

To: Project Advisory Committee (PAC) **From:** Thomas Errico, P.E.

Date: October 2, 2014

Address:

CC:

Re: State and High Streets Two-Way Conversion Study

MEMORANDUM

The purpose of the memorandum is to update the PAC on additional transportation information collected and evaluated as part of the on-going technical evaluation. This memorandum summarizes on-street parking supply, vehicular level of service, pros and cons of two-way street conversions from communities across the country, and a summary of the speed survey's performed at four locations along corridors.

On-Street Parking Supply:

The parking supply graphic illustrates approximately 315 parking spaces are located along State and High Streets within the study area. Over half of those spaces have no time limit – these are mostly concentrated north of Congress Street and from Danforth Street south. There are 71 metered parking spaces, mostly concentrated around Congress Street and 61 - 2 hour parking spaces between Forest Avenue and Park Avenue and between Spring and Danforth Streets. There are a handful of 1 hour and 15 minute spaces scattered throughout and some loading/taxi spaces on High Street just north of Congress Street. For spaces without clearly defined striping an average vehicle length of 20 feet was assumed for estimation purposes.

Level of Service and Queue Summary:

The Synchro/SimTraffic traffic simulation model was used to evaluate existing traffic mobility within the study area. The model was calibrated to match existing conditions as observed in the field. The model was simulated and the results discussed in this section and on the attached graphics are the result of the average of five runs over the course of one hour. It should be noted that a multi-modal level of service analysis is on-going and results will be provided in the future.

The model output provides two key pieces of information: vehicular level of service (based on delay) and queue lengths. The vehicular level of service is the measure of the delay experienced by motorists ranging from Level of Service A to F – from free flow conditions to heavily congested conditions. The following table summarizes the delay (in seconds) versus the assigned letter grade.

LOS	Signalized Intersection	Unsignalized Intersection
A	10	10
B	20	15
C	35	25
D	55	35
E	80	50
F	80	50

While the majority of intersections operate at a level of service “D” (the lowest MaineDOT accepted level of service), there are five intersections with significant delays – concentrated at the northerly and southerly ends of the corridors:

- Park Street and Commercial Street:
 - This intersection sees an overall good level of service with movements that fail southbound because they have difficulty turning onto Commercial Street.
- High Street and Commercial Street:
 - This intersection sees an overall good level of service with movements that fail significantly southbound on High Street and eastbound on Commercial Street.
- High Street and York Street:
 - This intersection sees an acceptable overall level of service but with long delays on the westbound York Street approach.
- High Street and Forest Avenue:
 - This intersection sees delays mostly in the PM Peak hour for vehicles turning left onto Forest Avenue.
- State Street and Marginal Way and Kennebec Street and Forest Avenue:
 - This intersection sees significant delays on both Forest Avenue (SB) and on Marginal Way (WB) approaches. The Forest Avenue delays occur in both the AM and PM Peak hours while Marginal Way is more concentrated to PM Peak hour delays.

Although the intersections appear to operate at relatively acceptable levels of service, another indicator of traffic performance measure within the corridor that was reviewed is vehicle queues. As illustrated in the attached graphic, there are a number of movements with queues during the 95th percentile condition (a typical design condition in which 95% of the time the queues are less than this length) that spill past the neighboring intersection. These include:

- Cumberland Avenue and State Street SB into Sherman Street
- Congress Street and State Street SB into Deering Street
- Spring Street and High Street NB into Pleasant Street
- High Street and Cumberland Avenue NB into Deering Street
- High Street and Park Avenue NB into Grant Street
- High Street and Park Avenue WB into Forest Avenue
- High Street and Forest Avenue SB into Marginal Way
- Forest Avenue and Cumberland Avenue WB into Mechanic Street
- Congress Street and Forest Avenue WB into Oak Street

- High Street and Congress Street WB into Forest Avenue

The previous list does not include turn bays that do not have sufficient storage for the estimated queue length. A list of these turn bays is noted below. This list does not include turning movements that get stuck in the through lane and cannot access the turn lane due to long through queue lengths:

