

Order 106-15/16

Passage: 8-1 (Brenerman) on 11/16/2015

Effective 11/26/2015

MICHAEL F. BRENNAN (MAYOR)
KEVIN J. DONOGHUE (1)
DAVID A. MARSHALL (2)
EDWARD J. SUSLOVIC (3)
JUSTIN COSTA (4)

CITY OF PORTLAND
IN THE CITY COUNCIL

DAVID H. BRENERMAN (5)
JILL C. DUSON (A/L)
JON HINCK (A/L)
NICHOLAS M. MAVODONES, JR (A/L)

**ORDER ACCEPTING THE STATE AND
HIGH STREETS TWO-WAY FEASIBILITY STUDY**

ORDERED, that the State and High Streets Two-Way Feasibility Study, attached hereto as Attachment A, is hereby accepted; and

BE IT FURTHER ORDERED, that the City Manager or his or her designee is directed to further assess the public safety impacts of two-way traffic on emergency responses, through a third party consultant; and

BE IT FURTHER ORDERED, that staff analyze the financial impact of the conversion in light of the Maine Department of Transportation's requirements.

prepared for:

City of Portland

State and High Streets Two-Way Feasibility Study

Draft Report

November 2015



TABLE OF CONTENTS

ACKNOWLEDGMENTS

1.0 INTRODUCTION

2.0 PURPOSE AND NEED STATEMENT

3.0 EXISTING CONDITIONS

4.0 STUDY PROCESS / PUBLIC INVOLVEMENT

5.0 FEASIBILITY ANALYSIS

6.0 CONCLUSIONS

APPENDIX

ACKNOWLEDGMENTS

Public Advisory Committee

- David Marshall, co-chair, City of Portland Councilor, Dist. 2
- Kevin Donoghue, co-chair, City of Portland Councilor, Dist. 1
- Carl Eppich, PACTS
- Steve Landry, MaineDOT
- Marie Gray, Parkside Neighborhood Assn
- Ian Jacob, West End Neighborhood Assn
- Anne Pringle, Friends of Deering Oaks
- Ron Spinella, Bayside Neighborhood Assn
- Rosanne Graef, Friends of Congress Square Park
- David Robinson, Greater Portland Landmarks
- Michael Connolly, Mercy Hospital
- Bruce Wennerstrom, Westin Portland Harborview
- Kristen Levesque, Portland Museum of Art
- William Barry, 100 State Street
- Lauren Wayne, State Theater

Community Advisors

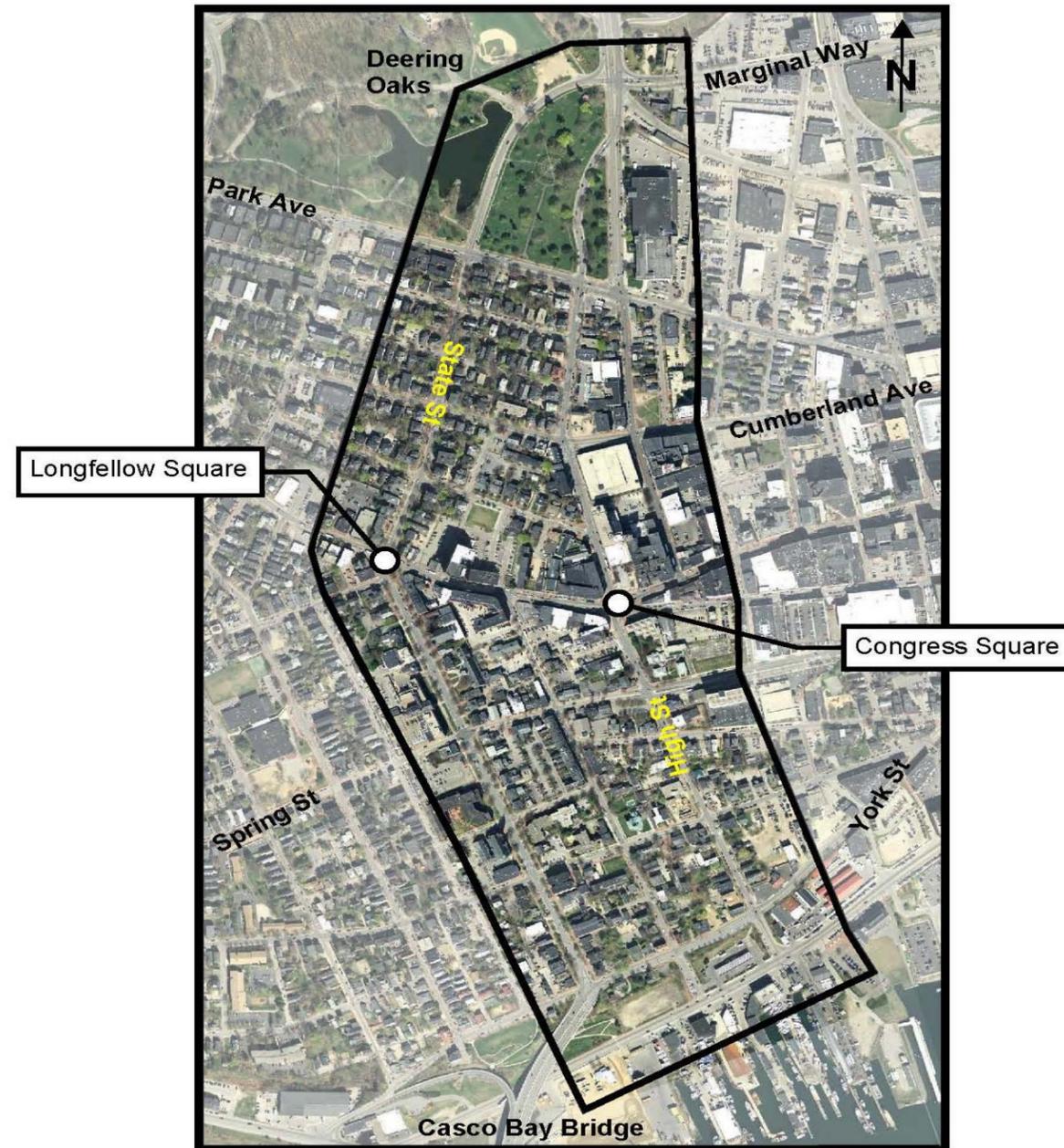
- Steve Hewins, Portland Downtown District
- Chris O'Neil, Portland Chamber
- Greg Jordan, METRO
- Pat Moody, AAA
- Lynn Tillotson, Convention and Visitors Bureau
- Damon Yakovleff, Portland Bike and Pedestrian Advisory Committee
- Zack Barowitz, Libbytown Neighborhood Assn
- Chris Cantwell, Portland Society of Architects
- Ben Shambaugh, Dean, St. Luke's Church
- Hildy Ginsberg, YMCA
- Bill Bray, Traffic Solutions
- Tuck O'Brien, Portland Planning Board Chair

1.0 INTRODUCTION

This study investigates whether it is technically feasible to return State and High Streets to a two way traffic pattern while maintaining vehicular capacity and improving the local function of those streets for other users. The conversion of State and High Streets to one-way traffic occurred in an historic framework of land use and transportation planning consistent with other changes occurring in Portland and in many major cities in the United States in the 1950's, 1960's and 1970s. Converting State and High Streets from two-way to one-way traffic were primary recommendations in the 1967 Victor Gruen Associates plan for downtown Portland, *Patterns for Progress*, which recommended a slate of additional urban renewal initiatives, such as the creation of the Franklin Arterial and the conversion of Spring Street to a four lane arterial, that Portland is now actively seeking to transform back to context-sensitive, walkable, multi-modal public spaces. In keeping with common practice of the time, these urban renewal initiatives prioritized automobile mobility not in conjunction with other modes, but often largely at the expense of them. In contrast, Portland's current land use and transportation planning policies are generally supportive of the diverse functions the historic pattern of State and High Streets would enable.

The State and High Streets Two-Way Feasibility Study was not meant to make the case for a change to the current traffic pattern, but to establish if an idea that had percolated up in public discourse and in local policy documents for over a decade was technically feasible to pursue. The impetus for restoring State and High Streets to two-way traffic precedes this feasibility study. State and High Streets will also need in the near term upgrades to their traffic signal systems, offering an opportunity to coordinate potential roadway modifications of both State and High Streets with future investments.

Study Area



2.0 PURPOSE AND NEED STATEMENT

The study Purpose and Need drives the process for alternatives consideration, in-depth analysis, and ultimate recommendations and/or identification of the preferred alternative(s). In conjunction with the City of Portland, the PAC, and the public, the Purpose and Need Statement and related goals and objectives were crafted to document the transportation deficiencies and needs in the Study Area. The Need was documented in the form of transportation measures related to vehicle, pedestrian, bicycle, and transit, as well as land use, social, environmental, and economic factors.

The **Purpose** of the State and High Streets Two-Way Feasibility Study is to study the effects of re-introducing two-way traffic flow on State and High Streets. The study will evaluate whether changes in transportation infrastructure will support the existing mix of land uses and neighborhoods in the study area. Both streets need to serve automobiles, trucks, transit, pedestrians, and cyclists equitably, as well as serve both those who are traveling within the City as well as through the City. From a safety and health perspective, new infrastructure should be designed to accommodate pedestrian and cyclist safety and increase livability. From an urban design perspective, changes should provide a positive experience, and actively connect historic neighborhoods. Changes should also serve the transportation needs of those living off the peninsula by creating convenient access to city amenities and work places. Changes should be compatible and coordinate with other related City planning projects, including the redesign of Congress Square.

Goals and Objectives:

- Improve Safety and Mobility for All Users
- Improve Neighborhood Livability
- Reduce Vehicle Travel Speeds
- Reduce Through Traffic Volumes
- Improve Accessibility for Vehicles, Pedestrians, Transit, and Cyclists.

Needs:

- Reduce High Crash Locations
- Reduce High Vehicle Speeds
- Moderate High Traffic Volumes
- Improve Limited and Difficult Pedestrian Crossings
- Improve Lack of Bicycle Facilities
- Improve Circuitous Neighborhood/Business Access Routing
- Improve Poor Access to Deering Oaks Park.

