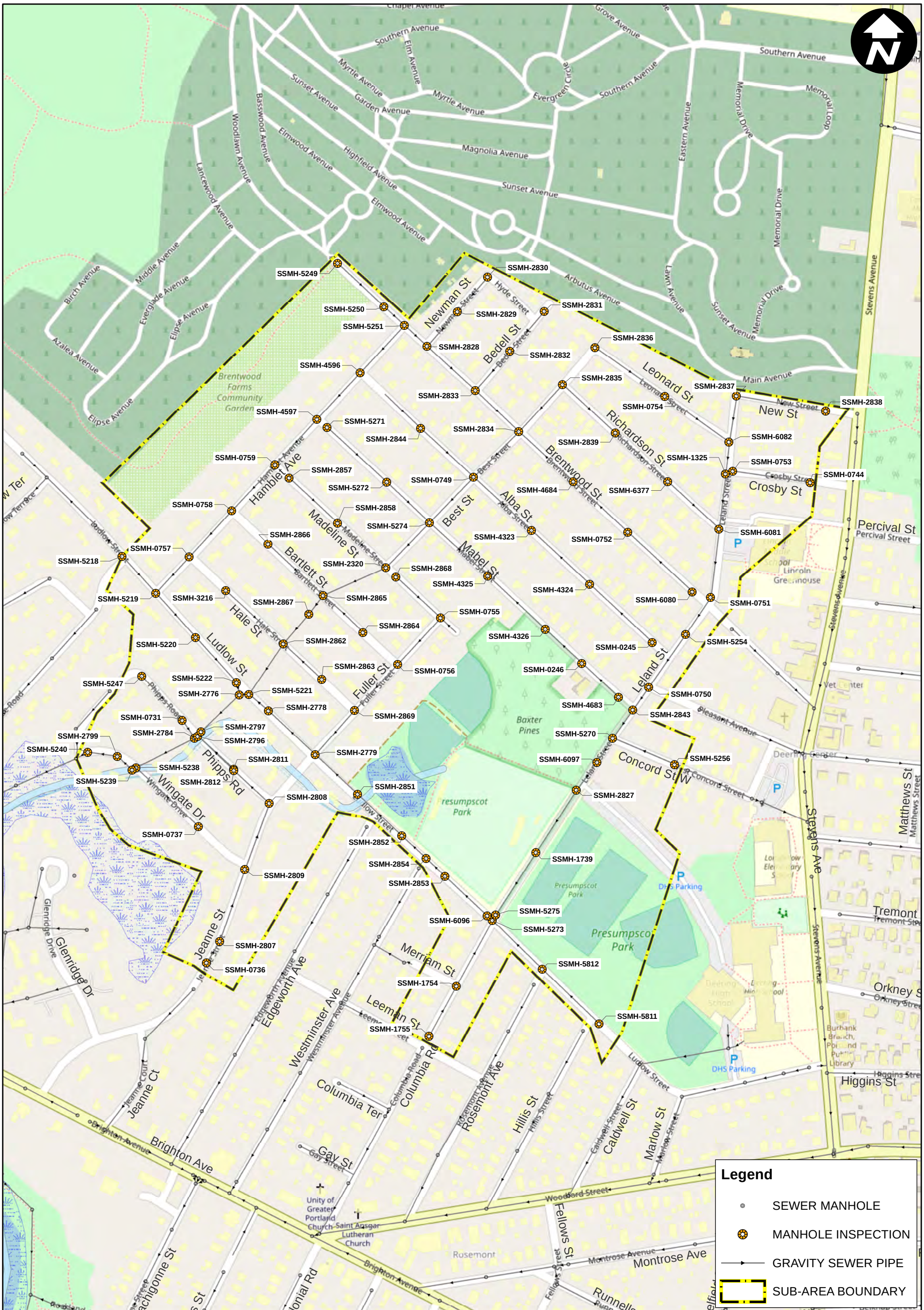


RESURGAM CITY OF PORTLAND, MAINE

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

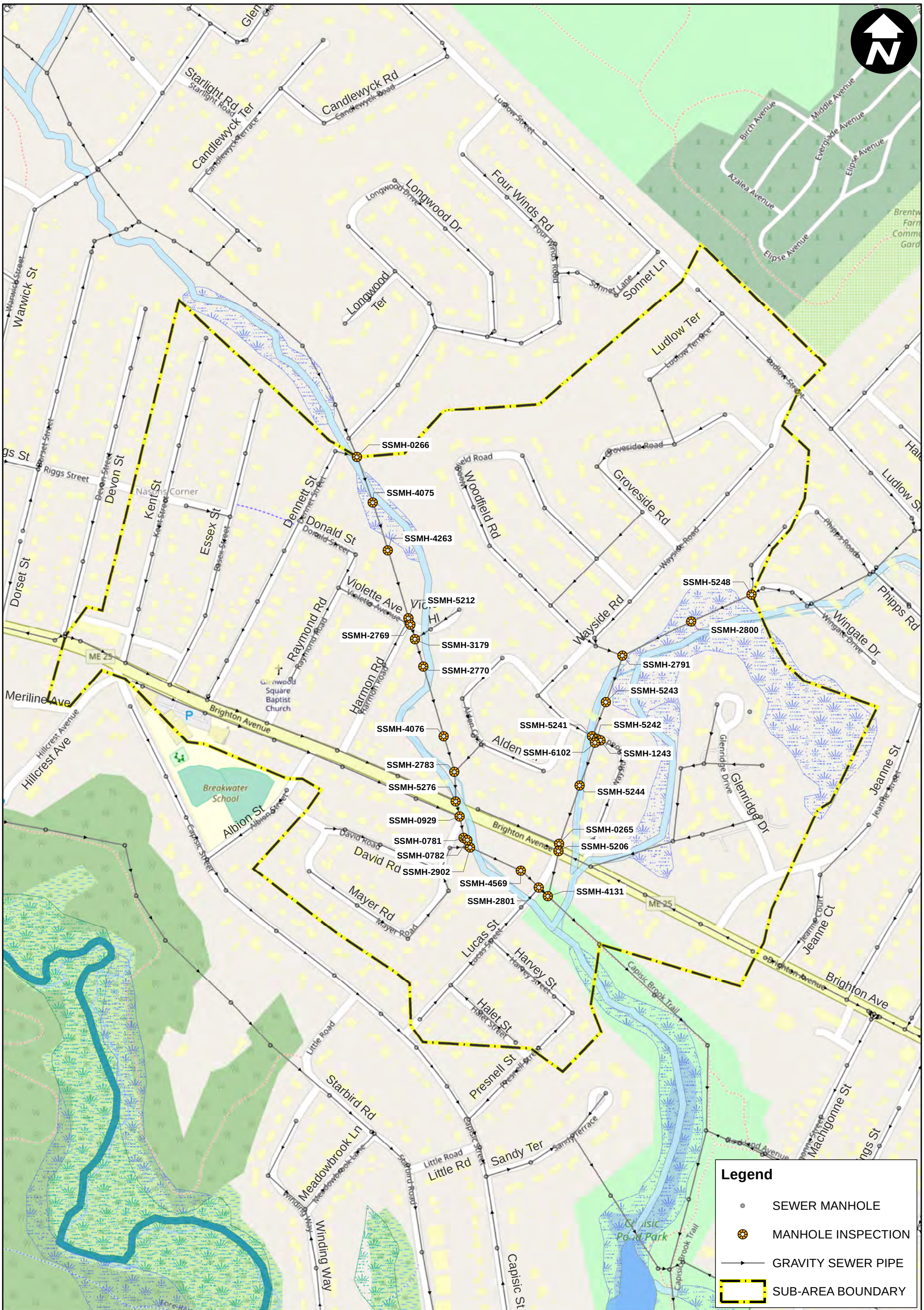
Sub-Area 16

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 MANHOLE INSPECTION SUB-AREA 16.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

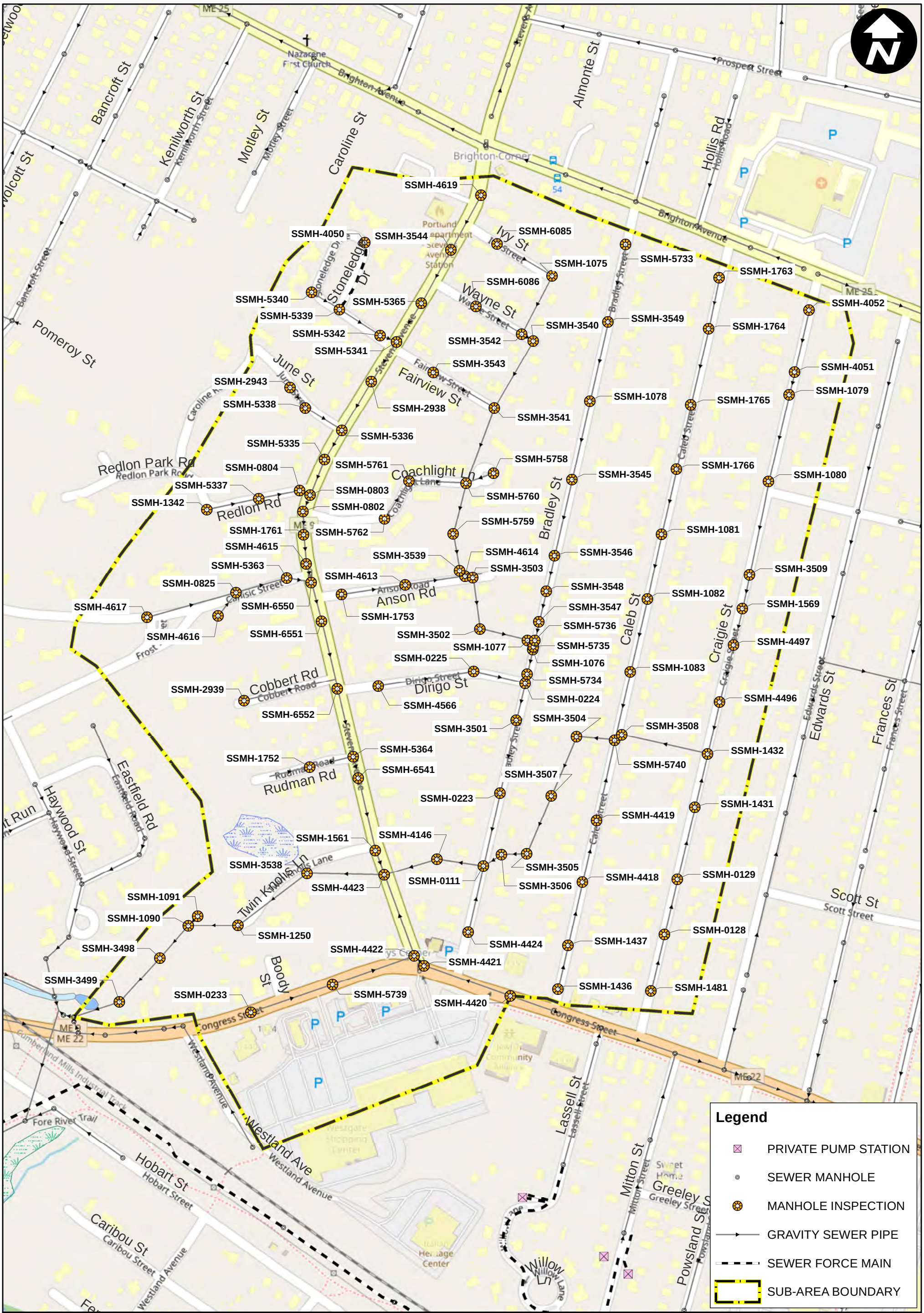
Sub-Area 17

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 MANHOLE INSPECTION SUB-AREA 17.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