- Forest Avenue and State Street and Marginal Way and Kennebec Street-Westbound Right Lane
- Cumberland Avenue and State Street-Southbound Left Lane
- Congress Street and State Street - Southbound Left and Right Lanes
- Congress Street and State Street - Westbound Left Lane
- Spring Street and State Street - Westbound Left Lane
- Congress Street and Danforth Street - Southbound Left and Right Lanes
- York Street and High Street - Eastbound Left Lane
- Spring Street and High Street - Northbound Right Lane
- Spring Street and High Street - Eastbound Left Lane
- Congress Street and High Street and Free Street - Northbound Right Lane
- Congress Street and High Street and Free Street - Eastbound Left Lane
- Congress Street and High Street and Free Street - Westbound Right Lane
- Cumberland Avenue and High Street - Northbound Right Lane
- Park Avenue and High Street - Northbound Left and Right Lanes
- Park Avenue and High Street - Westbound Left Lane
- Park Avenue and Forest Avenue - Eastbound Left Lane

Pros and Cons of Two-Way Street Conversions:

More than 40 cities in the US have performed one-way to two-way street conversions including many in New England such as Gardner, MA, New Haven, CT, Providence, RI, and Woonsocket, RI. In order to document the pros and cons, news articles, press releases, and pre and post studies were examined. A summary of specific City-by-City summaries will be provided in the future. It should be noted that these projects had different characteristics ranging from four lane one way streets to two lane one way streets like State and High Streets.

Pros:

- **Safety:**
 - Pedestrians: It was generally seen that two-way conversions improved pedestrian safety as part of these projects. It should be noted that many of these projects included improved ADA compliant facilities with up-to-date pedestrian countdown heads and bump outs and would therefore be expected to have an impact on improving pedestrian safety.
 - Bicyclists: Some projects provided for additional bicycle lanes that increased corridor safety and it was identified that adding sharrows and signing to the corridor encouraged bicycle usage and visibility. One of the key bicycle safety benefit identified was that wrong-way crashes were eliminated.

- **Access and Circulation:**
 - In addition to more direct travel opportunities provided by two-way streets for vehicles, bus routes had the opportunity to change routes and become more efficient.
- **Perception:**
 - Traffic feels both slower and safer through the corridor according to residents.
- **Crime:**
 - The City of Louisville studied this effect noting that after the two-way conversion there was an overall 23% reduction in crime. There was a 42% reduction in robberies.
- **Economic:**
 - Many locations reported increased business use and saw this type of project as a catalyst to revitalization.
 - Many cities reported a statistically significant increase in property values – reports of as much as 39% were documented.

Cons:

- **Parking:**
 - Corridors experienced a decrease in on-street parking supply to account for new turn movements. This was a concern in many of the cities interviewed. Some of the cities implemented parking that became a travel lane during peak hours – this led to initial confusion but dramatically increased the number of available spaces and capacity.
- **Snow Removal:**
 - Snow removal was a concern on many similarly narrow roadways with on-street parking.
- **Vehicle Delays:**
 - Vehicles did spread more through the corridors; however delays did increase in some areas. Turning vehicles did require additional traffic signal phases that slowed through movements and allowed for less synchronization of traffic signals.
- **Pollution:**
 - Additional delay can lead to increased pollution.
- **Costs:**
 - Costs included new pedestrian accommodations, new signals (many needed to be updated in addition to the new signals for opposing traffic), striping, paving, possible corner reconstruction, signage and a large public marketing campaign.
 - In one city, significant unexpected costs were incurred due to unknown sub-surface infrastructure.

Other:

- **Safety:**
 - Vehicles: This was divided. Many showed an increase in crashes with the two-way conversion, but because of decreased travel speeds crashes were less severe. It was also noted that vehicle lane changes that weaved around slow vehicles and stopped buses was reduced.

- **Historical Landmarks:**
 - One project's study limits were reduced due to historic preservation concerns.