3.0 EXISTING CONDITIONS

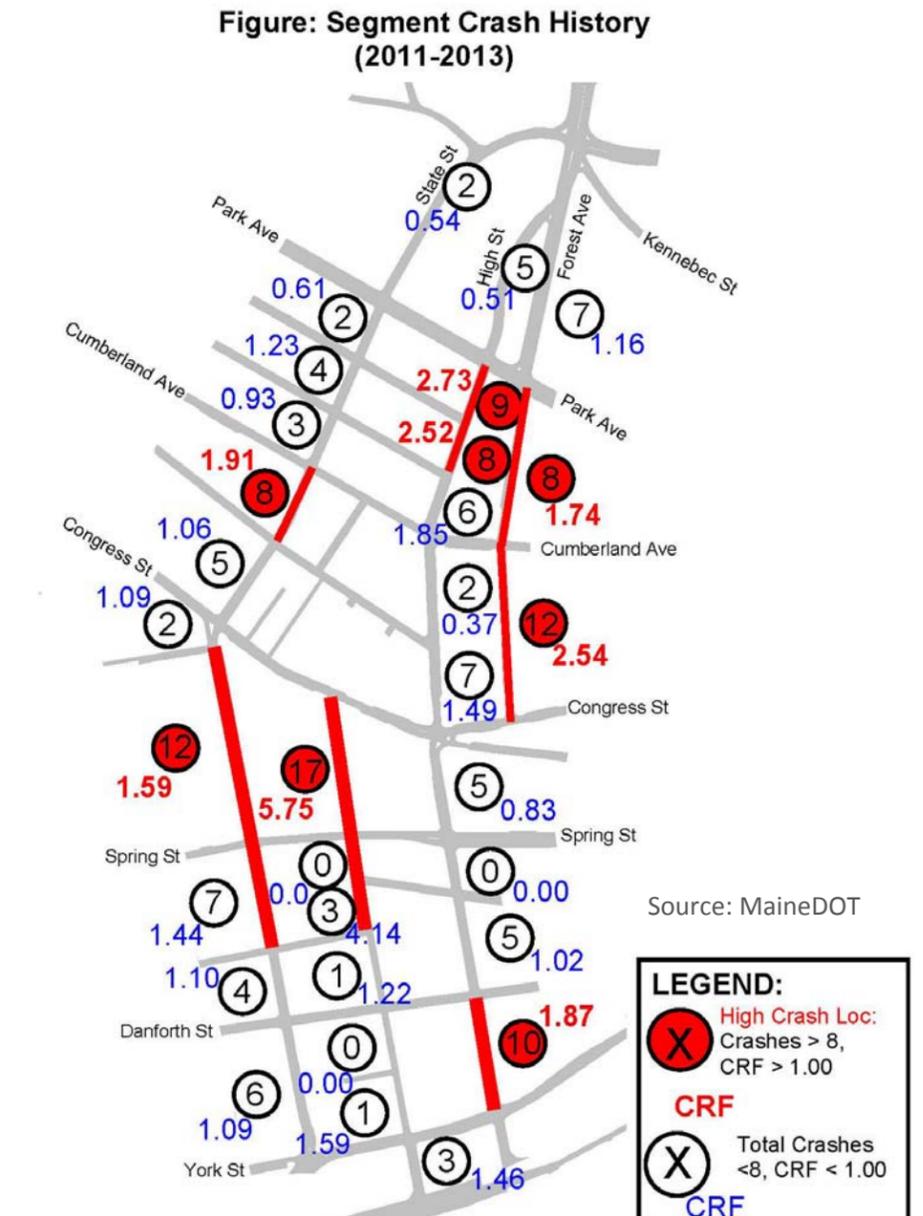
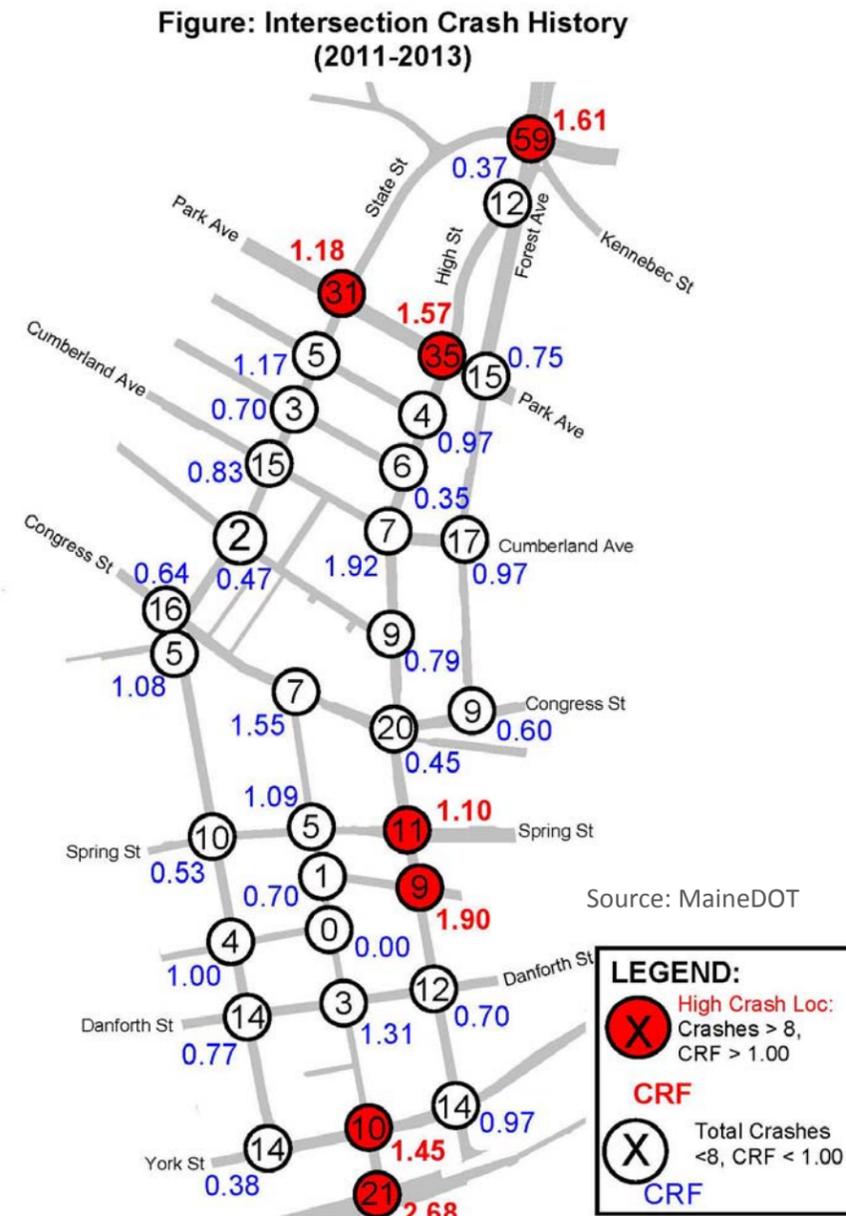
3.1 Crash History

Crash data was obtained from MaineDOT for the most recent three-year period (2011-2013) for both intersections and roadway segments. The adjacent figures note High Crash Locations (HCL) per MaineDOT criteria. A location is a HCL if it has 8 or more crashes within the three-year reporting period and if it has a Critical Rate Factor (CRF) of 1.0 or more. The CRF compares crash rates between similar locations. If a location has a CRF of 1.50, for example, it has a 50% higher rate of crashes than its peer locations.

There were two Segment HCL's on State Street and three on High Street. The following intersections are HCL's: State Street/ Forest Avenue/Marginal Way; State Street/Park Avenue; High Street/Park Avenue; High Street/Spring Street; High Street/Pleasant Street; York Street/Park Street. A detailed review of these HCL locations on State and High Streets was conducted to identify patterns and key conclusions are summarized below:

- **State/Forest/Marginal Way** - Majority of crashes were on Forest Avenue with most occurring on the southbound approach. Most were rear-end collisions or motorists making improper lane changes/turns.
- **State/Park** - Majority of crashes were rear-end collisions with a high number of red light running.
- **High/Pleasant** - All crashes were on High Street and the majority of crashes were rear-end collisions and improper lane changes.
- **High/Deering** - All crashes were on High Street and most were improper lane changes.
- **High/Park** - Majority of the crashes were T-bone type crashes (appears to be people on Park Avenue turning right-on-red), rear-end collisions or improper lane changes.
- **High/Spring** – The primary patterns included improper lane changes and rear-end collisions.
- **State/Cumberland to Deering and Pine to Spring** - Mostly improper lane changes and parking maneuvers.

- **High/Park to Sherman** – Most were rear-end crashes and related to signal operations at Park Avenue.
- **High/Sherman to Grant** - No distinct pattern – most of them were single car crashes.



3.2 Bicycle and Pedestrian Facilities and Conditions

The adjacent figure illustrates existing and potential future bicycle facilities in the study area, as identified by the City as part of their Bikeway & Pedestrian Network. State and High Streets between Park Avenue and Forest Avenue currently have bicycle lanes. The remaining portions of State and High Streets currently have no bicycle accommodations and are planned as on-road bikeway facilities. Congress Street, Danforth Street, and York Street are identified as areas slated to have on-road bikeway facilities in the future. Spring Street is identified as a future neighborhood byway street west of High Street and having on-road accommodations to the east of High Street. A review of bicycle and pedestrian crash information (see adjacent figure for crash locations) was obtained from MaineDOT between 2011 and 2013 with a summary of conditions noted below:

Summary:

- Total Bike Crashes: 15 (2 Forest Ave, 3 Park St, 5 State St, 3 High St)
- Total Pedestrian Crashes: 24 (4 Forest Ave, 1 Park St, 8 State St, 11 High St)

Intersections with 2 or more Bike/Pedestrian Crashes:

- Park St/York St: (2 Bike)
- Forest Ave/Park Ave (2 Pedestrian, 1 Bike)
- State St/Park Ave (2 Bike, 1 Pedestrian)
- State St/Cumberland Ave (1 Bike, 1 Pedestrian)
- State St/Congress St (2 Pedestrian)
- High St/Cumberland Ave (3 Pedestrian)
- High St/Congress St (4 Pedestrian)
- High St/York St (2 Bike)

Conclusion:

The majority of pedestrian crashes involved vehicles turning who did not yield to pedestrians in crosswalks. The second most common type of crash was pedestrians not crossing in a crosswalk. The third most common pattern involved pedestrians who were crossing with a 'Do Not Walk' Signal. Two of the bicycle crashes involved wrong way movements. Some

bicycle crashes involved right-turn "hook" collisions and a few crashes involved parked cars, and one incident consisted of a "dooring" collision.