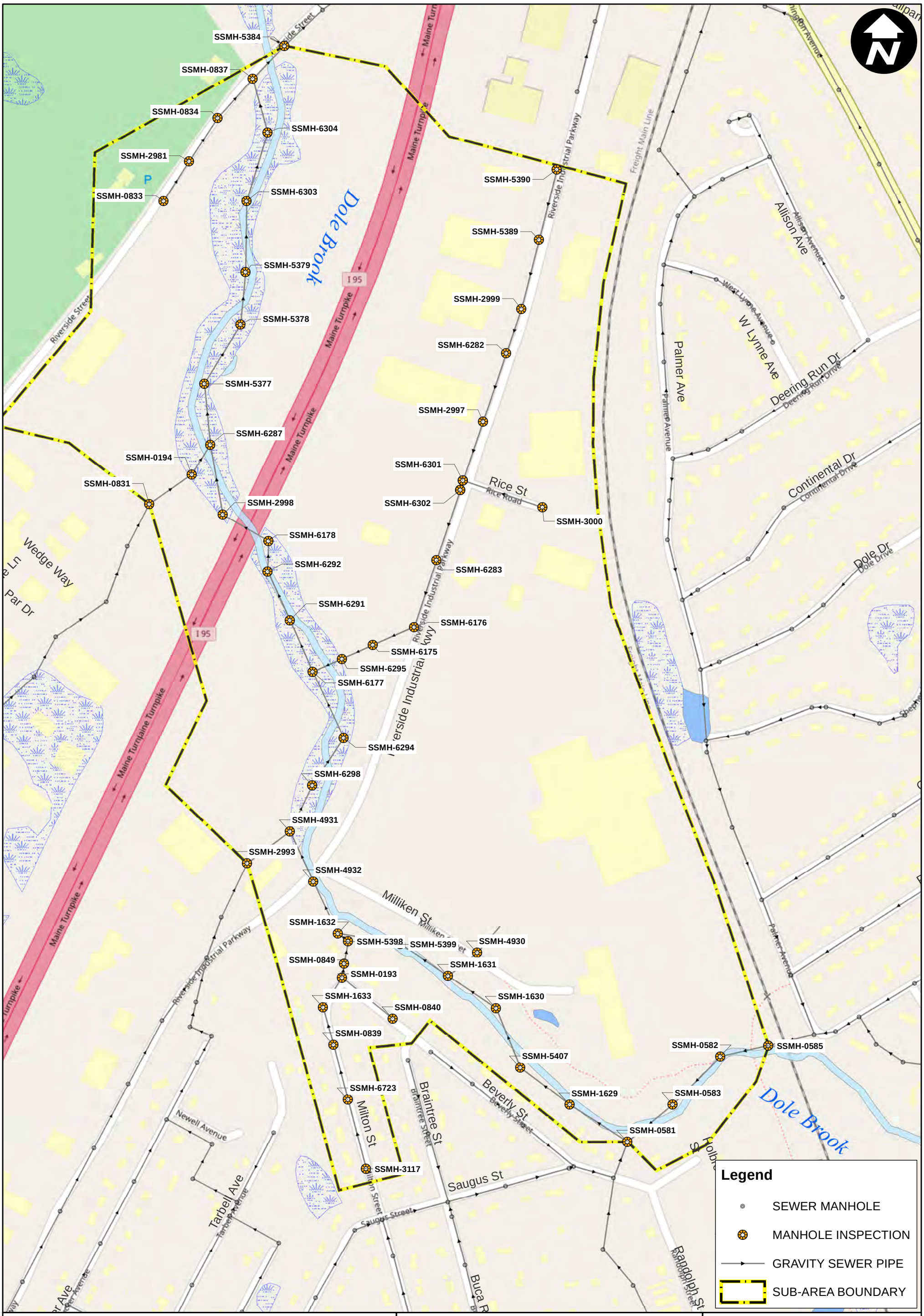
Sub-Area 22

Manhole Inspection Locations

December 2018

ARCADIS Design & Consultancy for natural and built assets

G:\GIS\Portland\2018 - 2019 SSES Maps\2018 MANHOLE INSPECTION SUB-AREA 22.mxd



City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 28

Manhole Inspection Locations

November 2018

ARCADIS Design & Consultancy for natural and built assets

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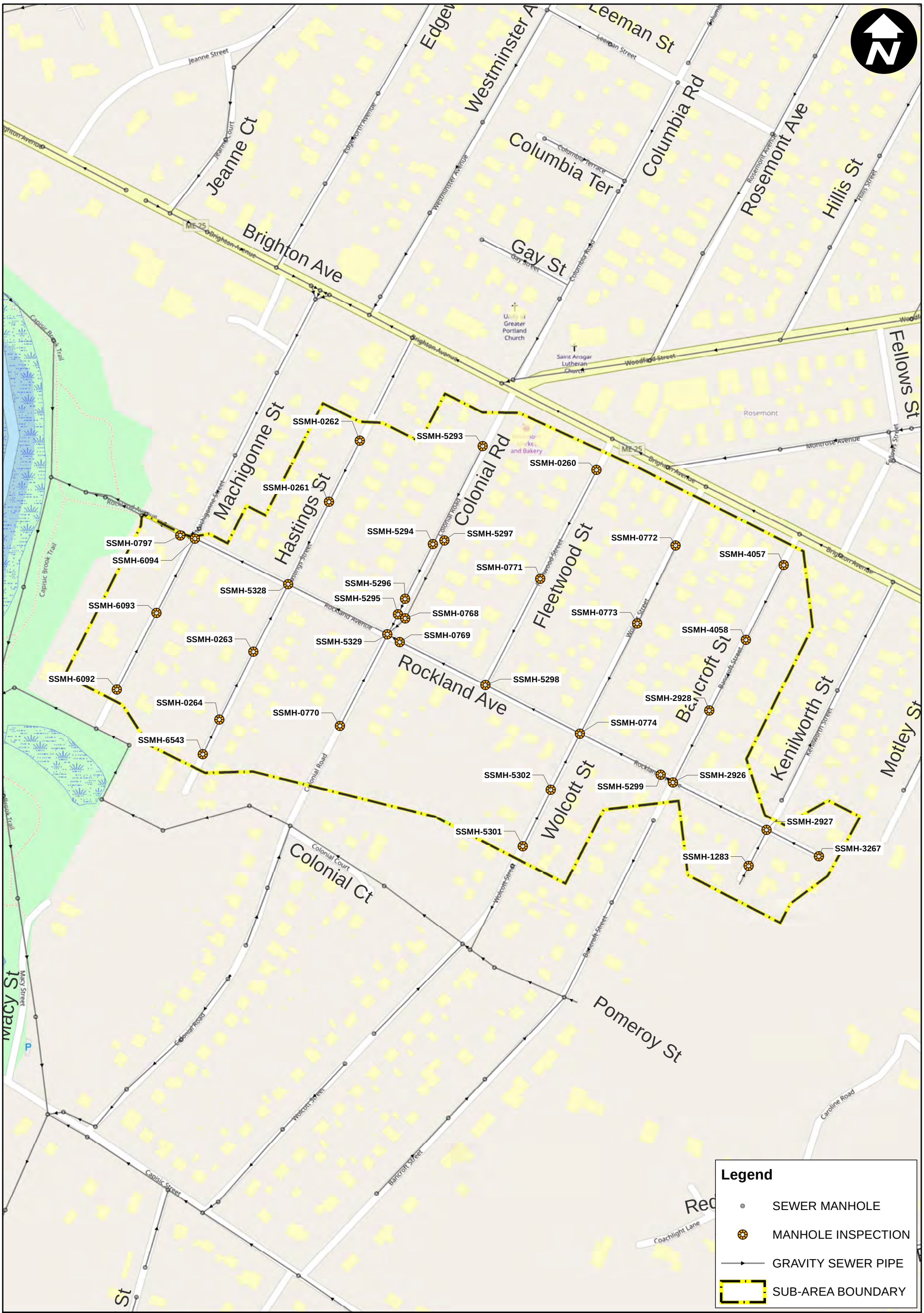

City of Portland, Maine

Planning & Engineering
Sewer System
Evaluation Survey

Sub-Area 29

Manhole Inspection Locations

0 100 200 300 400 Feet

December 2018

ARCADIS Design & Consultancy for natural and built assets

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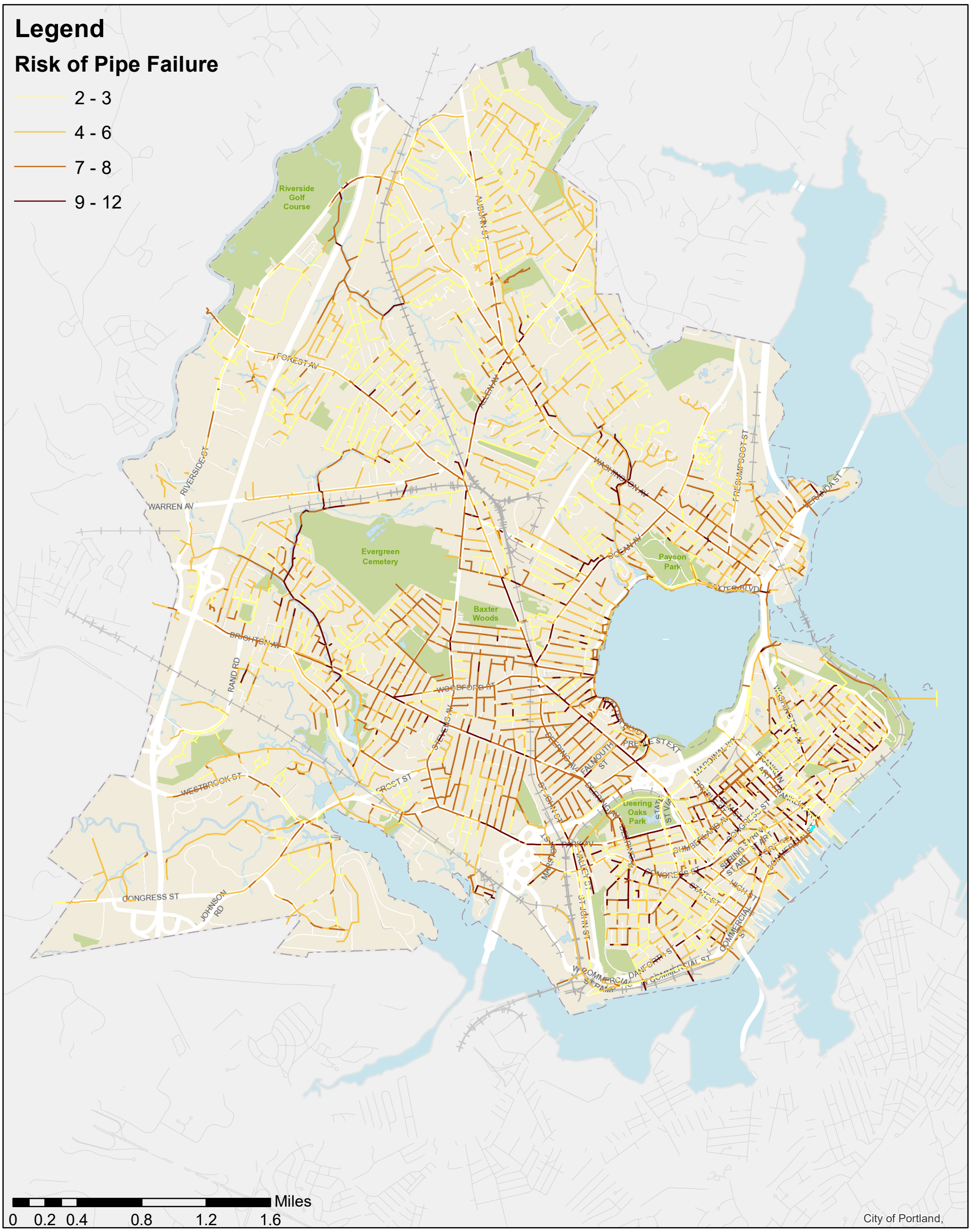
Appendix E – Risk Analysis Map and Rehabilitation Priorities

City of Portland Sanitary Sewer System
Risk of Pipe Failure



Risk number is calculated by multiplying the Consequence of Failure (COF) by the Likelihood of Failure (LOF). Consequence of Failure was determined by calculating the scores of each pipe as it relates to proximity to critical users, street classification, pipe diameter, proximity to surface waters, proximity to railroads and force vs. gravity mains. Likelihood of Failure was calculated using the calculated NASSCO condition rating of the pipes when available as well as the wet weather hydraulic performance. When NASSCO data was not available, assumptions were made based on the pipe's age, type, and location.