Speed Survey:

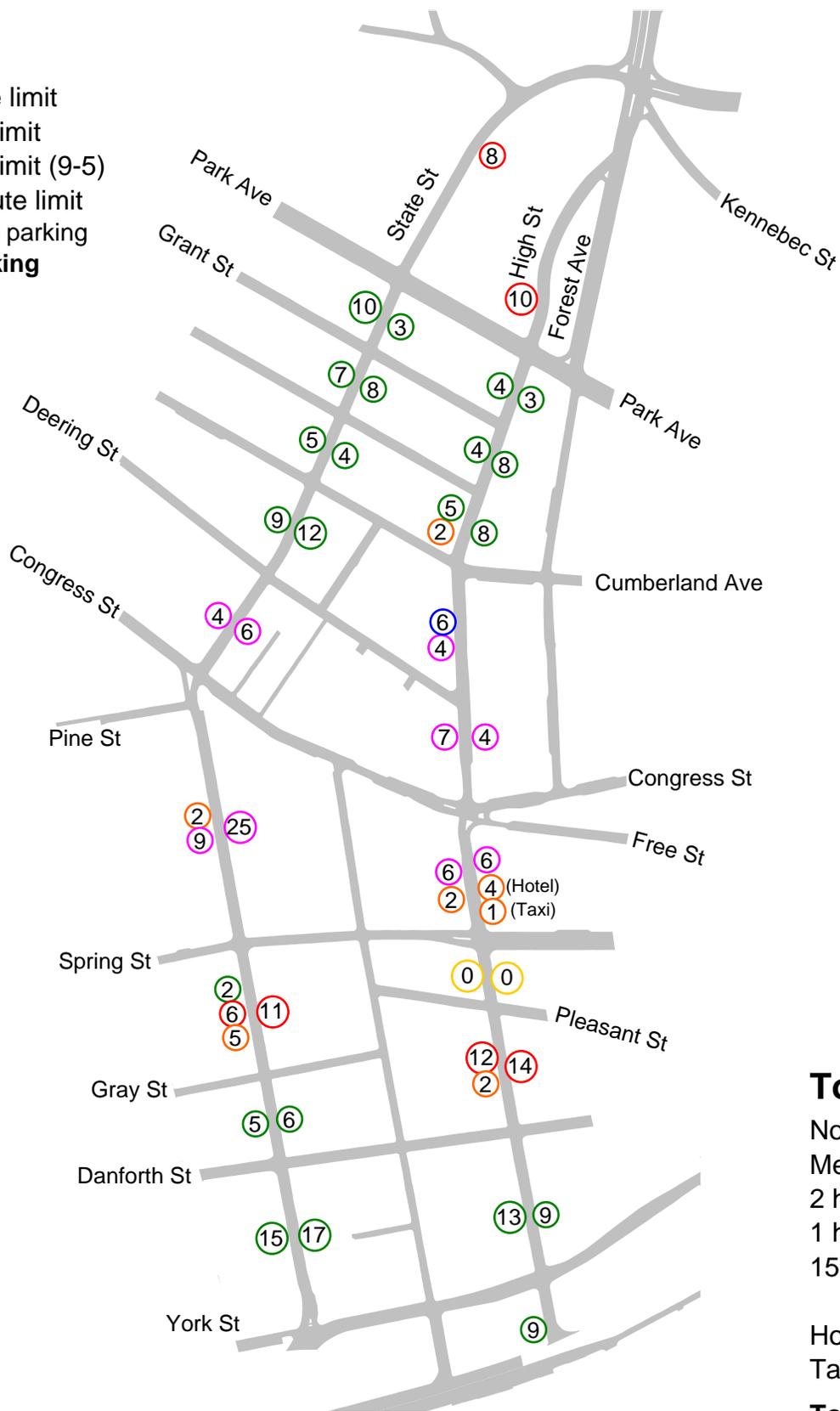
In addition to the travel time/delay study performed during the day of the traffic counts to determine the average travel time and speeds during peak AM and PM periods through the corridor, speed survey equipment recorded speeds in August near four intersections: State Street and Grant Street, High Street and Sherman Street, State Street and Danforth Street and High Street and Pleasant Street.

The surveys showed the average speed ranged from 15 mph to 25 mph, with High Street at Pleasant Street seeing the lowest speeds. The 85th percentile speeds, topping at 30 mph – meaning 85% of cars at this location (State and Danforth) travel less than 30 mph. It should be noted that additional speed surveys are being programmed for the study corridors and will be reported in the near future.