Figure: Corridor Bicycle Routes
Existing and Future Bicycle Routes as of April 2014

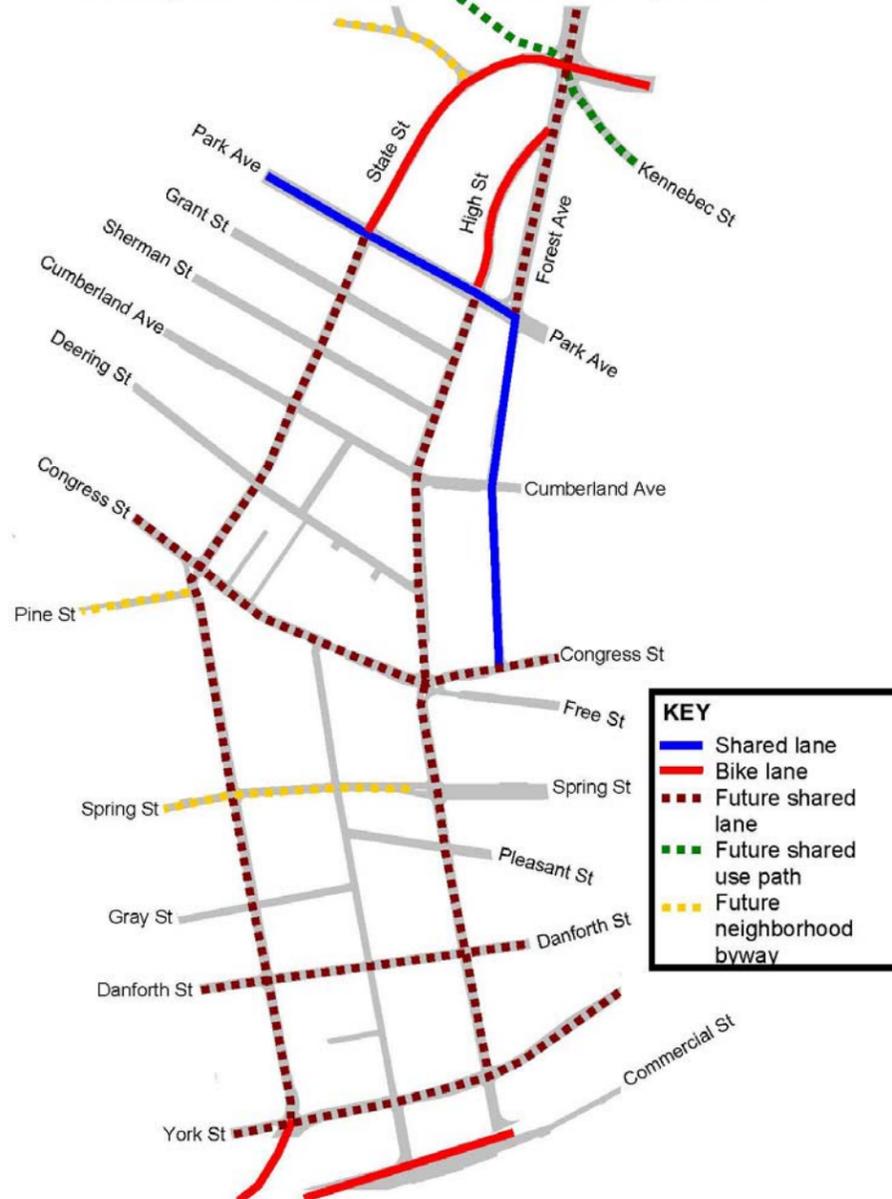


Figure: Pedestrian/Bicycle Crash History (2011-2013)



3.3 Transit Routes

METRO currently has bus routes on State Street between Spring Street and Danforth and on High Street between Danforth Street and Park Avenue. Additionally, METRO has routes on Congress Street and Park Avenue. South Portland Bus Service travels from Casco Bay Bridge to Congress Square and back via York Street. The figure to the right depicts existing transit routes and bus stops. METRO has indicated that a conversion to two-way will provide them greater flexibility in future route changes and may allow for improved service efficiency.

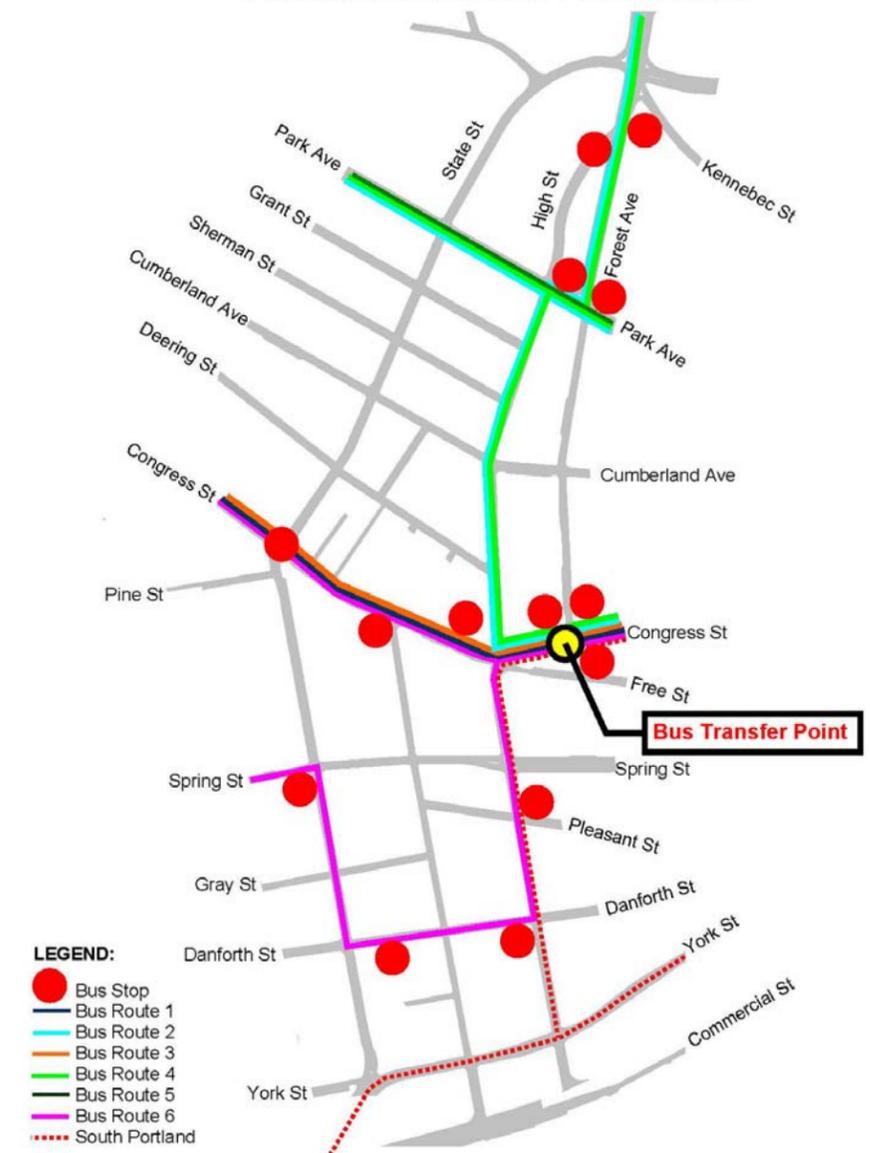
3.4 Vehicle Speeds

Vehicle speed surveys were conducted by City DPS staff on State and High Streets in 2014 and 2015. The data indicates that the 85th% speeds are slightly higher than the posted speed limit (27 to 30 MPH). The regulatory speed limit is 25 MPH. The data also shows that there is a portion of the vehicles that are significantly exceeding (35 to 45 MPH and higher) the posted speed limit. The figures and table on pages 8 and 9 present the results with the following key conclusions:

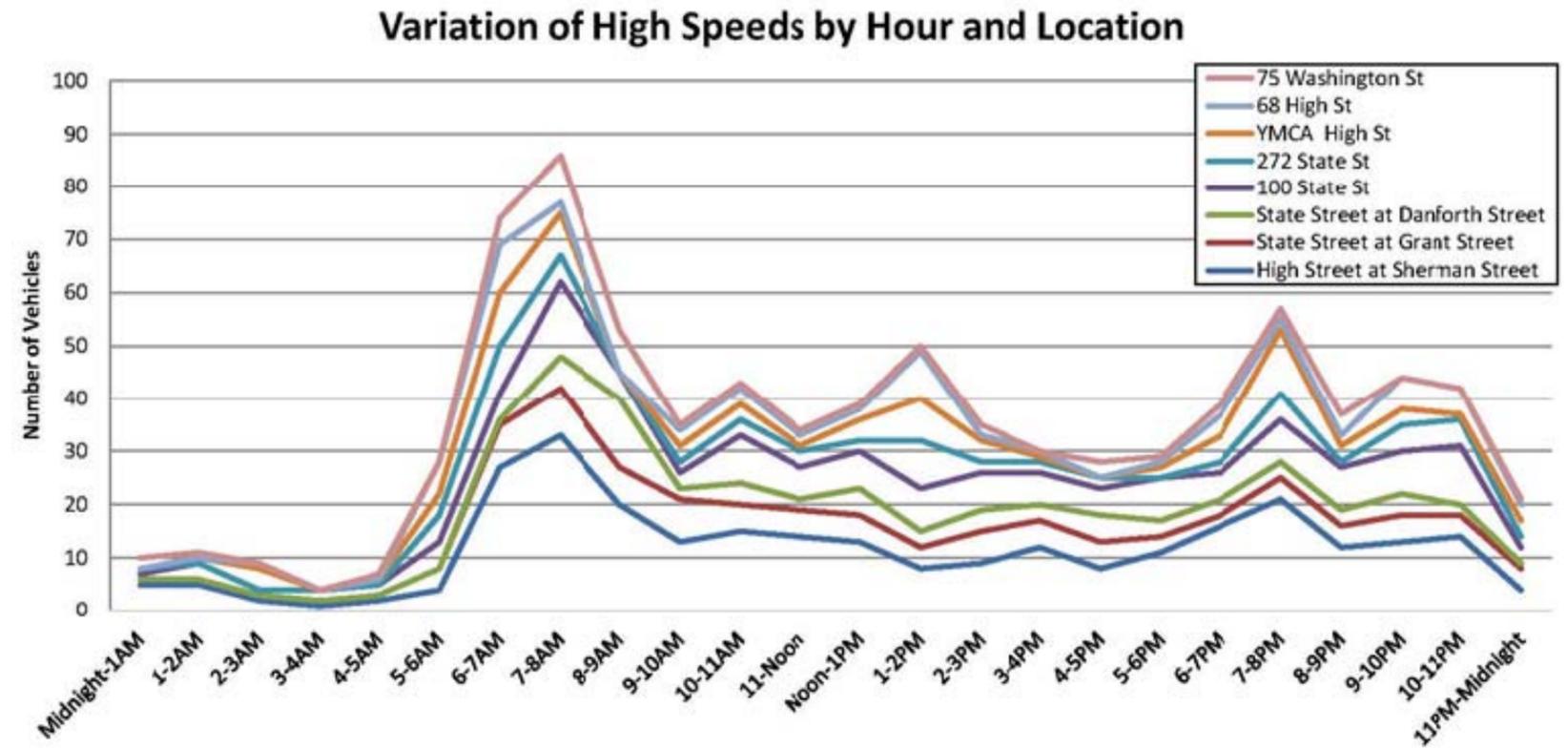
- The 85th% speed (a speed in which 85% of the vehicles are traveling at or below) on State Street is between 27 and 30 MPH.
- The 85th% speed on High Street is between 27 and 29 MPH.
- A portion (3 to 5%) of vehicles traveling along both corridors travel at speeds above 35 MPH. A few hundred vehicles were recorded traveling at this higher speed level during the survey period. It is likely that these fast moving vehicles strongly influence the perception of traffic conditions along the two corridors.
- A significant portion of vehicles traveling above 35 MPH occur during the morning commute time period. Motorists may be traveling faster given late arrival time.