1/31/2019

InspDate	USMH	DSMH	piMaterial	PiShape	QSR	QMR	QOR	LOF	Risk	Diameter	Length	Location	Notes
4/20/2018	SSMH-3266	SSMH-1201	Vitrified Clay Pipe	Circular	423B	2300	423B	5.0	10.7	24	296	Kennebec between Hanover and Parris	Multiple fractures and repairs
3/12/2018	SSMH-4554	SSMH-5371	PolyVinyl Chloride	Circular	0000	5100	5100	5.1	10.6	12.0	172.0	Franklin Street between Congress and Cumberland	Mutiple fractures and cracks
5/6/2016	SSMH-4320	SSMH-1340	Reinforced Concrete Pipe	Circular	1100	4632	4632	4.6	10.1	24	321	Cross Country line off Machigonne Street	Leaking several places, roots, crack
6/26/2018	SSMH-5188	SSMH-6214	Vitrified Clay Pipe	Circular	0000	4111	4111	4.1	10.1			Cedarhurst Lane	Root balls
6/19/2018	SSMH-3169	SSMH-3134	Brick	Egg Shaped	5141	2100	5141	5.1	9.2	24	194	Commercial Street between Custom House and Franklin	Missing brick and hole
3/6/2018	SSMH-6425	SSMH-6424	Reinforced Concrete Pipe	Rectangular	5100	2100	5121	5.1	8.9	96.0	100.0	BCSCN - In Baxter Boulevard	Roots, broken joint
4/27/2018	SSMH-5815	SSMH-1269	Asbestos Cement	Circular	0000	4100	4100	4.1	8.9	10	218	Maine State Pier	Infiltration runner
6/16/2016	SSMH-5962	SSMH-4754	Brick	Egg Shaped	5C31	2100	5C31	6.0	8.8	18	168	Washington Ave between Marion and Fox	Being replaced - 2018/19
4/18/2018	SSMH-1306	SSMH-3815	Concrete Pipe (Non-Reinforced)	Circular	5G49	2200	5G49	6.0	8.8	18.0	226.0	Pearl Street between Federal and Newbury	Multiple fractures, deformed vertically
5/10/2018	SSFT-0119	SSMH-0404	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	8.8	8.0	10.0	Cumberland Ave across Oak	Crack, turn in pipe unable to find US access
5/10/2018	SSMH-4789	SSMH-4788	Vitrified Clay Pipe	Circular	5545	2300	5545	5.5	8.7	10.0	168.0	Cumberland Ave between Cedar and Elm	Multiple fractures, deformed vertically
5/18/2016	SSMH-4857	SSMH-4856	Brick	Egg Shaped	5100	2211	5122	5.1	8.7	25	237	State Street between Congress and Spring	Hole, root, debris
5/2/2018	SSMH-2074	SSMH-2073	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	8.7	15.0	150.0	Elm Street across Kennebec	Broken pipe
8/26/2016	SSMH-6064	SSMH-0935	Vitrified Clay Pipe	Circular	5232	0000	5232	5.2	8.6	8	130	Allen Avenue between Woodlawn and Goodrich	Multiple cracks
9/7/2017	SSFT-0031	SSMH-4001	Vitrified Clay Pipe	Circular	5100	2200	5122	5.1	8.4	10	70	Bowdoin Street	Broken pipe
3/6/2018	SSMH-6421	SSMH-6420	Reinforced Concrete Pipe	Rectangular	0000	5121	5121	5.1	8.4	96.0	158.0	BCSCN - In Baxter Boulevard	Roots, Infiltration Gusher
6/14/2018	SSMH-2137	SSMH-3150	Vitrified Clay Pipe	Circular	5211	2100	5221	5.2	8.3	24.0	80.0	Union Street between Commercial and Fore	Pipe might be missing a bottom section
5/24/2017	SSMH-4869	SSMH-4595	Vitrified Clay Pipe	Circular	523A	4100	5241	5.2	8.3	15	681	Deering Ave between Park and 295	Multiple fractures and cracks, deformed horizontally
4/23/2018	SSMH-5911	SSMH-4795	Vitrified Clay Pipe	Circular	5234	0000	5234	5.2	8.3	12.0	90.0	Elm Street between Congress and Cumberland	Several fractures, material change
3/16/2016	SSMH-5536	SSMH-0465	Reinforced Concrete Pipe	Oval	5631	2200	5631	5.6	8.3	15	220	Bramhall Street	Multiple fractures, cracks, and deformed
8/10/2016	SSMH-3193	SSMH-3194	Brick	Egg Shaped	0000	5200	5200	5.2	8.3	24	90	High Street between Cumberland and Congress	Gushers - already lined
5/26/2016	SSMH-3194	SSMH-1193	Brick	Egg Shaped	0000	5242	5242	5.2	8.3	24	395	High Street off Cumberland	Infiltration runners and gushers - Lined 2017
5/24/2018	SSMH-5901	SSMH-3754	Reinforced Concrete Pipe	Circular	5131	4100	5141	5.1	8.3	12.0	106.0	Portland Street between Brattle and Mechanic	Fracture and broken pipe
4/24/2018	SSMH-4816	SSMH-4816a	Vitrified Clay Pipe	Circular	5142	0000	5142	5.1	8.3	15	80	Chestnut Street between Congress and Cumberland	Multiple fractures and broken pipe
2/5/2018	SSMH-5661	SSMH-3297	Vitrified Clay Pipe	Circular	4132	4121	4223	4.2	8.3	8	231	Washington Avenue between Pine Ledge Ter and Rainbow Mall	Multiple fractures and spiral cracks
9/29/2016	SSMH-1670	SSMH-1669	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	8.1			Reed Street on other side of railroad tracks (Forest Ave)	Collapsed
4/23/2018	SSMH-4793	SSMH-4788	Asbestos Cement	Circular	5131	2200	5131	5.1	8.1	12.0	102.0	Elm Street between Cumberland and Congress	Broken pipe and hole
4/23/2018	SSMH-4788	SSMH-0395	Vitrified Clay Pipe	Circular	5121	2100	5122	5.1	8.1	12.0	182.0	Elm Street between Cumberland and Oxford	Broken pipe and fracture
10/24/2017	SSMH-2162	SSMH-6046	Brick	Circular	5100	0000	5100	5.1	8.1	24	196	Park Avenue between Brighton and Weymouth	Soil visible, lateral causing bricks to protrude
6/16/2016	SSMH-6022	SSMH-0349	Brick	Circular	5200	2400	5224	5.2	8	18	79	Washington Ave between Oxford and Cumberland	To be replaced - 2018/19
7/12/2018	SSMH-0925	SSMH-5816	Vitrified Clay Pipe	Circular	463C	3100	463C	5.0	8	30	172	Franklin Street off of Cumberland (Munjoy Hill side)	Multiple fractures and cracks
4/19/2018	SSMH-4802	SSMH-0397	Vitrified Clay Pipe	Circular	5346	2100	5346	5.3	7.9	12.0	180.0	Oxford Street between Elm and Preble	Multiple fractures and breaks
3/16/2016	SSMH-2228	SSMH-2227	Reinforced Concrete Pipe	Oval	5241	0000	5241	5.2	7.8	15	110	Bramhall Street	Multiple fractures, deformed vertically
6/2/2016	SSMH-3725	SSMH-2162	Other	Circular	5200	2100	5221	5.2	7.8	18	233	Congress Street off Park	Deformed horizontally
3/23/2016	SSFT-0069	SSMH-6482	Asbestos Cement	Circular	5242	2100	5242	5.2	7.8	10	18	Ellsworth Street from Sewer Fitting off Charles St	Multiple cracks, hole, material/size change
6/21/2016	SSMH-4749	SSMH-4741	Vitrified Clay Pipe	Circular	0000	5231	5231	5.2	7.8	12	101	Cumberland Avenue off Anderson Street	Settled deposits, maybe concrete?
5/16/2018	SSMH-4824	SSMH-4827	Brick	Circular	5249	2100	5249	5.2	7.8	24.0	144.0	Pearl Street between Middle and Milk	Multiple fractures and broken pipe areas
9/28/2017	SSMH-4031	SSMH-0916	Vitrified Clay Pipe	Circular	0000	5241	5241	5.2	7.8	8	53	Congress Street between Hobart and Westbrook	Not sure what the issue is, material change
3/16/2016	SSMH-0466	SSMH-5536	Vitrified Clay Pipe	Circular	5221	2400	5225	5.2	7.8	10	154	Bramhall Street	Multiple holes, size change, and offset
6/21/2018	SSMH-5913	SSMH-2053	Vitrified Clay Pipe	Circular	5647	412C	5648	5.6	7.7	15.0	192.0	Myrtle Street between Cumberland and Oxford	Multiple fractures, breaks, and holes
5/20/2016	SSMH-3647	SSMH-3666	Asbestos Cement	Circular	0000	4122	4122	4.1	7.7	24	242	Congress Street between County Way and St John St	Infiltration at capped break-in
7/15/2016	SSMH-5935	SSMH-5934	Reinforced Concrete Pipe	Circular	0000	4100	4100	4.1	7.7	36	141	Marginal Way between Plowman and Diamond	Grease - HWL
5/24/2016	SSMH-5495	SSMH-6159	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	7.7	8	63	West Commercial Street	Infiltration Runner
6/20/2016	SSMH-2026	SSMH-3775	Reinforced Concrete Pipe	Circular	534C	3124	534C	6.0	7.6	10	290	XC line off Fox behind 117 Anderson	Multiple fractures, holes, repairs, and material change
8/9/2017	SSMH-0363	SSMH-2017	Vitrified Clay Pipe	Circular	514B	3100	514B	6.0	7.6	12	249	Walnut Street between North and Washington	Being replaced - 2018/19
5/9/2018	SSMH-2082	SSMH-3794	Vitrified Clay Pipe	Circular	544B	2700	544B	6.0	7.6	18.0	196.0	Under building between Kennebec and Lancaster	Multiple fractures, need to determine if this pipe and laterals are active
3/23/2016	SSMH-6158	SSFT-0099	Asbestos Cement	Circular	5337	3528	533A	6.0	7.6	12	265	Crescent Street between Ellsworth and Wescott	Multiple fractures, holes, and infiltration - needs replacement
5/11/2018	SSMH-6050	SSMH-1302	Asbestos Cement	Circular	5846	3222	5846	5.8	7.6	12.0	199.0	Pearl Street between Cumberland and Congress	Multiple fractures, deformed horizontally
5/16/2018	SSMH-3815	SSMH-4822	Concrete Pipe (Non-Reinforced)	Circular	5B47	2200	5B47	6.0	7.6	18.0	235.0	Pearl Street between Newbury and Middle	Multiple fractures and broken pipe areas
7/9/2018	SSMH-2134	SSMH-5922	Brick	Circular	5143	0000	5143	5.1	7.6	24	40	Between Exchange and Moulton	Multiple fractures, area of broken pipe, material change
5/3/2016	SSMH-2525	SSMH-2343	Asbestos Cement	Circular	0000	5141	5141	5.1	7.6	24.0	398.0	Saint John Street	Some liner failures, large amount of gravel and rock
8/4/2016	SSMH-1961	SSMH-1962	Brick	Egg Shaped	5100	2100	5121	5.1	7.6			Fore Street between Mountfort and Hancock	Already lined - Fall 2017
5/2/2018	SSMH-2081	SSMH-2074	Vitrified Clay Pipe	Circular	4131	5126	5141	5.1	7.6	15.0	150.0	Elm Street between Kennebec and Lancaster	Multiple fractures and debris
4/26/2018	SSMH-2131	SSMH-0414	Vitrified Clay Pipe	Circular	5100	2200	5122	5.1	7.6	18.0	72.0	Market Street between Fore and Commercial	Broken pipe
5/4/2017	SSMH-2269	SSMH-2270	Vitrified Clay Pipe	Circular	0000	5100	5100	5.1	7.6	15	229	St. John Street between Granite and Washington	Sag in pipe, debris
5/4/2017	SSMH-2270	SSMH-0477	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1	7.6	15	248	St. John Street between Granite and Washington	Hole near lateral
5/6/2016	SSMH-4319	SSMH-4320	Reinforced Concrete Pipe	Circular	2100	5132	5132	5.1	7.6	24	272	Sandy Terrace XC towards Capisic Pond Park	Multiple cracks, hanging seals, roots, and infiltration
6/14/2018	SSMH-5500	SSMH-3149	Brick	Egg Shaped	4133	5142	5143	5.1	7.6	36	200	Commercial Street between Cross and Union	Infiltration and lining failures
1/20/2016	SSMH-5732	SSMH-1470	Reinforced Concrete Pipe	Circular	0000	5121	5121	5.1	7.6	12	259	Off Brighton Avenue	Don’t think anything is wrong with this pipe
6/19/2018	SSMH-1097	SSMH-0511	Vitrified Clay Pipe	Circular	5135	2100	5135	5.1	7.6	30	129	Baxter Boulevard between Forest and Hannaford Plaza	Multiple fractures, cracks, and a hole