Figure: Parking
Based on Field Survey

KEY:

- ⊗ No time limit
- ⊗ 2 hour limit
- ⊗ 1 hour limit (9-5)
- ⊗ 15 minute limit
- ⊗ Metered parking
- ⊗ No Parking



Totals:

- No time limit: 166
- Metered parking: 71
- 2 hour limit: 61
- 1 hour limit: 6
- 15 minute/
Loading limit: 13
- Hotel Only: 4
- Taxi Only: 1
- Total: 315**



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Figure: Queue and Level of Service (AM 2014 Existing)

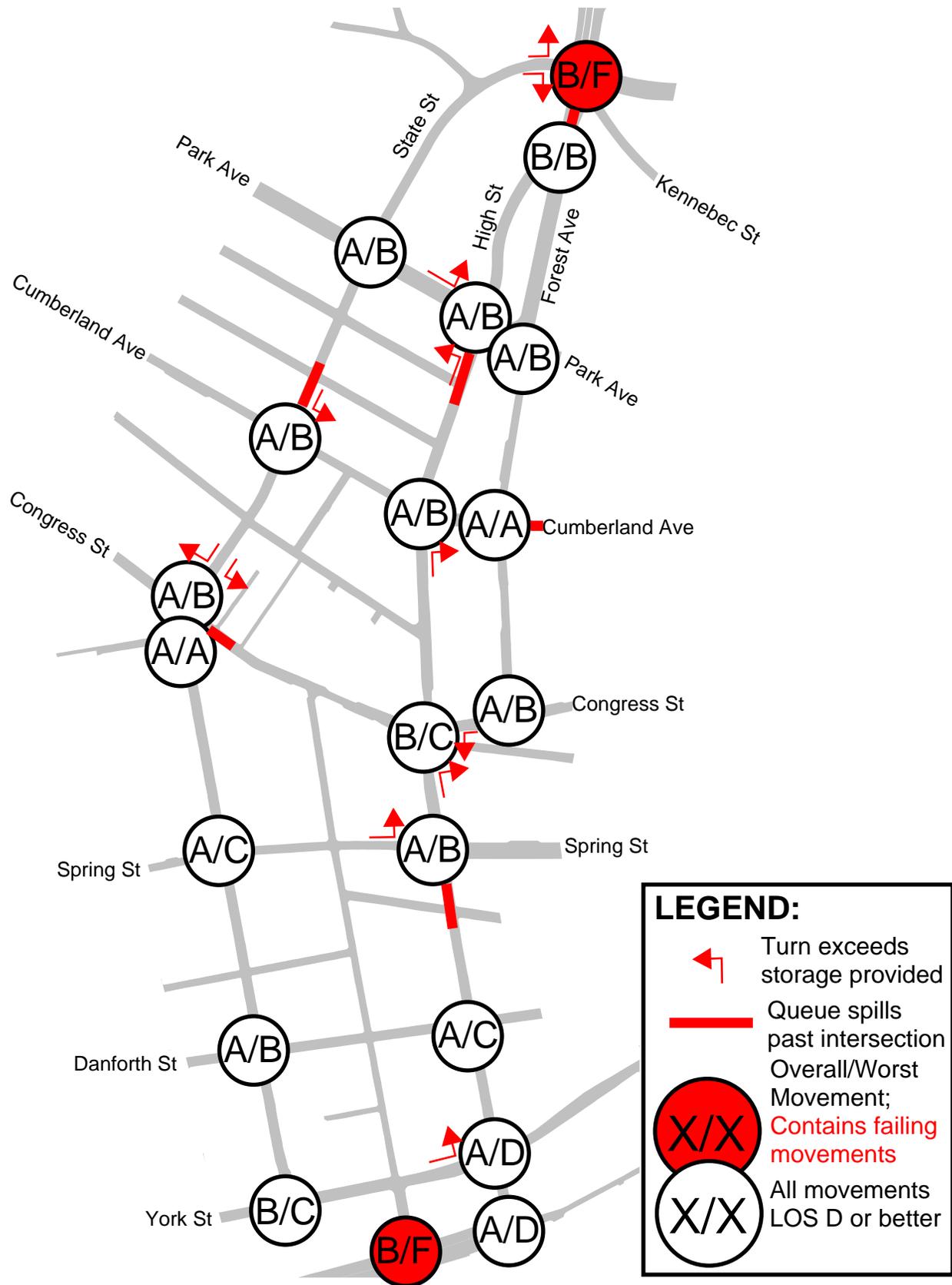
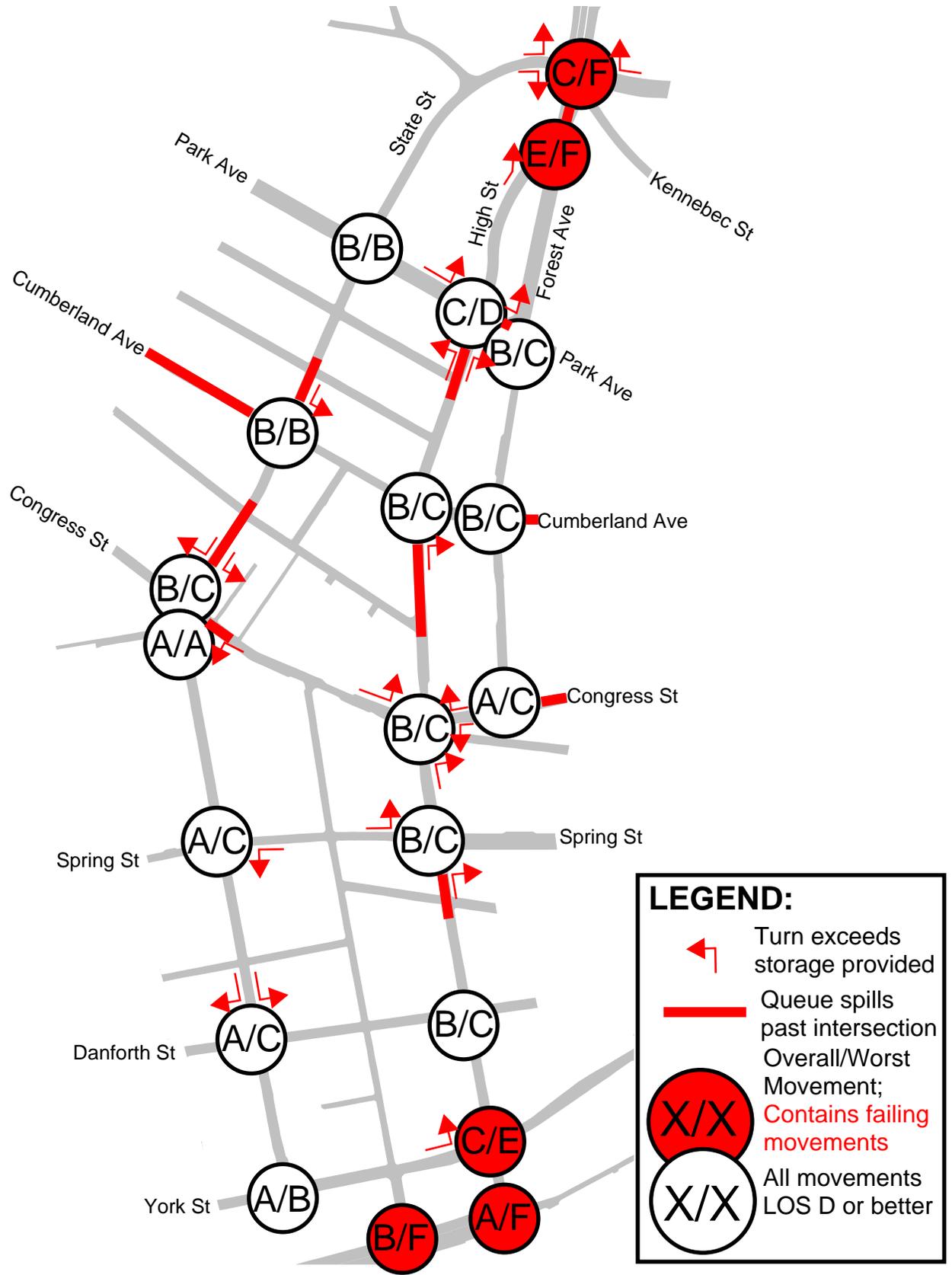


Figure: Queue and Level of Service (PM 2014 Existing)



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**Figure: Speed Study
(2014)**