The impact of the conversion of State and High Streets to two-way traffic on travel speeds is difficult to predict. As noted in Section 5.8 National Experiences with Two-Way conversions, a number of communities note some reduction in travel speeds. Some of these conclusions were quantified or surveyed, but many were visual observations. During the course of this study it was suggested that a speed survey be conducted on a two-way street that has similar characteristics (e.g. State Route Arterial, on-street parking, posted 25 MPH, and one lane in each direction) to State and High Streets. While not having exactly the same characteristics, a survey was conducted on Washington Avenue near Oxford Street and the results are noted on page 9. As noted the 85th% and average speeds on Washington Avenue are similar to those collected on State and High Streets and one can conclude that no change in speeds would occur with the two-way conversion – counter to the noted national experiences.

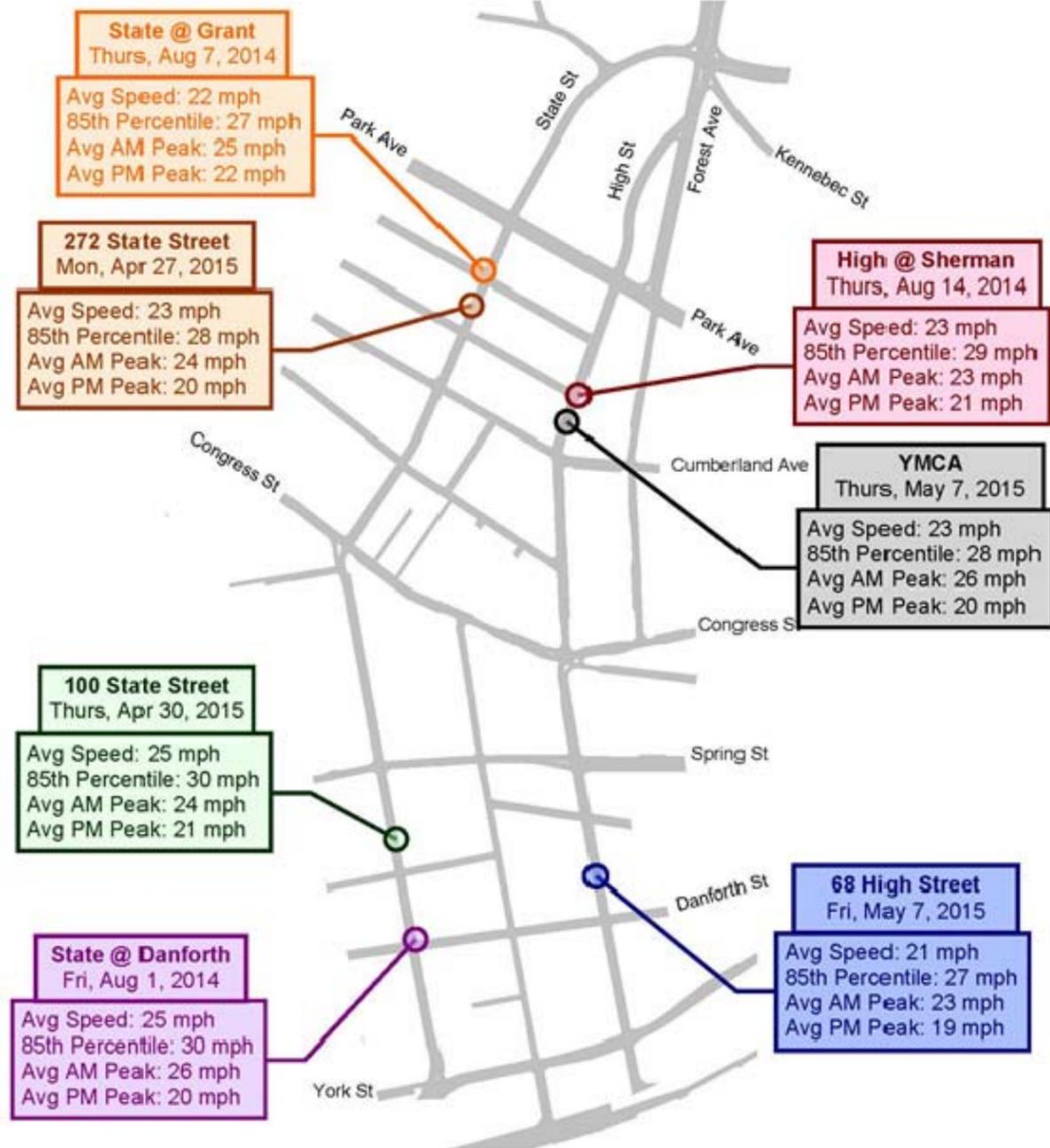
**Figure: Public Transit Map
Portland and South Portland Metro**



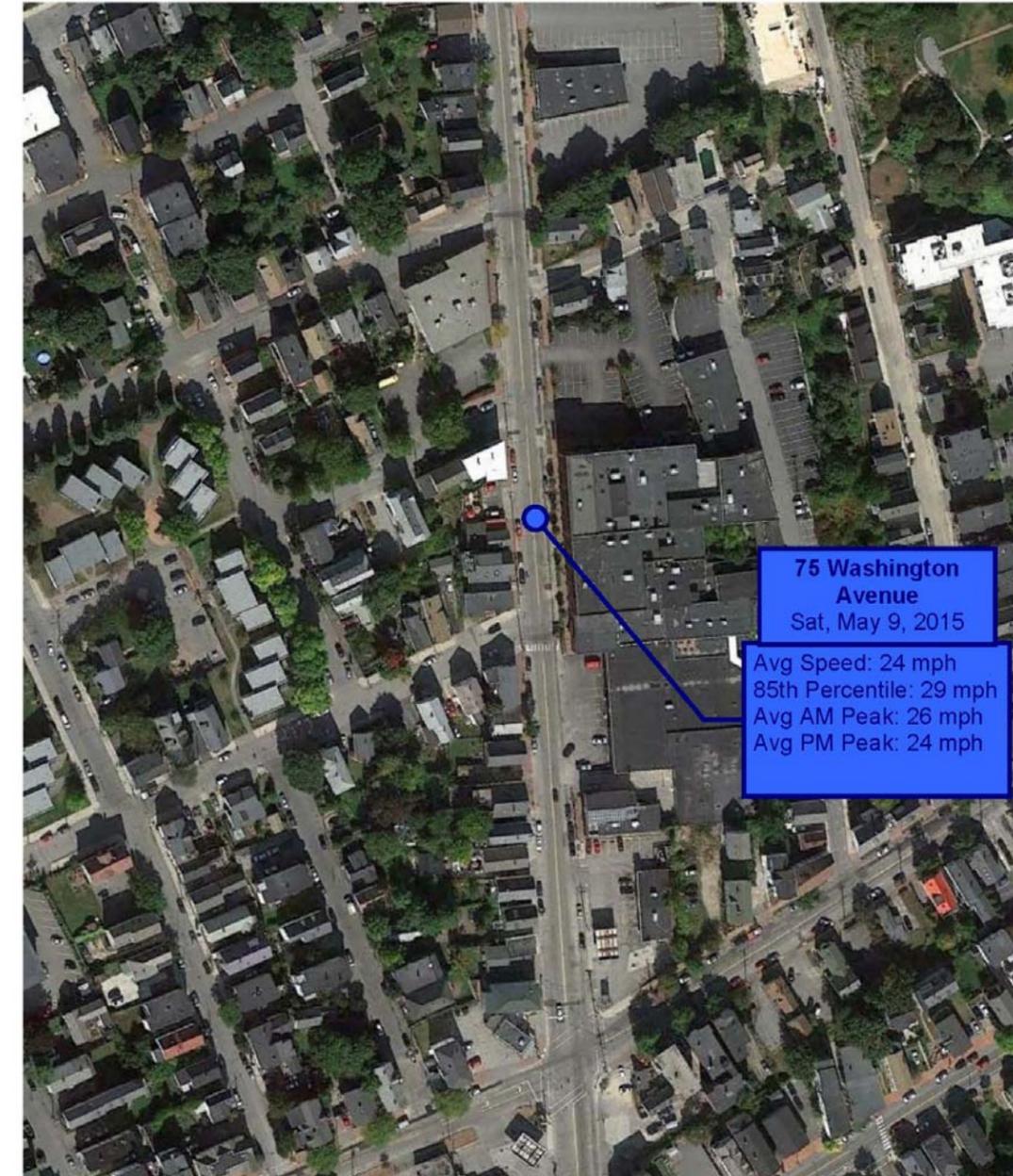
Date	Location	Total vehicles Sampled	Average Speed	85 th % Speed	Maximum Speed	Number of Vehicles between 35-40/35-45MPH per 10,000
Aug 7-12, 2014	State Street at Grant Street	59,610 vehicles	22MPH	27MPH	57MPH	99/112
Aug 1-5, 2014	State Street at Danforth Street	20,332 vehicles	25MPH	30MPH	51MPH	135/140
Aug 14-17, 2014	High Street at Sherman Street	50,807 vehicles	23MPH	29MPH	53MPH	240/261
Apr 30-May 1, 2015	100 State St	18,887 vehicles	25MPH	30MPH	49MPH	153/159
Apr 27, 2015	272 State St	15,794 vehicles	23MPH	28MPH	48MPH	73/77
May 7-8, 2015	YMCA High St	20,006 vehicles	23MPH	28MPH	48MPH	77/83
May 4-5, 2015	68 High St	20,108 vehicles	21MPH	27MPH	46MPH	63/67
May 9, 2015	75 Washington Ave	13,096 vehicles	24MPH	29MPH	54MPH	100/110