6/19/2018	SSMH-1846	SSMH-1097	Vitrified Clay Pipe	Circular	5121	4100	5141	5.1	7.6	30	150	Baxter Boulevard between Forest and Hannaford Plaza	Crack, hole, and infiltration
3/18/2016	SSMH-3684	SSMH-4864	Reinforced Concrete Pipe	Circular	5131	3224	5133	5.1	7.6	18	213	Neal Street	Crack, infiltration, and deformed vertically, material change
8/1/2017	SSMH-4377	SSMH-2162	Brick	Circular	5100	0000	5100	5.1	7.6	18	98	Congress Street to Park Street	Hole
5/2/2018	SSMH-0397	SSMH-2102	Vitrified Clay Pipe	Circular	5141	2A00	5141	5.1	7.6	18.0	314.0	Preble Street between Oxford and Lancaster	Multiple fractures and cracks - to be replaced
9/8/2016	SSMH-1903	SSMH-1064	Vitrified Clay Pipe	Circular	5100	2200	5122	5.1	7.6	10.0	247.0	Arbor Street	Hole under lateral
5/17/2016	SSMH-6024	SSMH-2246	Vitrified Clay Pipe	Circular	5141	2100	5141	5.1	7.6	12.0	90.0	Valley Street	Vermin, pieces of pipe falling off, hole
7/13/2017	SSMH-3845	SSMH-6023	Brick	Circular	5141	3123	5141	5.1	7.6	18	224	Washington Street between Ingraham Ct and Cumberland Ave	Being replaced - 2018/19
6/17/2016	SSFT-0451	SSMH-3840	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	7.6			Washington Ave from Fox to Walnut	Being replaced - 2018/19
6/18/2018	SSMH-6168	SSNS-0135	Reinforced Concrete Pipe	Circular	0000	5100	5100	5.1	7.6	66	141	Diamond Street between Marginal and Somerset	Needs maintenance
10/13/2017	SSMH-1840	SSMH-1838	Vitrified Clay Pipe	Circular	5442	0000	5442	5.4	7.5	8	61	Deering Ave between Revere Streets	Multiple fractures and broken pipe
5/24/2018	SSMH-4806	SSMH-4807	Vitrified Clay Pipe	Circular	5421	2400	5425	5.4	7.5	10.0	145.0	Portland Street between Hanover and Parris	Multiple fractures and holes
6/21/2016	SSMH-2288	SSMH-1220	Brick	Circular	5441	2700	5441	5.4	7.5	18	198	Cumberland Ave between Boyd and Locust	Multiple holes and missing bricks
3/29/2017	SSMH-4920	SSMH-4918	Reinforced Concrete Pipe	Circular	4L31	4100	4M00	5.0	7.5	24	164	Oakleigh Park	Multiple fractures and breaks
5/7/2018	SSMH-2047	SSMH-0383	Vitrified Clay Pipe	Circular	4100	2J00	412J	5.0	7.5	24	408	Wilmot Street between Cumberland and Oxford	Multiple areas of encrusted deposits and material/shape change
8/4/2016	SSMH-4858	SSMH-2193	Brick	Circular	4131	3A28	413A	5.0	7.5	15	221	State Street off Congress Street by Longfellow Square	Missing bricks, settled deposits, several cracks
5/21/2018	SSMH-4768	SSMH-0382	Brick	Circular	4200	2A00	422A	5.0	7.5	18	200	Cumberland Ave between Boyd and Wilmot	Multiple intruding taps and deformed horizontal
6/13/2016	SSMH-1316	SSMH-1978	Vitrified Clay Pipe	Circular	5349	3425	5349	5.3	7.4	15	146	Congress Street between Lawrence and Lafeyette	Multiple fractures and holes
4/27/2017	SSMH-4053	SSMH-1849	Vitrified Clay Pipe	Circular	5341	0000	5341	5.3	7.4	10	185	Ocean Avenue between Irving and Chenery	Being replaced - 2019/20
4/27/2018	SSMH-0415	SSMH-3142	PolyVinyl Chloride	Circular	4100	4100	4200	4.2	7.4	10	204	Portland Pier	Infiltration runners and deformed vertically
5/8/2018	SSMH-6537	SSMH-4389	Brick	Circular	4131	5100	5141	5.1	7.4	15.0	183.0	Cotton Street between Spring and Fore	Infiltration, missing brick, and fracture
5/22/2018	SSMH-2044	SSMH-2045	Vitrified Clay Pipe	Circular	4835	2100	4835	4.8	7.3	12	172	Franklin between Congress and Cumberland	Multiple cracks and fractures
8/30/2016	SSMH-0222	SSMH-0219	Vitrified Clay Pipe	Circular	5242	4112	5243	5.2	7.2	8	472	Goodridge Avenue	Several holes, material change, cracks, deformed, roots
8/3/2016	SSMH-4382	SSMH-5929	Vitrified Clay Pipe	Circular	5221	3300	5233	5.2	7.2	24	44	India Street (Benkay Side) between Fore and Commercial	Cracks, holes, pipe completely blocked
5/15/2018	SSMH-2152	SSMH-4832	Vitrified Clay Pipe	Circular	5131	5132	5233	5.2	7.2	15.0	117.0	Fore Street between Center and Cotton	Multiple cracks, holes, intruding sealing grout, obstacles, and rats
3/18/2016	SSMH-4892	SSMH-4863	Brick	Horseshoe	5548	2700	5548	5.5	7.1	12	354	Carleton Street off Brackett	Multiple holes, missing bricks, and deformed
4/17/2018	SSMH-1912	SSMH-1911	Vitrified Clay Pipe	Circular	0000	5100	5100	5.1	7.1	12.0		Sunset Lane between Cedarhurst and Brookview	Blocked by failed lateral cap
4/24/2018	SSMH-4816	SSMH-4791	Vitrified Clay Pipe	Circular	5134	2100	5134	5.1	7.1	15.0	187.0	Chestnut Street between Cumberland and Congress	Multiple breaks and fractures, inside drop
4/18/2018	**SSMH-5886**	**SSMH-2150**	**Reinforced Concrete Pipe**	**Circular**	**5137**	**2100**	**5137**	**5.1**	7.1	**10.0**	**83.0**	**Oak Street between Congress and Spring**	Multiple fractures, broken pipe, and material change
5/25/2018	SSNS-0088	SSMH-3755	Reinforced Concrete Pipe	Circular	5111	4100	5141	5.1	7.1	12.0	36.0	Angled off Forest and Portland towards USPS	Offset, hole visible
5/15/2018	SSMH-3807	SSMH-0428	Brick	Egg Shaped	5100	0000	5100	5.1	7.1	18.0	76.0	Forest Avenue between Cumberland and Deland Ct	Deformed horizontally
9/8/2017	SSMH-4254	SSMH-4255	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	7.1	12	185	Auburn Street	Broken pipe
3/23/2017	SSMH-1868	SSMH-1864	Vitrified Clay Pipe	Circular	4122	5100	5141	5.1	7.1	15	249	Walton Street	Being replaced - 2019/20
5/16/2018	SSMH-4822	SSMH-4823	Concrete Pipe (Non-Reinforced)	Circular	5143	0000	5143	5.1	7.1	18.0	32.0	Pearl Street between Middle and Newbury	Multiple fractures
3/22/2016	SSMH-0456	SSMH-4876	Vitrified Clay Pipe	Circular	5132	2500	5132	5.1	7.1	12.0	149	Danforth Street between May and Orange	Infiltration weepers, fractures, hole
7/5/2017	SSMH-5324	SSMH-5325	Vitrified Clay Pipe	Circular	5122	4131	5141	5.1	7.1	10	107	Webb Street	Roots, broken pipe, spiral crack
7/5/2017	SSMH-5323	SSMH-5324	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	7.1	8	276	Webb Street	Broken Pipe
2/23/2018	SSMH-1058	SSMH-1057	Vitrified Clay Pipe	Circular	0000	5141	5141	5.1	7.1	8.0	92.0	Woodford Street	Settled deposits
4/18/2018	SSMH-3690	SSMH-2150	Vitrified Clay Pipe	Circular	5131	0000	5131	5.1	7.1	10.0	197.0	Spring Street Between Oak and High	Two areas of broken pipe
5/9/2018	SSMH-0420	SSNS-0085	Brick	Egg Shaped	0000	5122	5122	5.1	7.1	28.0	123.0	York Street between Maple and Danforth	Pipe has a small chuck of concrete or grout in way, otherwise fine
7/11/2018	SSFT-0323	SSMH-4782	Brick	Circular	4131	5121	5141	5.1	7.1	24	222	Chestnut Street between Kennebec and Lancaster	Needs maintenance
7/20/2016	SSMH-3813	SSMH-5928	Reinforced Concrete Pipe	Circular	0000	4131	4131	4.1	7.1	48	439	Thames Street between Hancock and Franklin	Infiltration Runner
6/15/2018	SSMH-5991	SSMH-1352	Reinforced Concrete Pipe	Circular	0000	4121	4121	4.1	7.1	36	67	Thames Street off Maine State Pier towards Franklin	Infiltration Runner
5/8/2017	SSMH-1866	SSMH-6714	Vitrified Clay Pipe	Circular	2900	5122	512A	6.0	7	10	402	George Street between Clifton and Ocean	Multiple longitudinal cracks - not sure where this investigation started
10/3/2016	SSMH-0461	SSMH-3683	Reinforced Concrete Pipe	Circular	512C	2200	512D	6.0	7	18	>145	Vaughn Street off West Street	Multiple offsets and cracks/fractures
3/16/2016	SSMH-3999	SSMH-0461	Asbestos Cement	Circular	533A	3225	533A	6.0	7	10	80	Vaughn Street off West Street	Multiple fractures, holes, and infiltration - needs replacement
3/23/2016	SSMH-6482	SSMH-2230	Asbestos Cement	Circular	5B41	2300	5B41	6.0	7	10	79	Ellsworth Street between Hill and Wescott	Multiple fractures, holes, and infiltration - needs replacement
4/27/2017	SSMH-3208	SSMH-0288	Vitrified Clay Pipe	Circular	4K31	2400	4K31	5.0	7	15	245	Ocean Avenue between Forest and Hersey	Being replaced - 2019/20
6/23/2016	SSMH-3774	SSMH-4269	Vitrified Clay Pipe	Circular	423A	2600	423A	5.0	7	24	174	Anderson Street between Everett and Fox	Multiple fractures
5/8/2018	SSMH-4160	SSMH-5500	Vitrified Clay Pipe	Circular	4535	4132	4637	4.6	7	18	73	Cross Street down to Commercial	Multiple cracks and fractures
7/17/2018	SSMH-4819	SSNS-0094	Reinforced Concrete Pipe	Circular	0000	4231	4231	4.2	6.9	24	42	Cross country between Franklin St near Fore	Infiltration and deposits
6/14/2018	SSMH-3149	SSMH-3150	Brick	Egg Shaped	4131	4100	4200	4.2	6.9	36	91	Commercial Street between Union and Cross	Repair failure
10/20/2017	SSMH-2931	SSMH-4620	Vitrified Clay Pipe	Circular	5331	2100	5331	5.3	6.8	8	240	Motley Street	Several breaks/repairs
3/18/2016	SSMH-1150	SSMH-2229	Brick	Egg Shaped	5345	4131	5346	5.3	6.8	18	376	Vaughn Street betwene Bramhall and Brackett	Multiple holes, missing bricks, missing mortar, and deformed
3/24/2016	SSMH-1307	SSMH-1152	PolyVinyl Chloride	Circular	5122	2100	5123	5.1	6.8			Emery Street	Holes, offet joints, gasket issues
5/11/2018	SSMH-6051	SSMH-6050	Concrete Pipe (Non-Reinforced)	Circular	5142	2300	5142	5.1	6.8	12.0	200.0	Pearl Street between Congress and Cumberland	Roots, cracks, and hole
4/7/2016	SSMH-6385	SSMH-3679	Brick	Circular	3200	4100	4132	4.1	6.8	24	45	Congress Street off Walker/Mellen	Infiltration runner, lining failure
5/14/2018	SSMH-5917	SSMH-6164	Brick	Circular	4100	2300	4123	4.1	6.8	24	166	Middle Street between Franklin and Hampshire	Deformed vertically
7/10/2018	SSMH-2071	SSMH-5779	Brick	Circular	0000	4134	4134	4.1	6.8	36	295	Preble Street between Somerset and Marginal	Multiple areas of infiltration, to be replaced 2019/2020
5/22/2018	SSMH-4841	SSMH-4394	Brick	Circular	4200	2200	4222	4.2	6.8	18	343	Congress Street to Preble	Areas of missing brick
10/4/2017	SSMH-5080	SSMH-1542	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	6.8	12	230	Allen Avenue between Washington and Northport	Poorly lined section of pipe, longitudinal crack