**Speed Study
(2014/2015)**



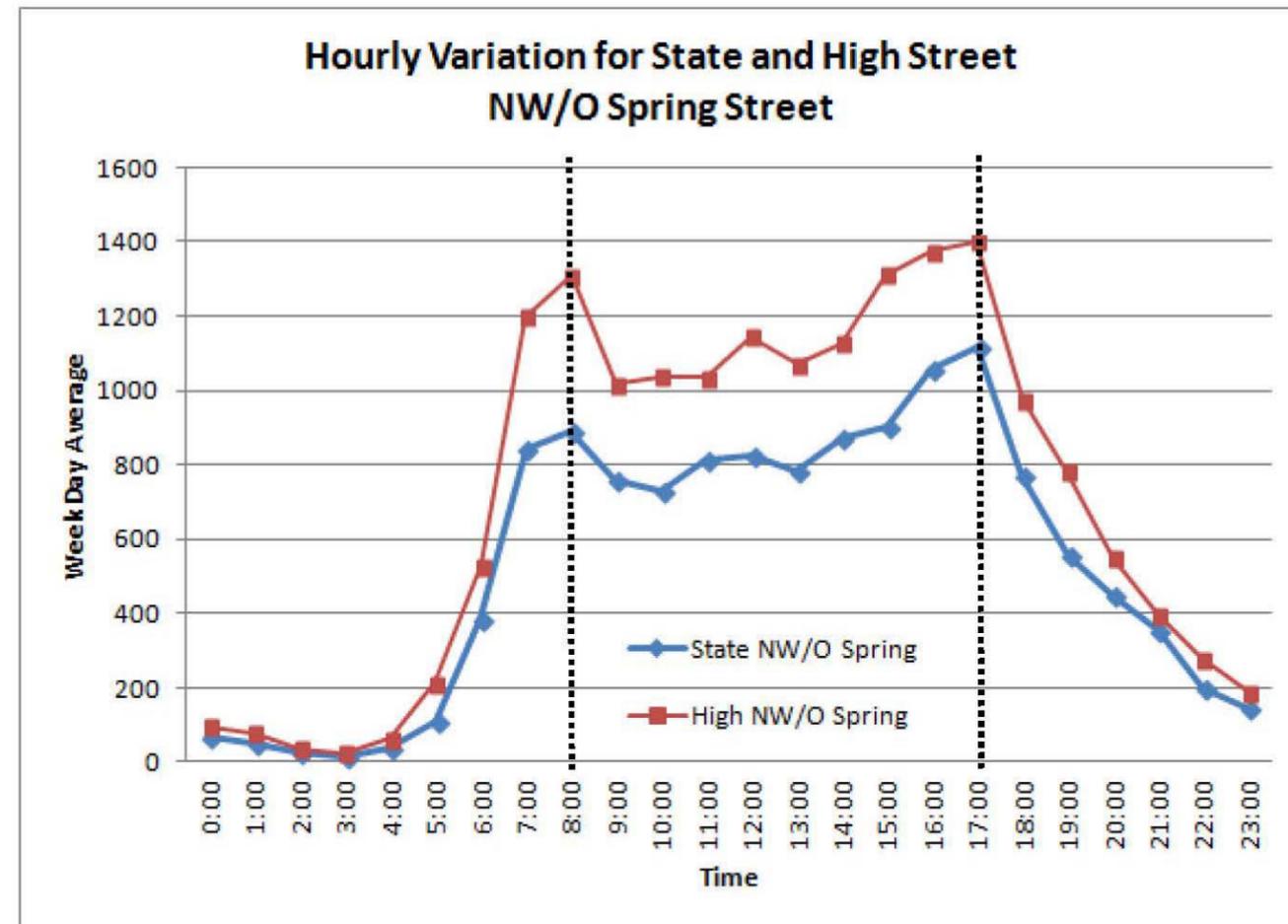
**Speed Study
(Washington Ave)**



3.5 Time of Day Traffic Volume Variation

The adjacent figure illustrates time of day traffic volume information along both State and High Streets between Congress Street and Spring Street as collected by MaineDOT in 2012. Traffic volume peaking is a factor in assessing traffic volume demand and congestion and how frequently would traffic conditions be impacted under a facility change. In essence managing short-term congestion as a policy toward balancing multi-modal users. As noted, traffic volumes peak during the morning and afternoon commute time periods, with less traffic during the day. Specific conclusions are noted below:

- For High Street the AM peak hour volume was about 1,300 vehicles, while the State Street volume was about 900 vehicles.
- For High Street the PM peak hour volume was about 1,400 vehicles, while the State Street volume was about 1,100 vehicles.
- At noon time the volume on High Street was about 1,100 vehicles and on State Street was about 800 vehicles. These volumes are about 25% lower than PM peak hour conditions.
- By 6:00PM the volume on High Street declines to about 1,000 vehicles, about a 30% decline from PM peak hour conditions.
- By 6:00PM the volume on State Street declines to about 800 vehicles, also a 30% decline in volume when compared to the PM peak hour.
- Before 6:00AM and after 7:00PM, volumes decline on both streets to less than 600 vehicles.
- The greatest challenge on State and High Streets from a vehicle perspective are only between 4:00 and 6:00PM, or 10 hours during the week and 240 hours over a year.

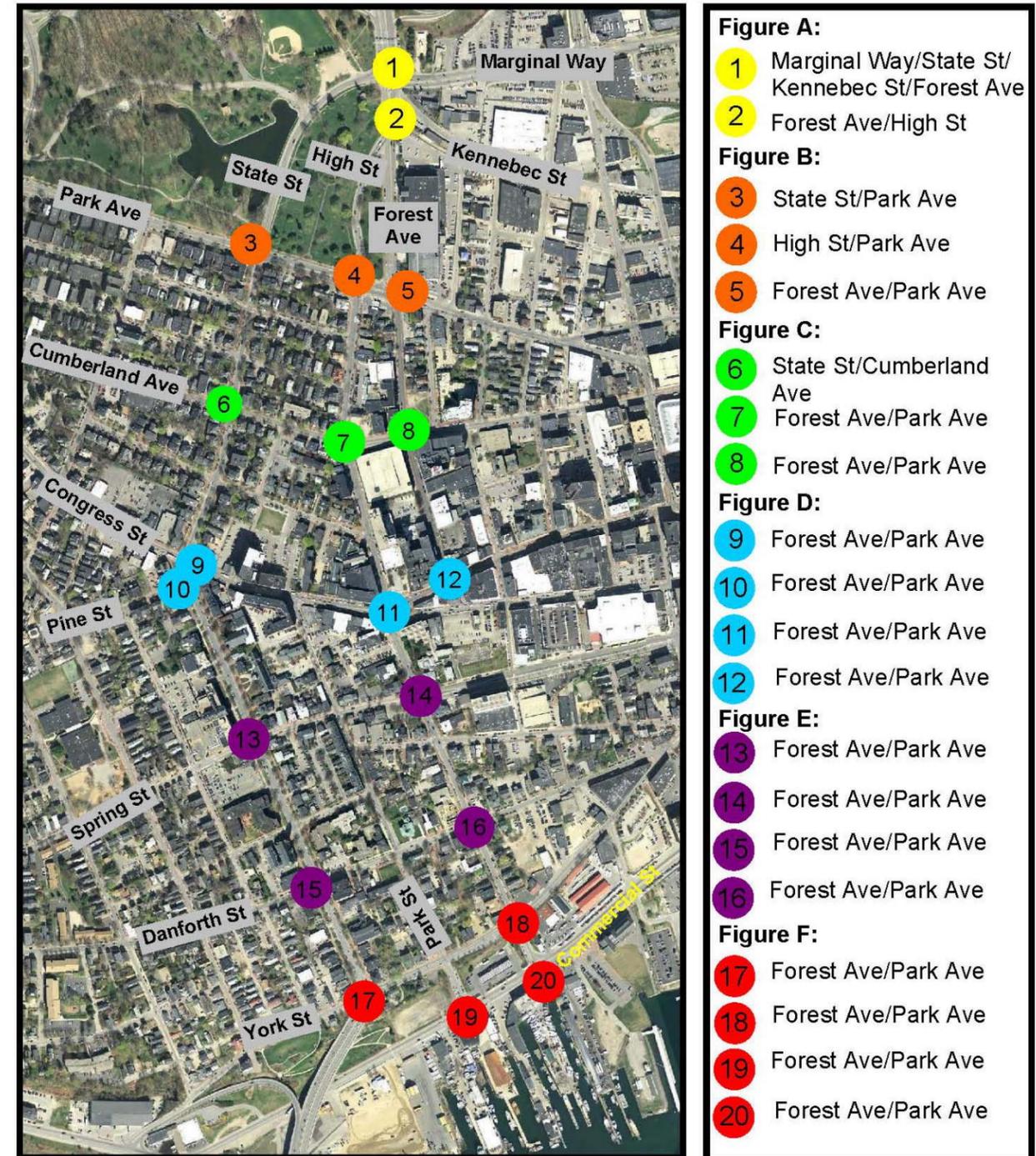


Source: MaineDOT, Counts performed 10/23/13 - 10/24/13

Commuter Peaks:
AM Peak: 8:00 AM
PM Peak: 5:00 PM

3.6 Intersection Traffic Volumes

Intersection turning movement counts were conducted on Tuesday June 10, 2014 between 7-9AM and 4-6PM. The data was collected via video cameras and included cars, trucks, pedestrians, and bicyclists. The morning peak hour occurred between 7:30 and 8:30AM and the afternoon peak hour occurred between 4:45 and 5:45PM. The volumes were used to quantify existing roadway performance/congestion and traffic volume changes with the conversion. The graphic to the right summarizes the locations where intersection turning movement counts were conducted. Figures presenting existing traffic volumes are included in the Appendix.

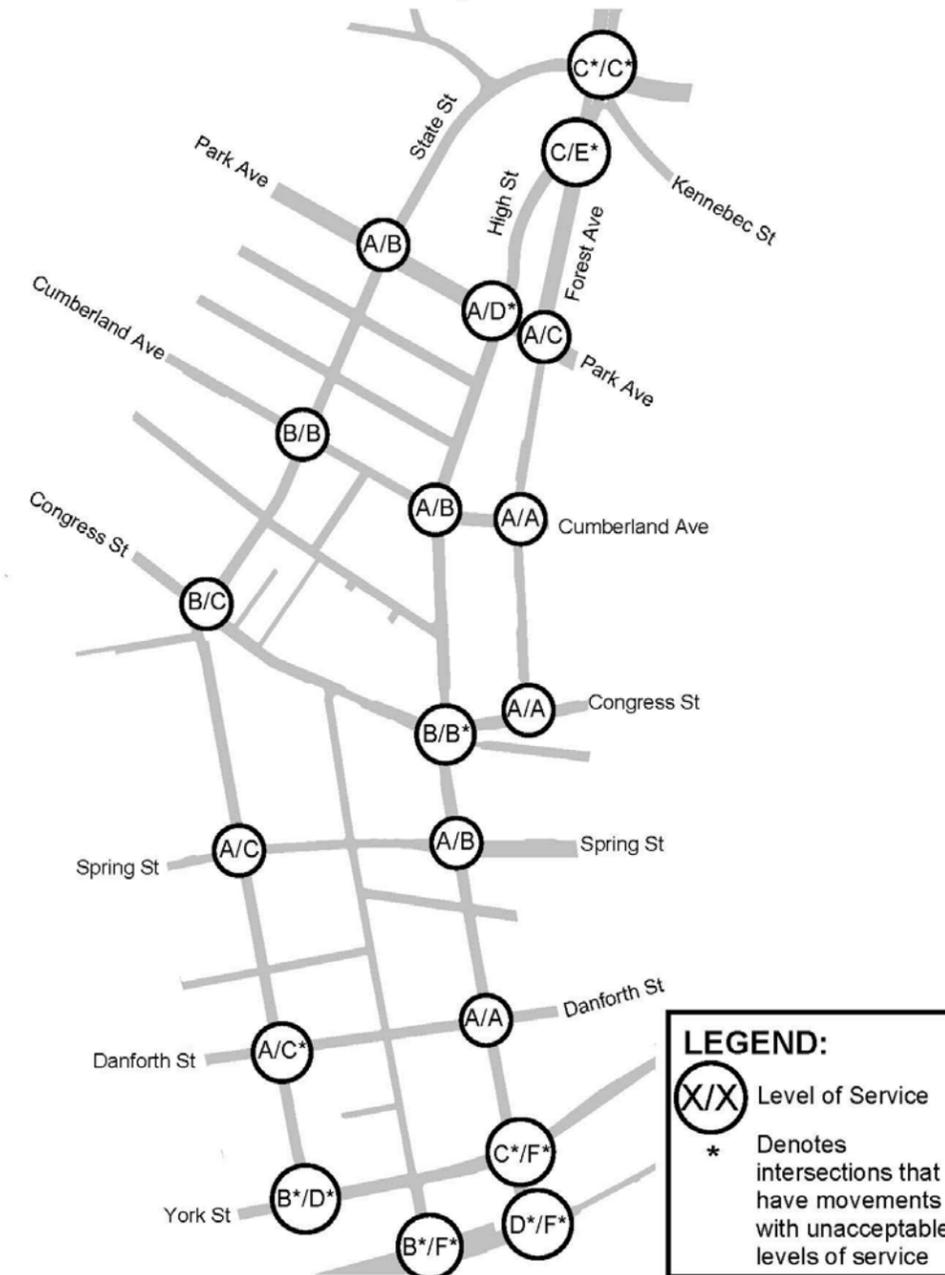


3.7 Vehicular Level of Service

A capacity analysis of the corridor was performed for the existing condition simulating AM and PM Peak Hour conditions using the traffic simulation model SimTraffic (version 9). Level of Service (LOS) is the standard used to evaluate traffic operating conditions. This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays, and freedom to maneuver. Level of Service provides a measurement of the delay experienced at an intersection as a result of traffic operations at that intersection. In general, there are six levels of service: Level of Service A to Level of Service F. The highest, Level of Service A, describes a condition of free-flow operations where the effects of incidents are easily absorbed. Level of Service B, describes a state in which maneuverability and speed limits are beginning to be restricted by other motorists although level of comfort is still high. In Level of Service C, experienced drivers are still comfortable but maneuverability is noticeably restricted. Level of Service D brings noticeable congestion and driver comfort levels decrease. In Level of Service E, roadway capacity is reached and disruptions are much more prevalent – driver comfort has declined. Finally, Level of Service F is the result of volumes greater than roadway capacity with congestion and possible stopped conditions. MaineDOT has determined that Levels of Service A-D are acceptable conditions for intersections. The results are shown in the graphic to the right and are based upon model analysis combined with existing field observations. Key conclusions are noted below.

- It should be that the overall LOS noted in the graphic can be deceiving as some individual movements are operating poorly.
- Frequent delays during the PM Peak Hour particularly on High Street from Park Avenue to I-295.
- Frequent delays at Congress Square contributed by the exclusive pedestrian phase and interaction with the traffic signal at Forest Avenue
- Frequent delays southbound on Forest Avenue at Marginal Way and State Street during the AM Peak Hour.
- Frequent delays at intersections on York Street and Commercial Street during both AM and PM peak hours.

**Figure: SimTraffic Vehicular Level of Service
2014 Existing Volumes**



4.0 STUDY PROCESS / PUBLIC INVOLVEMENT

In May 2014, two committees were appointed to represent stakeholder interests for this study. Based on the desire of the city councilors, the public advisory committee was capped at fifteen members; the community advisors, as non-voting members, were included to add additional context and information to the process.

Public Advisory Committee: Consists of organizations and associations located within the study area who would be directly affected by potential changes as well as those who are held accountable for funding and functionality: City Councilors, regional transportation representatives and representatives of neighborhood associations and major businesses/organizations within the study area.

- David Marshall, co-chair, City of Portland Councilor, Dist. 2
- Kevin Donoghue, co-chair, City of Portland Councilor, Dist. 1
- Carl Eppich, PACTS
- Steve Landry, MaineDOT
- Emma Holder, Parkside Neighborhood Assn
- Ian Jacob, West End Neighborhood Assn
- Anne Pringle, Friends of Deering Oaks
- Ron Spinella, Bayside Neighborhood Assn
- Frank Turek, Friends of Congress Square Park
- David Robinson, Greater Portland Landmarks
- Michael Connolly, Mercy Hospital
- Bruce Wennerstrom, Westin Portland Harborview
- Kristen Levesque, Portland Museum of Art
- Anne Thaxter, 100 State Street
- Lauren Wayne, State Theater

Community Advisors: Consists of those who have a stake in the study outcome but whose interests are also outside of the study area - regional and city-wide organizations, neighborhood organizations adjacent to the study area and neighboring towns.

- Steve Hewins, Portland Downtown District
- Chris O'Neil, Portland Chamber
- Greg Jordan, METRO
- Eric Cyr, AAA

- Lynn Tillotson, Convention and Visitors Bureau
- Damon Yakovleff, Portland Bike and Pedestrian Advisory Comm
- Channing Capuchino, St. John Valley Neighborhood Assn
- Zack Barowitz, Libbytown Neighborhood Assn
- Chris Cantwell, Portland Society for Architecture
- Ben Shambaugh, Dean, St. Luke's Church
- Heidi Ginsberg, YMCA
- Bill Bray, Traffic Solutions
- Tuck O'Brien, Portland Planning Board Chair

Meetings

There were three Committee Meetings and two Public Workshops.

July 30, 2014: Committee Meeting

This introductory meeting's agenda included a presentation by Tom Errico of T.Y. Lin: Review of Committee Roles and Responsibilities, Summary of Project and Scope Summary/How this fits into other City planning, Data Collection and Existing Conditions, a Brainstorming Session on Challenges and Benefits of Proposed Conversion and a Discussion of a Draft Purpose and Need Statement, Goals and Objectives.

Challenges and benefits of the conversion, as facilitated by Carol Morris, Morris Communications, were seen as:

Potential Benefits:

- Improved safety for all modes
- Slower traffic speeds
- Making Congress Square more pedestrian-friendly
- Increasing access to the view corridors up and down the roads (such as allowing traffic to approach the front of the art museum)
- Potential to improve non-vehicular access to Deering Oaks and the Casco Bay Bridge
- Potential for uphill bike climbing lanes
- Increased potential for improved transit service
- Improved connectivity/increased routing options
- Shortened trip distances
- Improved crosswalk safety (crossing pedestrians will be visible from both lanes of traffic)
- Improved perception of the roads as safe places
- Less circling traffic/more direct routes

- Improved access to businesses and services
- Improved wayfinding/opportunity to better direct traffic
- Potential to lower vehicular traffic volumes by improving pedestrian experience
- Diversion of traffic to routes better equipped to handle it (Fore River Parkway)
- Return streets to their historic residential use and feel
- More intuitive (eliminate the problem of unfamiliar drivers turning on to the streets in the wrong direction)
- Potential to reconnect (or better connect) the portion of Deering Oaks north of State Street back to the rest of the park.

Potential Challenges

- Possible increased congestion in other areas
- Reduced parking
- Trucks at the State Theater are forced to block traffic while backing into the loading area; this is easier with one-way traffic.
- The Westin Hotel main entrance is on High Street and patrons loading and unloading cars often block traffic, manageable with two lanes going the same direction but would be a challenge in a two way road
- Back up from the drawbridge could be more of an issue without two lanes to stack traffic
- Midblock left turns would become an impediment to traffic
- Certain times have high demand for parking (for example church services)
- Potential increase in travel time between the highway and the South Portland side of the bridge
- Resistance of current users
- Potential for more complicated snow removal
- Two-way traffic could take more space, particularly when accommodating all modes
- Diversion traffic to neighborhoods
- Increase in points where traffic modes come into conflict
- Potential for head-on crashes

September 8, 2014 - Public Workshop

This workshop included a summary presentation similar to the July Committee Meeting, with the second half of the meeting devoted to discussion of the proposal. About 50-60 people attended. The list of Challenges and Benefits generated by the Committees was posted in large format, with attendees encouraged to prioritize these. Verbal commentary by attendees was about half in favor (residents who were concerned about safety and quality of life issues with the existing one-way configuration) and half against (commuters and others who were concerned that a change would create more congestion.).

January 7, 2015 - Committee Meeting

At this committee meeting, a detailed pros and cons chart was prepared to help the Committees understand the nuances of the tradeoffs involved. In addition, a summary of research undertaken by T.Y. Lin via phone survey, determining the experiences of other cities where a conversion had taken place was distributed. Tom Errico then presented the results of the traffic modeling, intersection analysis, and other data. In summary, findings indicated that there were no “fatal flaws” to a conversion to two way. While certain intersections would be slightly more congested and some parking would be lost, a connection to the Casco Bay Bridge was feasible and cross-town traffic times would be reduced only slightly. After much discussion of these findings, attendees were asked to informally detail their thinking and leanings at this time. A large majority were in favor, a minority were still on the fence but had moved toward being in favor, and only a small handful were against.

March 4, 2015 - Public Workshop

At this workshop, Tom Errico presented an updated pros and cons chart, also provided as a handout, in order to illustrate the tradeoffs between the two options. The room was then opened up to verbal commentary, and then attendees were asked to provide written notes on displayed maps to capture more specific comments.

In general, there were a handful of individuals who were against the conversion (most notably the Chamber representative); most residents of the city and neighborhood believed it would improve livability. Some also

felt the evidence for improvements was mostly qualitative as opposed to quantitative, and so felt the added cost was not supportable.

June 3, 2015 - Final Committee Meeting

Tom Errico presented updated data on speed, intersections, truck deliveries and snow removal, all subjects that the Committee and public had asked for clarifications on. Much discussion ensued as to whether the study had proved that this change would be a benefit. Discussion took place regarding on what wording the final vote should be based. It was decided that the vote language should be:

"The committee finds that the findings of the study indicate a two-way conversion is feasible and that the changes to the transportation infrastructure will support the existing mix of land uses and neighborhoods in the area."

The final Public Advisory Committee vote was: 7 in favor, 2 against and 2 abstaining.