6/13/2018	SSMH-3147	SSMH-2144	Brick	Oval	4100	0000	4100	4.1	6.8	36	203	Commercial Street between Maple and Center	Repair patch defective
1/26/2018	SSMH-3544	SSMH-5365	Vitrified Clay Pipe	Circular	4100	2213	4122	4.1	6.8	8	202	Stevens Avenue between Wayne and Ivy	Roots, needs maintenance
7/12/2018	SSMH-0094	SSMH-0925	Vitrified Clay Pipe	Circular	4138	2100	4138	4.1	6.8	30	77	Franklin Street between Middle and Fore	Multiple fracture, longitudinal fracture
4/18/2018	SSMH-2052	SSMH-0381	Vitrified Clay Pipe	Circular	5243	3121	5243	5.2	6.7	10.0	120.0	Oxford Street between Pearl and Chapel	Multiple fractures, holes, and infiltration stains
5/11/2018	SSMH-0391	SSMH-0390	Brick	Egg Shaped	5200	2300	5223	5.2	6.7	15.0	268.0	Cedar Street between Cumberland and Oxford	Rock pushed into mainline
4/27/2017	SSMH-4054	SSMH-1850	Vitrified Clay Pipe	Circular	5242	0000	5242	5.2	6.7	10	268	Ocean Avenue between Sawyer and Chenery	Being replaced - 2019/20
5/9/2018	SSMH-2078	SSMH-6753	Vitrified Clay Pipe	Circular	5235	0000	5235	5.2	6.7	10.0	170.0	Lancaster Street feeder towards Cedar	Multiple fractures, deformed vertically
4/20/2018	SSMH-2089	SSMH-6728	Vitrified Clay Pipe	Circular	4131	4100	4200	4.2	6.7	15	24	Brown Street between Congress and Cumberland	Large offset joint
8/4/2016	SSMH-3192	SSMH-3193	Asbestos Cement	Circular	0000	3A00	3A00	4.0	6.7	24	134	High Street between Congress and Cumberland	Settled deposits
4/17/2018	SSNS-0080	SSMH-5765	Vitrified Clay Pipe	Circular	372A	2100	372A	4.0	6.7	36		Bedford Street between Baxter and Forest	Replaced
3/23/2017	SSMH-1277	SSMH-1318	Vitrified Clay Pipe	Circular	4131	5641	5642	5.6	6.6	8	720	Walton Street between Canco and Ocean	Being replaced - 2019/20
4/18/2018	SSMH-2050	SSMH-2051	Asbestos Cement	Circular	5131	0000	5131	5.1	6.6	10.0	26.5	Chapel Street between Oxford and Cumberland	Hole visible
5/7/2018	SSMH-0379	SSMH-4780	Vitrified Clay Pipe	Circular	5142	2300	5142	5.1	6.6	18.0	331.0	Chestnut Street between Oxford and Lancaster	Multiple fractures and cracks
6/20/2016	SSMH-1949	SSMH-1956	Brick	Circular	5100	2200	5122	5.1	6.6	18	75	Vesper Street	Hole VIsible
5/2/2018	SSMH-0380	SSMH-4773	Vitrified Clay Pipe	Circular	5144	2100	5144	5.1	6.6	15.0	192.0	Pearl Street between Oxford and Lancaster	Multiple fractures, cracks, and broken pipe areas
6/8/2017	SSMH-5130	SSMH-4543	Vitrified Clay Pipe	Circular	5100	4738	5147	5.1	6.6	8	92	Westlawn Ave off of Forest	Roots, broken pipe
2/21/2017	SSMH-2973	SSMH-2974	PolyVinyl Chloride	Circular	0000	5100	5100	5.1	6.6	8	300	Riverside Street in front of Golf Course (956, 969)	Material buildup - Get Air
9/27/2016	SSMH-1062	SSMH-1889	Vitrified Clay Pipe	Circular	0000	5141	5141	5.1	6.6	8	318	Tremaine	Roots
3/30/2018	SSFT-0115	SSMH-5822	Asbestos Cement	Circular	5121	4200	5142	5.1	6.6	10.0	410.0	Gilman Street Cross Country	Roots, grease, debris - needs maintenance
4/19/2018	SSMH-3758	SSMH-2090	Brick	Circular	5131	2100	5131	5.1	6.6	15.0	186.0	Parris Street between Portland and Kennebec	Bottom of pipe missing
5/7/2018	SSMH-0380	SSMH-3810	Brick	Circular	0000	5141	5141	5.1	6.6	18.0	180.0	Oxford Street between Pearl and Wilmot	Multiple patches, needs cleaning or pipe is broken
4/25/2018	SSMH-4798	SSMH-4035	Vitrified Clay Pipe	Circular	5142	2100	5142	5.1	6.6	15.0	101.0	Casco Street between Cumberland and Congress	Multiple fractures
9/5/2017	SSMH-6283	SSMH-6176	Vitrified Clay Pipe	Circular	0000	5131	5131	5.1	6.6	10	247	Riverside Industrial Parkway (317)	Grease, settled deposits
6/21/2018	SSMH-3796	SSMH-2046	Vitrified Clay Pipe	Circular	5111	0000	5111	5.1	6.6	8	31	Franklin Street between Congress and Cumberland	Offset at material change, pipe break in one location
5/7/2018	SSMH-5915	SSMH-0379	PolyVinyl Chloride	Circular	4121	0000	4121	4.1	6.6	18	270	Chestnut Street between Cumberland and Oxford	Material change, missing brick, surface spalling
3/18/2016	SSFT-0070	SSMH-2226	Vitrified Clay Pipe	Circular	5532	2500	5532	5.5	6.5	10	72	Neal Street	Multiple fractures, cracks, and deformed
9/7/2016	SSMH-4065	SSMH-4238	Vitrified Clay Pipe	Circular	0000	4200	4200	4.2	6.5	10	194	Forest Avenue	Material Changes
4/26/2018	SSMH-2048	SSMH-2049	Vitrified Clay Pipe	Circular	473D	2200	473D	5.0	6.5	15	158	Pearl Street between Cumberland and Oxford	Multiple fractures, cracks, and signs of infiltration
1/12/2016	SSMH-2242	SSMH-2267	Vitrified Clay Pipe	Circular	4234	2100	4234	4.2	6.5	12	205	Gilman Street	Multiple fractures
6/16/2016	SSNS-0130	SSMH-1299	Reinforced Concrete Pipe	Circular	3M00	0000	3M00	4.0	6.5	42	492	Commercial Street by Casco Bay Bridge (Beach St)	Wrinkled liner
6/24/2016	SSMH-5959	SSMH-3855	Vitrified Clay Pipe	Circular	5249	3B2B	5249	5.2	6.4	15	347	Melbourne Street between Eastern Prom and Emerson	Multiple fractures, cracks, breaks
3/23/2017	SSMH-5129	SSMH-5128	Vitrified Clay Pipe	Circular	5116	1500	511A	6.0	6.4	8	194	Wall Street between Lexington and Broadway	Several joint offsets, hole, material change, roots
5/10/2018	SSMH-3805	SSMH-0428	Vitrified Clay Pipe	Circular	4531	0000	4531	4.5	6.4	15	30	Cumberland Ave between Forest and Parris	Multiple cracks and fractures
5/17/2018	SSFT-0127	SSMH-4828	Vitrified Clay Pipe	Circular	4338	2100	4338	4.3	6.4	12	384	Off Fore Street, under Hub Furniture Store to parking lot	Multiple fractures, cracks, and breaks
7/16/2018	SSMH-0392	SSMH-2077	Vitrified Clay Pipe	Circular	4138	0000	4138	4.1	6.4	15	179	Elm Street between Oxford and Lancaster	Multiple fractures and infiltration
4/24/2018	SSMH-4791	SSMH-4792	Vitrified Clay Pipe	Circular	0000	4122	4122	4.1	6.4	18	57	Chestnut Street between Congress and Cumberland	Infiltration stains, encrustation
4/23/2018	SSMH-0394	SSMH-0392	Vitrified Clay Pipe	Circular	4132	2A11	4132	4.1	6.4	12	176	Elm Street between Cumberland and Oxford	Longitudinal cracks, fractures, infiltration weepers
5/16/2018	SSMH-4826	SSMH-4825	Brick	Circular	4100	2100	4121	4.1	6.4	24	299	Pearl Street between Fore and Milk	Deformed vertically, intruding tap
4/12/2016	SSMH-4853	SSMH-4852	PolyVinyl Chloride	Circular	0000	4124	4124	4.1	6.4	12	274	High Street between Spring and Congress	Tap break in - intruding - root ball in lateral
6/14/2016	SSMH-4750	SSMH-3814	Vitrified Clay Pipe	Circular	4121	2111	4122	4.1	6.4	15	253	Congress Street between Smith and Montgomery	Longitidunal crack, hinge crack
6/19/2018	SSMH-0511	SSMH-4918	Vitrified Clay Pipe	Circular	4100	0000	4100	4.1	6.4	36	55	Bedford Street between Forest and Baxter	Fracture multiple, may have been replaced
10/19/2017	SSMH-0821	SSMH-6223	Vitrified Clay Pipe	Circular	2600	4100	4126	4.1	6.4	18	255	Warren Avenue between Hicks and Hemingway	Root ball from lateral, longitudinal fracture
5/24/2018	SSMH-4840	SSMH-2149	Brick	Egg Shaped	4100	2100	4121	4.1	6.4	18	298	Congress Street between Casco and Brown	Multiple intruding taps
5/25/2018	SSMH-3765	SSMH-3766	Reinforced Concrete Pipe	Circular	0000	4121	4121	4.1	6.4	30	192	XC off Forest ave parallel to Kennebec	Roots
5/7/2018	SSMH-4792	SSMH-5915	Vitrified Clay Pipe	Circular	4100	0000	4100	4.1	6.4	18	101	Chestnut off Cumberland	Fracture multiple, infiltration stains
5/15/2018	SSMH-0405	SSMH-3804	PolyVinyl Chloride	Circular	0000	4121	4121	4.1	6.4	24	268	Forest Avenue between Cumberland and Portland	Infiltration
3/23/2016	SSMH-2231	SSMH-2236	Asbestos Cement	Circular	0000	4121	4121	4.1	6.4	12	124	Ellsworth Street off Congress	Camera underwater
6/1/2016	SSNS-0112	SSFT-0078	Brick	Circular	4100	2100	4121	4.1	6.4	18	125	Congress Street between State and Avon	Missing brick
9/1/2016	SSMH-4238	SSMH-4063	Asbestos Cement	Circular	0000	4131	4131	4.1	6.4	15	163	Morrill Street off Forest	Infiltration
5/17/2016	SSMH-5821	SSMH-2243	Asbestos Cement	Circular	0000	4133	4133	4.1	6.4	12	302	Valley Street off A	Infiltration
6/14/2018	SSMH-4820	SSMH-1351	Vitrified Clay Pipe	Circular	4136	3322	4139	4.1	6.4	18	156	Fore Street between Pearl and Franklin	Several longitudinal/spiral fractures, intruding taps
9/20/2017	SSMH-3154	SSMH-4031	Vitrified Clay Pipe	Circular	1100	4100	4111	4.1	6.4	8	156	Congress Street off Hobart Street	Joint offset, material change, crack
6/6/2018	SSMH-6183	SSMH-6184	Reinforced Concrete Pipe	Circular	0000	4200	4200	4.2	6.3	66	34	Marginal Way between Cove and Diamond	Pipe needs maintence
3/22/2016	SSMH-0457	SSMH-5834	Brick	Egg Shaped	0000	312B	312B	4.0	6.3	24	130	Danforth Street by Brigg St	Roots, settled deposits
6/18/2018	SSMH-5922	SSMH-2123	Vitrified Clay Pipe	Circular	3A00	0000	3A00	4.0	6.3	24	55	Moulton Street between Fore and Wharf	Multiple fractures, spiral and longitudinal
6/15/2016	SSMH-6436	SSMH-4402	Polyethylene	Circular	5241	4213	5243	5.2	6.2	18	148	Fernald Street parallel to Payson Park Drive	Infiltration, material change, cracks, breaks roots, spiral fractures
4/25/2017	SSMH-2587	SSMH-2585	Reinforced Concrete Pipe	Circular	0000	5200	5200	5.2	6.2	30	206	Princeton Pines	Infiltration Gushers
5/24/2016	SSMH-5838	SSMH-2217	Vitrified Clay Pipe	Circular	513B	5141	5241	5.2	6.2	10	280	Thomas Street off Pine	Multiple fractures, roots, material change
6/25/2018	SSMH-5893	SSMH-5891	Asbestos Cement	Circular	5200	2400	5224	5.2	6.2	18.0	178.0	Between City Center and Monument Way	Holes, to be repaired by TBC
6/6/2016	SSMH-2234	SSMH-5851	Vitrified Clay Pipe	Circular	4337	0000	4337	4.3	6.2	48	187	Deering Ave off Cumberland near Congress	Infiltration Runners
3/10/2016	SSMH-0369	SSMH-0373	Brick	Circular	0000	4300	4300	4.3	6.2			Anderson Street between Gould and 203 Anderson	Already replaced

12/13/2016	SSMH-3256	SSMH-1296	Asbestos Cement	Circular	2200	4200	4222	4.2	6.2	24	280	Marlborough XC	Crack and infiltration
6/6/2018	SSMH-6184	SSMH-6355	Reinforced Concrete Pipe	Barrel	0000	4100	4100	4.1	6.2	66		Marginal Way between Cove and Uhaul	Not actually inspected, silt too deep
3/14/2016	SSMH-1424	SSMH-1425	Concrete Segments (Unbolted)	Circular	0000	5142	5142	5.1	6.1	48.0	250.0	Jansen Street Overflow	Infiltration Gusher
11/1/2016	SSMH-1831	SSMH-1810	Vitrified Clay Pipe	Circular	4100	5144	5145	5.1	6.1	15.0	297.0	Cottage Street	Debris
9/21/2016	SSMH-4764	SSMH-1925	Vitrified Clay Pipe	Circular	0000	5131	5131	5.1	6.1	12.0	276.0	Melbourne Street	Roots
6/16/2016	SSMH-1999	SSMH-0338	Vitrified Clay Pipe	Circular	5127	3124	5131	5.1	6.1	281.0	20.0	Adams Street	Material change, hole in pipe
7/19/2016	SSMH-4721	SSMH-4722	Brick	Egg Shaped	5100	3226	5132	5.1	6.1	18.0	200.0	Saint Lawrence Street	Roots, hole
5/3/2017	SSMH-4672	SSMH-4671	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	6.1	12	172	Parsons Road	Roots, broken pipe
4/19/2018	SSMH-2083	SSMH-0390	Asbestos Cement	Circular	5100	0000	5100	5.1	6.1	8.0	208.0	Oxford Street between Elm and Cedar	Hole visible
4/8/2016	SSMH-4868	SSMH-2182	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1	6.1	18.0	29.0	Mellen Avenue from Cumberland Avenue	Hole Visible
3/18/2016	SSMH-4890	SSMH-4889	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1	6.1	10.0	142.0	Brackett Street off Neal and Trowbridge Ct	Broken pipe, infiltration stains
8/10/2016	SSMH-2185	SSMH-2183	Vitrified Clay Pipe	Circular	0000	5131	5131	5.1	6.1				Dye test, no issues found
3/23/2017	SSMH-2676	SSMH-6231	Vitrified Clay Pipe	Circular	5131	0000	5131	5.1	6.1	12	25	XC over Hicks Street	Broken pipe and spiral fracture
9/22/2016	SSMH-3414	SSMH-3413	Vitrified Clay Pipe	Circular	5100	3100	5131	5.1	6.1	10	237.0	Woodford Street	Hole visible - sewer replaced
5/1/2017	SSMH-4343	SSMH-1020	Vitrified Clay Pipe	Circular	5122	3400	5134	5.1	6.1	10	261	Bayview Drive btween Clifton and Ocean	Multiple cracks, hole, roots
7/19/2016	SSMH-5699	SSMH-1732	Vitrified Clay Pipe	Circular	5100	3100	5131	5.1	6.1			Glenwood Avenue	Hole above lateral
5/22/2018	SSMH-3799	SSMH-2123	Asbestos Cement	Circular	5100	0000	5100	5.1	6.1	8.0	44.0	Wharf Street between Moulton and Dana	Hole visible at end of pipe
8/9/2017	SSMH-3854	SSMH-0363	Vitrified Clay Pipe	Circular	5141	0000	5141	5.1	6.1	12	40	Walnut XC to North Street	Being replaced - 2018/19
8/21/2017	SSMH-1945	SSMH-0346	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	6.1	10	295	Morning Street between Wilson and Eastern Prom	Hole
9/7/2017	SSMH-4000	SSMH-3700	Vitrified Clay Pipe	Circular	5100	3721	5137	5.1	6.1	12	39	Bowdoin Street	Intruding lateral
6/18/2018	SSMH-4391	SSMH-4390	Asbestos Cement	Circular	5137	3121	5138	5.1	6.1	15	50	Parallel to Union Street, under building across Canal Plaza	Multiple cracks, fractures, and a hole
9/8/2016	SSMH-6234	SSMH-0316	Vitrified Clay Pipe	Circular	5100	3121	5131	5.1	6.1	8	157	Poland Street	Deformed horizontally
3/20/2017	SSMH-4290	SSMH-4292	Vitrified Clay Pipe	Circular	5136	1C00	5136	5.1	6.1	12	218	Dorothy Street by Beaumont	Multiple fractures, cracks, hole, and roots
3/18/2016	SSMH-3683	SSMH-1150	Brick	Egg Shaped	5141	2A00	5141	5.1	6.1	12	213	Vaughan Street	LARGE Hole visible
2/9/2016	SSMH-6013	SSMH-3854	Vitrified Clay Pipe	Circular	2100	5123	5124	5.1	6.1	12	374	North Street between Walnut and Melbourne	Broken pipe, several fractures, cracks and roots - offset joint, material change
5/8/2018	SSMH-3731	SSMH-3728	Vitrified Clay Pipe	Circular	4200	2200	4222	4.2	6.1	24	217	Center Street between Commercial and Fore	Multiple fractures and infiltration stains
5/7/2018	SSMH-3734	SSMH-4835	Asbestos Cement	Circular	0000	4223	4223	4.2	6.1	12	228	Center Street	Infiltration gushers, material change
7/18/2017	SSMH-0296	SSMH-1856	PolyVinyl Chloride	Circular	0000	4100	4100	4.1	6.1	10	217	Chenery Street between Clifton and Ocean	Infiltration Runner
5/16/2018	SSMH-1391	SSFT-0498	Reinforced Concrete Pipe	Circular	0000	412C	412C	5.0	6	84	261	Deering Oaks Park	Infiltration stains - needs maintenance, couldn't complete inspection
3/29/2016	SSMH-6044	SSMH-4892	Brick	Egg Shaped	423A	3121	423A	5.0	6	12	293	Brackett Street	Displaced, missing bricks
5/30/2018	SSMH-0387	SSMH-5913	Vitrified Clay Pipe	Circular	1400	4132	4132	4.1	6	15	117	Myrtle Street between Congress and Cumberland	Cracks, offset joints, infiltration
4/20/2018	SSMH-1312	SSMH-4804	Vitrified Clay Pipe	Circular	4121	0000	4121	4.1	6	10	72	Preble Street Resource Center Oxford Street	Infiltration, broken pipe, cracks, size change
2/15/2017	SSMH-4408	SSMH-4409	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	6	10	249	Brookside Lane off Brookside Rd	Bricks in pipe, needs cleaning
10/13/2017	SSMH-1838	SSMH-1839	Vitrified Clay Pipe	Circular	3322	4100	4133	4.1	6	8		Revere Street between Deering and Forest	Pipe size change, crack
5/5/2017	SSMH-4675	SSMH-1857	Brick	Circular	0000	4100	4100	4.1	6	42	241	Mackworth Street off Ocean Ave	Infiltration, To be replaced - 2019/2020
7/19/2016	SSMH-4723	SSMH-3871	Brick	Circular	4100	0000	4100	4.1	6	18	40	St Lawrence off Fore	Missing brick, shape change
3/22/2016	SSMH-4876	SSMH-0457	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	6	12	80	Danforth Street between School and Orange	Infiltration stains
3/16/2016	SSFT-0067	SSMH-0466	Vitrified Clay Pipe	Circular	4131	3121	4132	4.1	6	8	160	Bramhall Street off West	Several fractures, circumferential, roots from laterals
7/5/2017	SSMH-5325	SSMH-5326	Vitrified Clay Pipe	Circular	4132	3400	4136	4.1	6	8	111	Webb Street past Levia	Multiple cracks, fractures, and roots
6/11/2018	SSNS-0085	SSNS-0152	Brick	Arched	4131	0000	4131	4.1	6	45	133	Maple Street between York and Commercial	Multiple cracks, fractures, section of pipe missing
4/27/2017	SSMH-1849	SSMH-3208	Vitrified Clay Pipe	Circular	342B	4100	4134	4.1	6	10	237	Ocean between Codman and Hersey	Multiple cracks, fractures, and infiltration
7/17/2018	SSMH-1182	SSMH-5889	Asbestos Cement	Oval	4100	2200	4122	4.1	6	15	57	XC off Temple between Middle and Federal	Fracture, roots
4/18/2018	SSMH-5914	SSMH-3793	Vitrified Clay Pipe	Circular	4134	0000	4134	4.1	6	12	131	Chapel off of Cumberland	Multiple fractures, spiral cracks, and infiltration
5/17/2018	SSMH-2118	SSMH-4828	Vitrified Clay Pipe	Circular	4134	2100	4134	4.1	6	15	101	Fore Street between Franklin and Pearl	Multiple fractures, longitudinal, separated joints
6/21/2016	SSMH-5937	SSMH-5936	Reinforced Concrete Pipe	Circular	0000	4100	4100	4.1	6	12	194	Marginal Way between Diamond and Boyd	Infiltration
5/25/2018	SSMH-3755	SSMH-5901	Reinforced Concrete Pipe	Circular	2111	4100	4121	4.1	6	12	141	Portland Street between Forest and Brattle	Crack longitudinal, inifltration, material change, joint offset
3/25/2016	SSMH-5533	SSMH-4003	Brick	Egg Shaped	3300	4132	4135	4.1	6	36	488	Emery Street between Spring and Taylor	Roots and infiltration
5/23/2018	SSMH-4392	SSMH-2047	Brick	Egg Shaped	3200	4131	4133	4.1	6	18	530	XC between Cumberland and Congress off Wilmot	Infiltration weepers, roots, settled deposits,
4/19/2018	SSMH-6053	SSMH-0399	Vitrified Clay Pipe	Circular	4132	0000	4132	4.1	6	10	137	East Oxford Street between Alder and Preble	2 Section of broken pipe and joint offset
9/26/2016	SSMH-1669	SSMH-4565	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	6	18	22	Bell Street between Reed and Forest	No issues, needed cleaning
6/8/2016	SSMH-4589	SSMH-5776	Vitrified Clay Pipe	Circular	4231	2100	4231	4.2	5.9	24	297	Falmouth Street	Multiple fractures
3/23/2017	SSMH-0649	SSMH-0650	Asbestos Cement	Circular	5300	2100	5321	5.3	5.8	8	280	Newton Street between Braintree and Hingham	Several holes
9/7/2016	SSMH-0904	SSMH-0222	Vitrified Clay Pipe	Circular	5200	5121	5321	5.3	5.8	8	140	Eleanor Street	Multiple breaks
3/27/2017	SSMH-1318	SSMH-1317	Vitrified Clay Pipe	Circular	5100	0000	5100	5.1	5.8	8	50	Walton Street	Being replaced - 2019/20
5/9/2018	SSMH-5871	SSMH-0420	Vitrified Clay Pipe	Circular	4331	2100	4331	4.3	5.8	12	170	York Street between Danforth and Maple	Multiple fractures
5/11/2018	SSMH-1302	SSMH-2048	Asbestos Cement	Circular	3A00	3121	3A21	4.0	5.8	12	84	Pearl Street between Cumberland and Congress	Fracture longitudinal and debris
2/16/2016	SSMH-1474	SSMH-1473	Vitrified Clay Pipe	Circular	5225	2100	5226	5.2	5.7			Mitton Street	Being replaced - 2018/19
3/22/2017	SSMH-2604	SSMH-2672	Asbestos Cement	Circular	5200	2200	5222	5.2	5.7	8	336	Eighth Street between Broadway and dead end	Broken pipe and infiltration
3/8/2017	SSMH-2671	SSMH-5179	Polyvinyl Chloride	Circular	5200	0000	5200	5.2	5.7	8	142	Avalon Terrace	Deformed vertically
7/21/2017	SSMH-5694	SSMH-0247	Vitrified Clay Pipe	Circular	5242	2100	5242	5.2	5.7	8	200	Fairmont Street	Hole in pipe
6/8/2016	SSMH-4891	SSMH-1150	Vitrified Clay Pipe	Circular	5200	0000	5200	5.2	5.7	8	92	Brackett Street off Vaughn	Multiple holes, including very large one