Other Communication/Coordination

- Historic Preservation Review – A communication (attached in Appendix) with HP staff was conducted and concluded that while the proposed conversion will be subject to HP Board review, it is not anticipated that the Board would oppose some level of modification to the square that would allow for two-way traffic. In fact, the Board expressed its strong support for a return to the original two-way traffic pattern of State and High when questioned on the matter in a workshop some time ago. .
- Emergency Response Department Check-In – Coordination with a staff member of the City Fire Department was performed. That staff member did not have concern with the conversion. Later conversations with both the Fire and Police Chiefs and Chain of Command indicated significant concerns with the conversion from a public safety perspective.
- Bicycle Coalition of Maine – A detailed review was performed by BCM staff and in general the Coalition supports the change. A letter is located in the Appendix.

- Portland Society for Architecture – The PSA has been involved in the study process and a support letter is attached in the Appendix.
- City of South Portland/Town of Cape Elizabeth – Communications with both communities has taken place over the course of the study and included one coordination meeting with City/Town Managers.

5.0 FEASIBILITY ANALYSIS

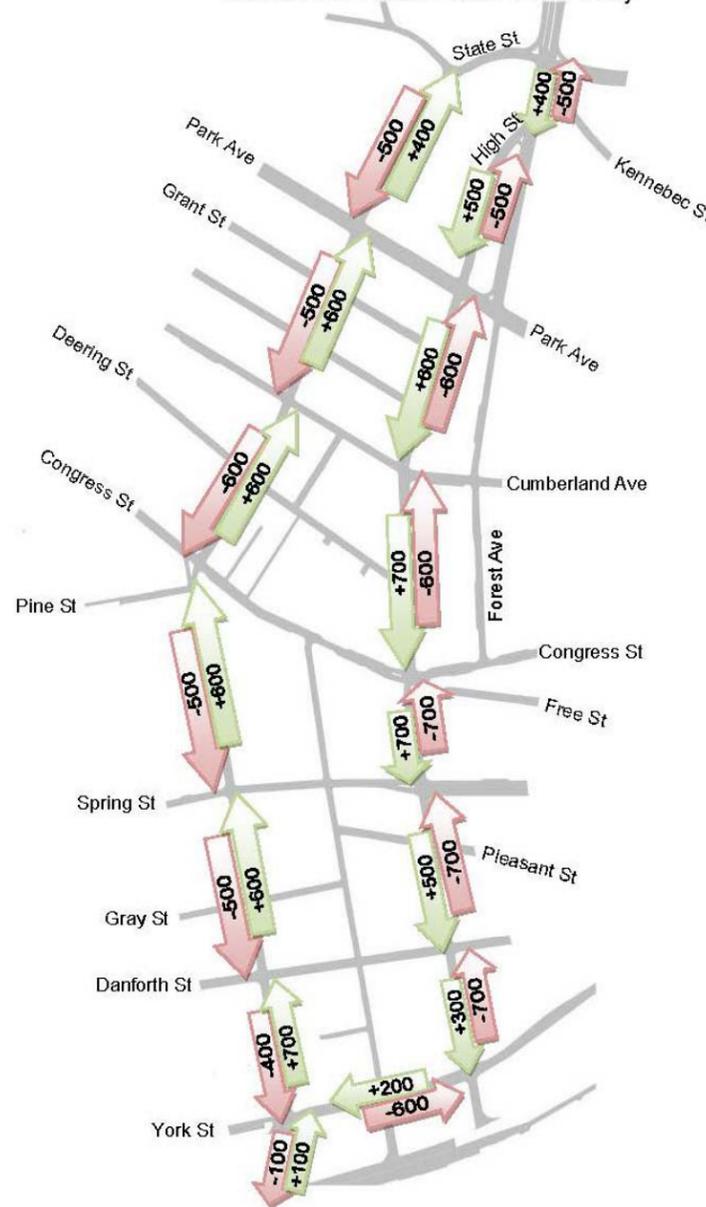
The following feasibility analysis included the assessment of the full two-way conversion on both State and High Streets from York Street to I-295. A quantitative assessment included of traffic volume projections, multi-modal mobility analysis, truck movements and deliveries, concept roadway modifications plans, on-street parking impacts, transit service impacts, and winter maintenance needs. A qualitative review of speeds and others elements are also included.

5.1 Traffic Volume Changes with Conversion

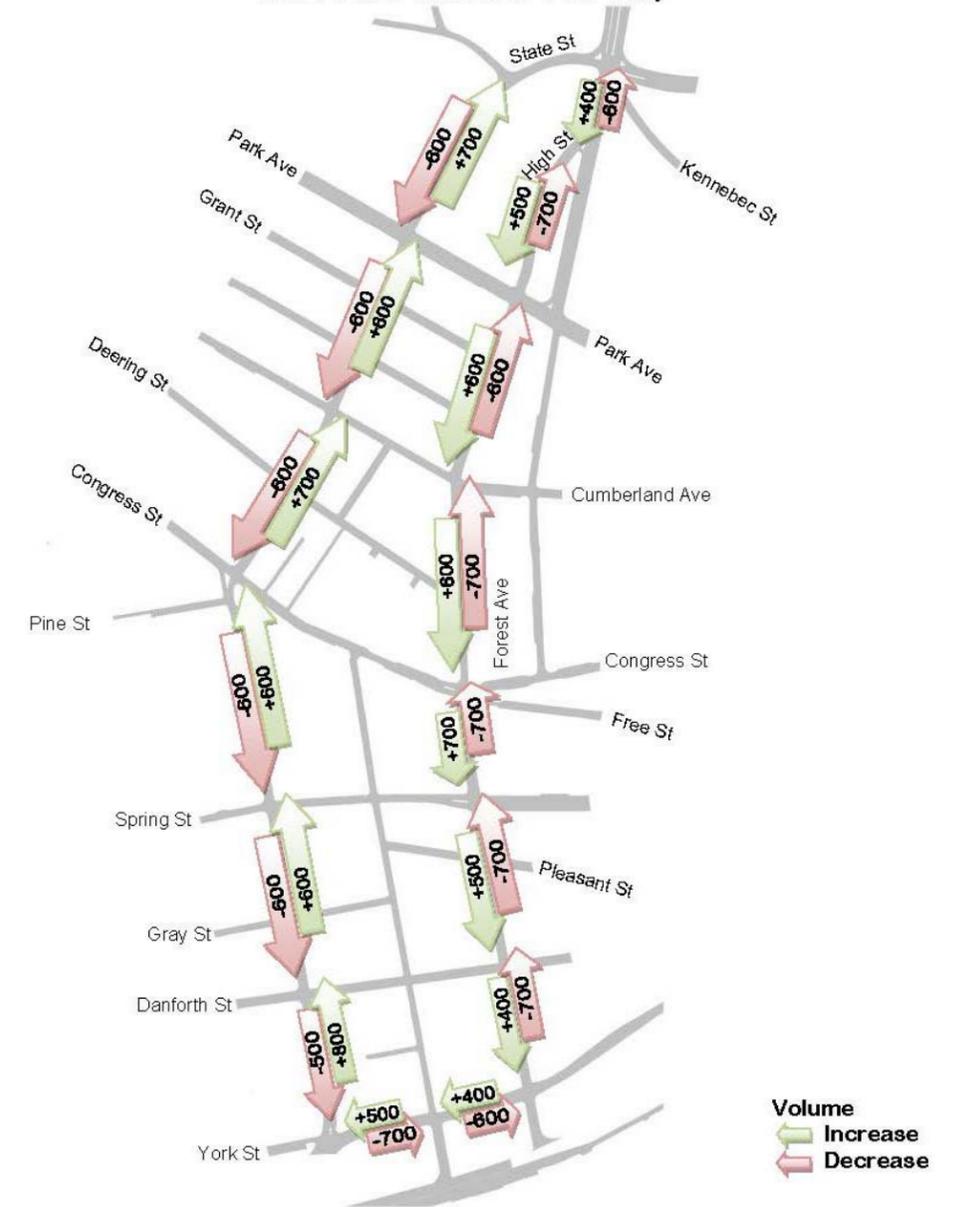
In general, with a conversion/reversion from one-way to two-way, total traffic volumes on State and High Streets are forecasted to remain about the same during the AM and PM peak hours. Projected 2035 traffic volumes are slightly higher on State Street with the greatest increase between the Casco Bay Bridge and Danforth Street. This is due to more direct routing to/from the bridge and West End neighborhood. On State Street traffic increases by 100 vehicles, with the exception of a 300 vehicle increase between Casco Bay Bridge and Danforth Street. Projected 2035 traffic volumes on High Street are unchanged or slightly lower with the greatest volume reduction between York Street and Spring Street. On High Street traffic declines by 400 vehicles between York Street and Danforth Street and declines by 200 vehicles between Danforth Street and Spring Street.

A significant diversion of Peninsula traffic from State and High Streets to other through-routes (such as Fore River Parkway) is not expected. Some localized diversion (re-routing due to shorter travel times and distances) is expected, such as traffic increases on Danforth Street headed to the West End due to improved accessibility from the Casco Bay Bridge. It should be noted that because the analysis forecasted no diversion, it can be considered a worst-case evaluation as some shifting in traffic is likely.