3/13/2017	SSMH-2669	SSMH-2670	PolyVinyl Chloride	Circular	0000	5121	5121	5.1	5.6	8	266	Avalon Road off Forest and after Avalon Terrace	Infiltration, settled deposits
3/22/2017	SSMH-5136	SSMH-2604	Asbestos Cement	Circular	5100	0000	5100	5.1	5.6	8	310	Eighth Street to Broadway	Hole, infiltration
1/31/2017	SSMH-2754	SSMH-2755	Asbestos Cement	Circular	5100	0000	5100	5.1	5.6	8	234	Candlewyck Terrace	Hole in pipe
1/30/2018	SSMH-2863	SSMH-2862	Vitrified Clay Pipe	Circular	0000	5132	5132	5.1	5.6	8.0	184.0	Hale Street	Roots, grease, debris - needs maintenance
1/30/2018	SSMH-2864	SSMH-2865	Asbestos Cement	Circular	0000	5121	5121	5.1	5.6	8.0	208.0	Bartlet Street	Infiltration gusher
6/28/2017	SSMH-2896	SSMH-2897	Vitrified Clay Pipe	Circular	0000	5122	5122	5.1	5.6	8	122	XC parallel to Sonnet off Four Winds	Not sure what the issue is if any
4/13/2017	SSMH-4335	SSMH-0857	Asbestos Cement	Circular	5133	0000	5133	5.1	5.6	8	338	Aldworth Street off Belden	Multiple longitudinal fracture, hole
7/5/2018	SSMH-5723	SSMH-3479	Asbestos Cement	Circular	5100	0000	5100	5.1	5.6	8	324	Woodlawn Avenue between Magnolia and Morrill	Hole
6/8/2016	SSMH-3681	SSMH-2226	Vitrified Clay Pipe	Circular	5131	2111	5131	5.1	5.6	8	134	Marshall Street	Broken pipe
1/19/2018	SSMH-6017	SSMH-6686	Vitrified Clay Pipe	Circular	0000	5121	5121	5.1	5.6	8.0	161.0	Virginia Street between Racine and Kansas	Gravel, not an issue, needs maintenance
8/30/2017	SSMH-4055	SSMH-4679	Vitrified Clay Pipe	Circular	5143	3321	5143	5.1	5.6	8	150	Florence Street to Clinton	Multiple fractures, roots, hole
5/16/2016	SSMH-4187	SSMH-5824	Vitrified Clay Pipe	Circular	5100	4125	5141	5.1	5.6	8	180	Boynton Street	Hole, root balls, intruding service
5/16/2016	SSMH-4186	SSMH-4187	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1	5.6	8	53	Boynton Street	Surface missing
3/22/2016	SSMH-4004	SSMH-6375	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1	5.6	8	67	Briggs Street	Intruding services, possible hole
7/11/2018	SSMH-0095	SSMH-3254	Vitrified Clay Pipe	Circular	4621	2200	4623	4.6	5.6	15	157	Fernald Terrace	Fractures and infiltration
3/22/2016	SSMH-0458	SSMH-0456	Vitrified Clay Pipe	Circular	4234	2900	4234	4.2	5.6	12	201	Danforth Street between Emery and Orange	Multiple fractures, cracks, and infiltration weepers
2/26/2018	SSMH-2710	SSMH-2712	Vitrified Clay Pipe	Circular	2100	4200	4221	4.2	5.6	8	77	Brookview Terrace	Spiral crack and rootballs, needs maintenance
9/19/2017	SSMH-3153	SSMH-3154	Vitrified Clay Pipe	Circular	2100	4200	4221	4.2	5.6	8	203	Congress Street between Hobart and Brewer	Longitudinal crack, deposits
4/20/2018	SSMH-2096	SSMH-6558	Vitrified Clay Pipe	Circular	4235	2200	4235	4.2	5.6	15	35	Parris Street cross country to Lancaster St sewer	Multiple fractures and cracks
2/18/2016	SSMH-1897	SSMH-4355	Vitrified Clay Pipe	Circular	0000	4231	4231	4.2	5.6	8	25	Elmwood Street	Roots
6/6/2016	SSMH-5851	SSMH-2186	Vitrified Clay Pipe	Circular	4200	0000	4200	4.2	5.6	18	44	Deering Avenue	Multiple fractures
5/14/2018	SSMH-2126	SSMH-3817	Vitrified Clay Pipe	Circular	4237	3124	4238	4.2	5.6	15	159	End of Church Street to Newbury Street	Multiple fractures and roots
6/15/2016	SSMH-5945	SSMH-2020	Vitrified Clay Pipe	Circular	4235	2100	4235	4.2	5.6	18	267	Madison Street	Being replaced - 19/20
4/26/2018	SSMH-6664	SSMH-2121	Brick	Circular	0000	4224	4224	4.2	5.6	18	202	Market Street between Milk St and Middle	Infiltration runners
1/22/2018	SSMH-2877	SSMH-2883	Vitrified Clay Pipe	Circular	5131	2400	5131	5.1	5.6	24.0	119.0	Colonial Road between Colonial Ct and Capisic	Broken pipe and crack
2/6/2017	SSMH-2830	SSMH-2829	Vitrified Clay Pipe	Circular	0000	4E3C	4E3C	5.0	5.5	8	173	Newman Street between Hyde and Brentwood	Roots, settled deposits
9/19/2017	SSFT-0144	SSMH-4585	Vitrified Clay Pipe	Circular	3100	4131	4132	4.1	5.5	8	100	Congress Street off Brewer	Crack multiple
4/18/2018	SSMH-0381	SSMH-0380	Vitrified Clay Pipe	Circular	4121	2100	4122	4.1	5.5	10	25	Oxford Street between Chapel and Pearl	Fracture multiple, infiltration weeper, joint offset
7/24/2017	SSMH-4633	SSMH-4641	Vitrified Clay Pipe	Circular	2800	4132	4132	4.1	5.5	15	287	Ashmont off Linden Street	Several longitudial cracks and settled deposits
3/24/2016	SSMH-2216	SSMH-2211	Vitrified Clay Pipe	Circular	3123	4137	4138	4.1	5.5	24	41	Emery Street off Pine	Infiltration, circumferential crack, crack multiple
4/27/2017	SSMH-1850	SSMH-1867	Vitrified Clay Pipe	Circular	4100	2100	4121	4.1	5.5	15	220	Ocean off Parsons	Multiple fracture
5/9/2018	SSMH-4779	SSMH-4778	Vitrified Clay Pipe	Circular	4131	0000	4131	4.1	5.5	12	153	Lancaster Feeder off Chestnut and Pearl	Broken pipe, spiral fracture
4/25/2018	SSMH-4799	SSMH-4797	Vitrified Clay Pipe	Circular	4132	2200	4132	4.1	5.5	15	109	Casco Street between Cumberland and Congress	Fracture longitudinal and fracture multiple
4/19/2018	SSMH-3316	SSMH-2096	Brick	Circular	4100	2300	4123	4.1	5.5	15	56	Parris between Portland and Kennebec	Missing brick, infiltration weeper, outside drop
4/25/2018	SSMH-4836	SSMH-0426	Vitrified Clay Pipe	Circular	4135	2500	4135	4.1	5.5	12	151	South Street off Pleasant St	Multiple Fracture spiral and infiltration
5/2/2018	SSMH-2049	SSMH-0380	Vitrified Clay Pipe	Circular	4134	3100	4135	4.1	5.5	15	211	Pearl Street between Cumberland and Oxford	Fracture multiple, multiple longitidunal cracks, and infiltration stains
6/8/2017	SSMH-5155	SSMH-6207	Vitrified Clay Pipe	Circular	3100	4100	4131	4.1	5.5	8	108	XC off Glenhaven	Longitidunal fracture, roots
6/21/2017	SSMH-2912	SSMH-2913	Vitrified Clay Pipe	Circular	4122	2100	4123	4.1	5.5	12	253	Frost Street off Haywood	Longitudinal cracks, hinge cracks
9/19/2017	SSMH-4585	SSMH-3153	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	5.5	8	202	Congress St between Brewer and Hobart	Material change, settled debris
7/11/2018	SSMH-5551	SSMH-0096	Vitrified Clay Pipe	Circular	1200	4138	4138	4.1	5.5	10	136	XC off Ocean towards Fernald Terrace	Circumferential cracks, rootballs
9/21/2016	SSMH-3415	SSMH-3414	Vitrified Clay Pipe	Circular	2100	4131	4131	4.1	5.5	10	267	Woodford Street off Grace	Intruding lateral, multiple cracks - Already replaced
3/28/2017	SSMH-3594	SSMH-1036	Brick	Circular	0000	4132	4132	4.1	5.5	36	330	XC between Gleckler and Wellington	Some infiltration, obstacles/debris
1/12/2016	SSMH-1145	SSMH-1144	Vitrified Clay Pipe	Circular	4133	2200	4133	4.1	5.5	12	218	Gilman St off Park Ave	Multiple cracks and fractures, some infiltration
4/27/2018	SSMH-2143	SSMH-1191	Vitrified Clay Pipe	Circular	4131	0000	4131	4.1	5.5	15	133	Cross Street between Commerical and Fore	Fracture multiple, circumferential, longitudinal
4/26/2018	SSMH-1210	SSMH-2131	Vitrified Clay Pipe	Circular	4134	0000	4134	4.1	5.5	18	116	Market Street between Commercial and Fore	Fracture multiple, longitudinal, and multiple spirals
4/23/2018	SSMH-5888	SSMH-1219	Reinforced Concrete Pipe	Circular	0000	4122	4122	4.1	5.5	15	200	City Center	Infiltration, intruding taps
5/8/2018	SSMH-4389	SSMH-4833	Brick	Circular	4100	0000	4100	4.1	5.5	15	208	Cotton Street between Spring and Fore	Missing brick, material change
5/7/2018	SSMH-6662	SSMH-6663	Asbestos Cement	Circular	0000	4121	4121	4.1	5.5	12	102	Center Street between Spring and City Center	Intruding sealing ring
1/22/2018	SSMH-0770	SSMH-5329	Vitrified Clay Pipe	Circular	4232	2200	4232	4.2	5.4	10	248	Colonial Road between Rockland Ave and Colonial Ct	Multiple fractures
6/28/2018	SSMH-0055	SSMH-0059	Vitrified Clay Pipe	Circular	2B11	3321	332B	4.0	5.4	12	277	Grafton Street off Ocean	Cracks, material change, roots
6/22/2016	SSMH-3311	SSMH-3312	Polyethylene	Circular	3124	2813	312A	4.0	5.4	36	255	XC off W Kidder towards Alton	Crack spiral, longitudinal, material change
5/23/2016	SSMH-3694	SSMH-2202	Reinforced Concrete Pipe	Circular	0000	3B23	3B23	4.0	5.4	30	238	Clark Street between Gray and Dermot	Infiltration stains, drippers, weepers
4/11/2016	SSMH-4894	SSMH-4893	Reinforced Concrete Pipe	Circular	0000	3C21	3C21	4.0	5.4	24	156	Carlton Street between West and Brackett	Infiltration dripper
4/27/2018	SSMH-0416	SSMH-0415	PolyVinyl Chloride	Circular	0000	4200	4200	4.2	5.2	10	206	Portland Pier	Infiltration runners
8/3/2016	SSMH-0450	SSMH-4868	Vitrified Clay Pipe	Circular	4200	3122	4231	4.2	5.2	12	310	Cumberland Avenue of Mellen	Fractures and infiltration
4/19/2018	SSMH-5899	SSMH-4178	PolyVinyl Chloride	Circular	4200	0000	4200	4.2	5.2	8	92	Mechanic Street between Cumberland Ave and Portland St	Deformed vertically and horizontally
7/21/2017	SSMH-0247	SSMH-1745	Vitrified Clay Pipe	Circular	4500	0000	4500	4.5	5.1	8	196	Fairmount Street between Beacon and Highland	Multiple fractures
4/19/2018	SSMH-3756	SSMH-4808	Vitrified Clay Pipe	Circular	4100	2200	4122	4.1	5.1	8	244	Parris Street between Portland and Cumberland	Deformed horizontally
3/7/2017	SSMH-1428	SSMH-4430	Reinforced Concrete Pipe	Circular	3100	4100	4131	4.1	5.1	21	344	Front Street	Infiltration runner, fracture spiral
5/9/2017	SSMH-1860	SSMH-1862	Vitrified Clay Pipe	Circular	0000	4131	4131	4.1	5.1	10	271	Austin Street off Clifton	Roots, fine, medium, ball
1/7/2016	SSMH-0167	SSMH-0164	Vitrified Clay Pipe	Circular	0000	4133	4133	4.1	5.1	12	295	Edwards Street between Congress and Elizabeth	Lining failure, abandoned connection

6/16/2016	SSMH-0339	SSMH-0338	Vitrified Clay Pipe	Circular	4100	0000	4100	4.1	5.1	12	40	Kellogg off Adams	Fracture multiple
5/31/2016	SSMH-3850	SSMH-2014	Vitrified Clay Pipe	Circular	3100	4100	4131	4.1	5.1	15	27	North Street towards Eastern Promenade	Fracture spiral, infiltration runner
6/10/2016	SSMH-1946	SSMH-1952	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	5.1	10	285	O'Brion off Wilson Street	Infiltration runner
4/25/2017	SSMH-4292	SSMH-6229	Vitrified Clay Pipe	Circular	322C	4100	4132	4.1	5.1	15	247	Dorothy Street between Beaumont and Hicks	Several longitudinal cracks, muliple longitudinal fractures, runner
8/11/2017	SSMH-4933	SSMH-0647	Asbestos Cement	Circular	4100	0000	4100	4.1	5.1	10	249	XC between Harris and Newton	Grease
6/5/2017	SSMH-5178	SSMH-5177	Vitrified Clay Pipe	Circular	3123	4121	4131	4.1	5.1	12	227	Hicks off of Dibiase	Crack longitudinal, roots, fracture longitudinal
8/17/2017	SSMH-5198	SSMH-2738	Vitrified Clay Pipe	Circular	0000	4122	4122	4.1	5.1	10	275	Dorset Street off Riggs St	Roots fine, settled deposits
2/1/2017	SSMH-2755	SSMH-2765	Asbestos Cement	Circular	0000	4100	4100	4.1	5.1	8	172	Candlewyck Terrace	Debris
12/8/2016	SSMH-0748	SSMH-5260	Vitrified Clay Pipe	Circular	3100	4131	4132	4.1	5.1	10	256	Westminster Ave between Ludlow and Leeman	Infiltration and longtiduinal crack
7/5/2017	SSMH-2919	SSMH-2918	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	5.1	8	144	Webb Street between Levia and Brighton	Roots
5/2/2016	SSMH-3136	SSMH-3137	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	5.1	10	266	XC between Fore River and St John	Infiltration runner
5/3/2017	SSMH-4673	SSMH-1021	Vitrified Clay Pipe	Circular	4100	2200	4122	4.1	5.1	10	272	Parsons Road between Ocean and Clifton	Roots
5/2/2017	SSMH-1021	SSMH-4672	Vitrified Clay Pipe	Circular	0000	4138	4138	4.1	5.1	12	304	Parsons Road between Ocean and Clifton	Infiltration and fractures
1/7/2016	SSMH-1168	SSMH-2168	Asbestos Cement	Circular	3100	412A	4131	4.1	5.1	18	463	Brackett between Gray and Spring	Several intruding taps, some chips in the pipe
7/6/2016	SSMH-3772	SSMH-0378	PolyVinyl Chloride	Circular	0000	4100	4100	4.1	5.1	10		XC off Franklin and Boyd	Underwater
6/16/2016	SSMH-0340	SSMH-0339	Vitrified Clay Pipe	Circular	4133	251C	4133	4.1	5.1	10	301	Kellogg off Adams	Roots, fracture spiral, and cracks longitudinal, infiltration
6/14/2016	SSMH-1980	SSMH-1983	Vitrified Clay Pipe	Circular	4100	2300	4123	4.1	5.1	12	202	Cumberland between Sheridan and North	Infiltration, fracture multiple
6/2/2016	SSMH-3862	SSMH-5967	Asbestos Cement	Circular	1100	4100	4111	4.1	5.1	18	46	Turner Street off Eastern Promenade	Infiltration runner, material change, joint offset
9/26/2016	SSMH-6005	SSMH-5718	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	5.1	10		XC between Bell Street and Walton Street	Grease
9/22/2016	SSMH-1066	SSMH-6005	Vitrified Clay Pipe	Circular	0000	4132	4132	4.1	5.1	10		XC between Bell Street and Walton Street	Grease
7/19/2017	SSMH-1319	SSMH-1525	Vitrified Clay Pipe	Circular	0000	4132	4132	4.1	5.1	8	97	Fairfield Street	Roots
4/10/2018	SSMH-0753	SSMH-1325	Asbestos Cement	Circular	0000	4100	4100	4.1	5.1	10	27	Crosby Street off Leland	Roots
9/23/2016	SSMH-1278	SSMH-6107	Vitrified Clay Pipe	Circular	2A00	4135	4135	4.1	5.1	18	278	XC between Bell Street and Walton Street	Several longitidunal fractures and roots
4/19/2018	SSMH-4178	SSMH-5900	PolyVinyl Chloride	Circular	4131	0000	4131	4.1	5.1	8	233	Mechanic Street between Cumberland Ave and Portland St	Deformed horizontal, fracture longitudinal
3/22/2017	SSMH-0640	SSMH-0639	Asbestos Cement	Circular	4134	4321	4421	4.4	5	8	227	Ninth Street	Multiple fractures and infiltration
6/1/2016	SSMH-1930	SSMH-1923	Vitrified Clay Pipe	Circular	3123	2B1A	312B	4.0	5	15	161	Quebec Street between Emerson and Howard	Crack longitudinal, roots
6/22/2016	SSMH-3312	SSMH-6435	Vitrified Clay Pipe	Circular	332B	241A	332B	4.0	5	36	264	XC off W Kidder towards Alton	Cracks longitudinal, spiral, roots
7/12/2018	SSFT-0125	SSMH-5893	Asbestos Cement	Circular	3300	2B00	332B	4.0	5	12	210	Pipe within Monument Way	Roots, hole, broken pipe
1/19/2016	SSMH-0124	SSMH-1570	Vitrified Clay Pipe	Circular	0000	4200	4200	4.2	4.8	8	289	Edwards Street	Roots, fractures, infiltration
11/16/2016	SSMH-6615	SSMH-1785	Vitrified Clay Pipe	Circular	0000	4231	4231	4.2	4.8	8	234	Williams Street	Lined, no issues
4/13/2017	SSMH-5506	SSMH-5507	Asbestos Cement	Circular	4200	0000	4200	4.2	4.8	8	245	Castine Avenue	Lined, no issues
8/8/2017	SSMH-6104	SSMH-5108	Vitrified Clay Pipe	Circular	4221	0000	4221	4.2	4.8	8	137	Pennell Avenue off of Cypress Ave	Material change, multiple fractures
7/19/2017	SSMH-4512	SSMH-1591	Vitrified Clay Pipe	Circular	4100	2300	4123	4.1	4.7	8	122	Hennessy Drive off Cypress Street	Fracture multiple, intruding tap
3/24/2017	SSMH-4539	SSMH-4540	Asbestos Cement	Circular	4100	2300	4123	4.1	4.7	8	300	Farnham Street off Forest Ave	Missing piece
5/19/2017	SSMH-0306	SSMH-0304	Vitrified Clay Pipe	Circular	0000	4134	4134	4.1	4.7	8	227	Pya Road off Ocean	Roots
12/2/2016	SSFT-0150	SSMH-0149	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	4.7	8		Pembroke Street	Roots
7/17/2017	SSMH-2566	SSMH-4512	Vitrified Clay Pipe	Circular	0000	4132	4132	4.1	4.7	8	250	Hennessy Drive off Cypress Street	Roots
7/21/2017	SSMH-2568	SSMH-2567	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	4.7	8		Hennessy Drive off Cypress Street	Debris
7/21/2017	SSMH-2563	SSMH-2569	Vitrified Clay Pipe	Circular	4124	0000	4124	4.1	4.7	8	268	Hennessy Drive off Skylark	Crack longitudinal, cricuferential, and multiple fracture
4/25/2017	SSMH-0638	SSMH-5123	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	4.7	8	260	5th Street of Broadway	Infiltration, drop in line
3/22/2017	SSMH-2594	SSMH-2595	Vitrified Clay Pipe	Circular	0000	4122	4122	4.1	4.7	8	195	Lexington Ave between Faragut and Libby	Material change, roots, intruding taps
3/22/2017	SSMH-2672	SSMH-0639	Asbestos Cement	Circular	0000	4100	4100	4.1	4.7	8	280	XC between 8th and 9th	Infiltration, might be a tap
4/25/2017	SSMH-2321	SSMH-2674	Asbestos Cement	Circular	4100	0000	4100	4.1	4.7	8	249	XC between Faragut and Luke	Fracture multiple
3/22/2017	SSMH-2602	SSMH-2316	Asbestos Cement	Circular	0000	4100	4100	4.1	4.7	8	250	Harris Avenue off of Lexington	Infiltration runner
8/22/2016	SSMH-2613	SSMH-4227	PolyVinyl Chloride	Circular	0000	4100	4100	4.1	4.7	8	168	Mayfield Street off Bishop	Settled deposits
3/24/2017	SSMH-2620	SSMH-6445	Polyvinyl Chloride	Circular	0000	4100	4100	4.1	4.7	8	120	Iffley Street	Infiltration runner at manhole
1/30/2018	SSMH-2866	SSMH-2865	Asbestos Cement	Circular	0000	4100	4100	4.1	4.7	8	280	Bartlett Street off Hamlet Ave	Infiltration runner
5/3/2018	SSMH-4261	SSMH-0779	Vitrified Clay Pipe	Circular	0000	4132	4132	4.1	4.7	8	54	Bancroft off Capisic towards the brook	Roots
1/7/2016	SSMH-1162	SSMH-1161	PolyVinyl Chloride	Circular	0000	4100	4100	4.1	4.7	8	247	Gray Street off Lexington	Infiltration runner
8/4/2016	SSFT-0060	SSMH-1965	Vitrified Clay Pipe	Circular	0000	4100	4100	4.1	4.7	12	6	Hancock between Federal and Newbury	Outside Drop
7/11/2018	SSMH-0096	SSMH-0095	Vitrified Clay Pipe	Circular	3823	3300	3A00	4.0	4.6	10	172	XC between Ocean and Fernald Terrace	Roots, multiple cracks
4/10/2017	SSMH-0673	SSMH-0672	Vitrified Clay Pipe	Circular	0000	311A	311A	4.0	4.6	8	139	Libby Street off Lexington	Roots
7/2/2018	SSMH-0054	SSMH-0055	Vitrified Clay Pipe	Circular	3A22	1100	3A22	4.0	4.6	8	245	Grafton Street off Ocean	Roots, multiple cracks
3/24/2017	SSMH-4540	SSMH-4541	Asbestos Cement	Circular	0000	4229	4229	4.2	4.3	8	305	Farnham Street	Infiltration, several stubs for road extension
5/22/2018	SSMH-3790	SSMH-2047	Asbestos Cement	Circular	3113	412A	4131	4.1	4	12	225	Cumberland between Wilmot and Franklin	Fracture multipe, longitudinal, crack multiple, spiral, deposits
4/8/2016	SSMH-9858	SSMH-4853	Vitrified Clay Pipe	Circular	5141	0000	5141	5.1	3.3	8	59	High Street	Multiple cracks - can't find in GIS
5/29/2018	SSMH-3254	SSMH-6436	Vitrified Clay Pipe	Circular	0000	5100	5100	5.1				Fernald Terrace	Nothing wrong here
5/29/2018	SSMH-5261	SSMH-2850	Vitrified Clay Pipe	Circular	0000	5100	5100	5.1				Westminster Street	Nothing wrong here
5/29/2018	SSMH-0040	SSMH-0094	PolyVinyl Chloride	Circular	0000	5131	5131	5.1				East Kidder Street off Washington	Nothing wrong here
3/30/2016	SSMH-6015	SSMH-4884	Reinforced Concrete Pipe	Circular	5200	3100	5231	5.2		10	19	Vaughn Street off Pine	Holes, roots
5/2/2016	SSMH-3659	SSMH-3137	Vitrified Clay Pipe	Circular	0000	5131	5131	5.1				St. John Street at Fore River Parkway	Settled deposits - can't find in GIS

5/25/2016	SSMH-1184	SSMH-0441	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1		15	108	Deering Street	Broken pipe, looks repaired
6/20/2018	SSMH-2104	SSMH-2072	Vitrified Clay Pipe	Circular	332B	5122	5133	5.1		24	162	Preble Street between Kennebec and Somerset	Multiple fractures and repairs - being replaced
8/1/2017	SSMH-5915	SSMH-0379	Brick	Circular	5142	3121	5142	5.1		18	281	Chestnut Street between Oxford and Cumberland	Material Change
2/16/2018	SSFT-0494	SSMH-2124	Brick	Circular	5100	2200	5122	5.1		24.0	486.0	Middle Street between Exchange and Market	Size change, hole in pipe
3/23/2017	SSMH-4240	SSMH-1318	Vitrified Clay Pipe	Circular	5100	2100	5121	5.1		8	47	Walton Street	Being replaced - 2019/20
3/6/2018	SSMH-6419	SSMH-6418	Reinforced Concrete Pipe	Rectangular	0000	5141	5141	5.1		96.0	282.0	BCSCN - In Baxter Boulevard	Infiltration Gusher and runner
5/22/2018	SSMH-2045	SSMH-3790	Vitrified Clay Pipe	Circular	443A	312A	443A	5.0		12	225	Franklin Street off of Cumberland (City Hall side)	Multiple fractures, cracks, infiltration, and items within joints
5/10/2018	SSMH-0404	SSMH-3805	Vitrified Clay Pipe	Circular	473B	0000	473B	5.0		15	258	Cumberland Avenue between Oak and Forest	Multiple fractures
6/20/2016	SSMH-4714	SSMH-0336	Vitrified Clay Pipe	Circular	4435	2200	4435	4.4		24	204	Moody Street	Nothing wrong here
7/16/2018	SSMH-3806	SSFT-0136	Vitrified Clay Pipe	Circular	4434	3122	4435	4.4		10	40	Cumberland Ave between Forest and High	Defective Tap
7/6/2018	SSMH-5782	SSMH-5783	Reinforced Concrete Pipe	Circular	0000	4232	4232	4.2		36	240	Marginal Way between Franklin and Chestnut	Infiltration throughout
7/16/2018	SSMH-5784	SSMH-3584	Reinforced Concrete Pipe	Circular	0000	4100	4100	4.1		36	307	Marginal between Franklin and Chestnut	Infiltration runner
6/20/2016	SSMH-3677	SSMH-3676	Brick	Oval	0000	4100	4100	4.1		48	150	State Street	No issues
6/2/2016	SSMH-0441	SSMH-3194	Brick	Egg Shaped	0000	4132	4132	4.1		24	397	Deering Street	Infiltration weepers, runners
4/7/2016	SSMH-2276	SSMH-3721	Vitrified Clay Pipe	Circular	3B00	3100	3B00	4.0		15	157	Congress Street	Lining wrinkle
8/12/2016	SSMH-1282	SSMH-4842	Brick	Circular	0000	3A00	3A00	4.0		12	53	Cotton Street	Deposits
8/28/2018	SSMH-5196	SSMH-0700	Vitrified Clay Pipe	Circular						18	237	Brighton Avenue	Multiple Fractures and Cracks