**Figure 1: Volume Change
2035 AM Peak Hour Two-Way**



**Figure 2: Volume Change
2035 PM Peak Hour Two-Way**

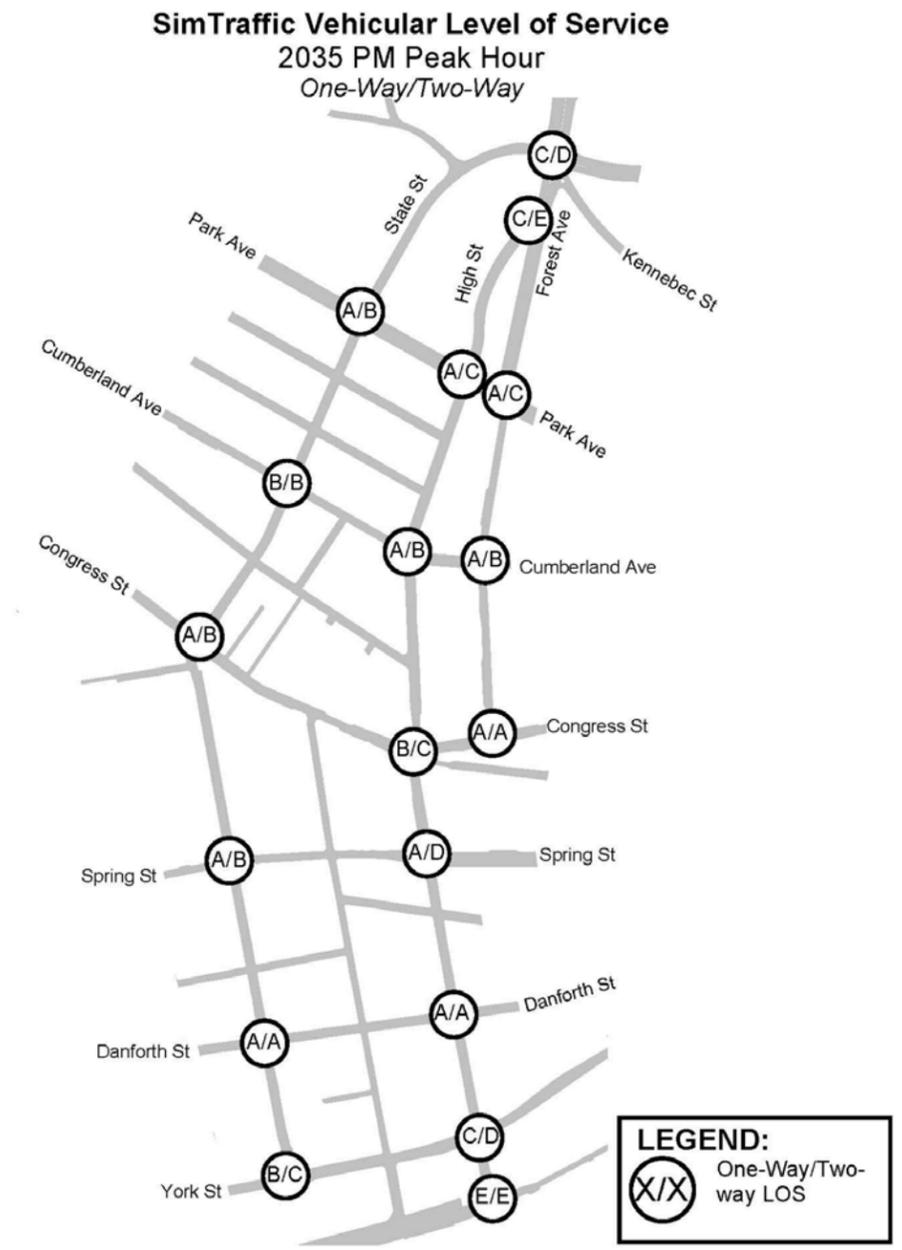
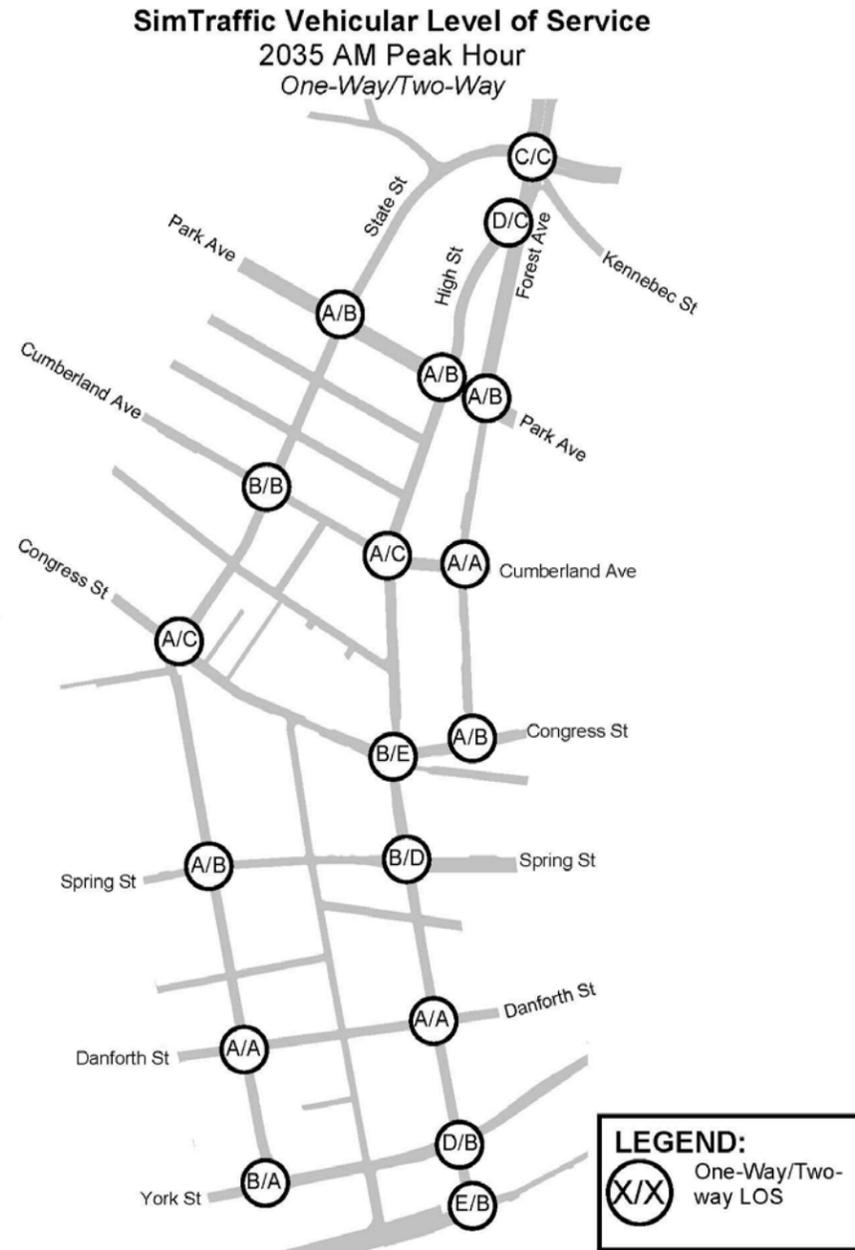


5.2 Vehicle Mobility and Level of Service

Unacceptable degradation in traffic congestion is not expected following the conversion to two-way flow. However, it is anticipated that some intersections will experience some increase in delay and travel time across the peninsula is projected to increase by approximately two minutes during peak hours out of five minutes in the current one-way configuration. Some intersections (but fewer) are forecasted to improve in LOS. Some key items to note:

The locations that are expected to have some congestion impacts during peak hours include Congress Square, the High Street/York Street/Commercial Street area, and the Forest Avenue/Marginal Way/High Street area.

- Left-turn movements on northbound State Street at Congress Street are assumed to be prohibited.
- Left-turn movements on southbound State Street at York Street are assumed to be prohibited.
- The Casco Bay Bridge approach to State Street would be modified to add a left-turn lane (removal of the median barrier).
- The analysis is based upon a fully optimized state-of-the-art signal system and conclusions noted may be better than what actually happens.
- In response to MaineDOT comments, traffic counts and analysis at unsignalized intersections along State and High Streets were performed and results indicate those intersections will function acceptably.
- In response to MaineDOT comments, the traffic analysis modeling extended to include the I-295 interchange on Forest Avenue.



5.3 Heavy Vehicles/Truck Deliveries/Passenger Drop-Offs

The change to two-way should have positive overall improvements to truck circulation and access due to improved site accessibility; traffic count data indicates truck volumes are low. The change will require geometric improvements at many intersections and it is assumed that some truck movements encroach into other lanes. We have reviewed truck deliveries to the State Theater and other commercial businesses along the corridors and the two-way conversion is not anticipated to present additional problems. Most deliveries to commercial businesses occur on side streets, and those conditions will not change. Residential deliveries may require establishment of on-street loading areas. The table to the right notes current delivery conditions. A few key points:

- Westin Hotel valet operations will need to be managed to ensure the travel lanes are not blocked. This may include changes to on-street parking regulations and/or provision of an off-street valet drop-off location.
- The YMCA pick-up and drop-off on High Street will have to be managed to avoid lane blockage.
- The intersection analysis did assume that in some cases the large trucks would need to use a large portion of the intersection – typical for many downtown intersections.
- As noted above short-term residential deliveries may need additional loading areas.
- During truck deliveries at the State Theater, High Street between Congress Street and Cumberland Avenue is closed. While this event lasts only minutes, a two-way State Street would provide a relief route to northbound traffic.

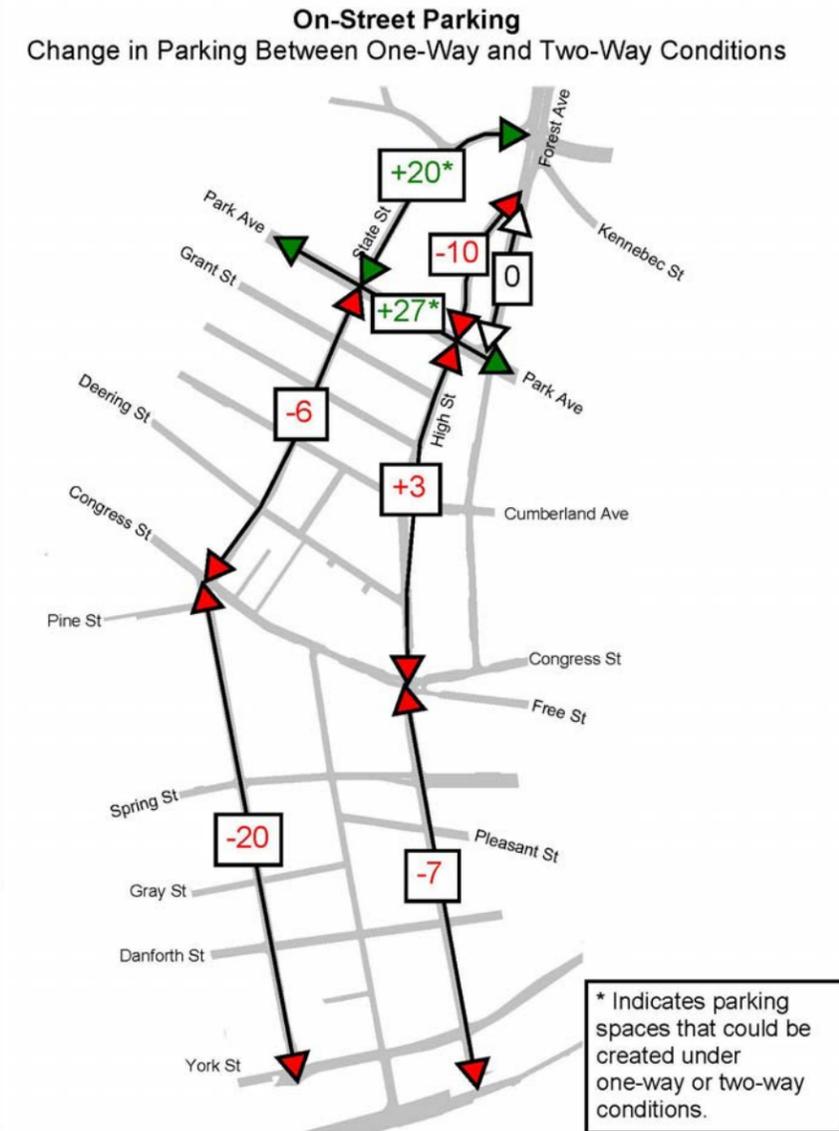
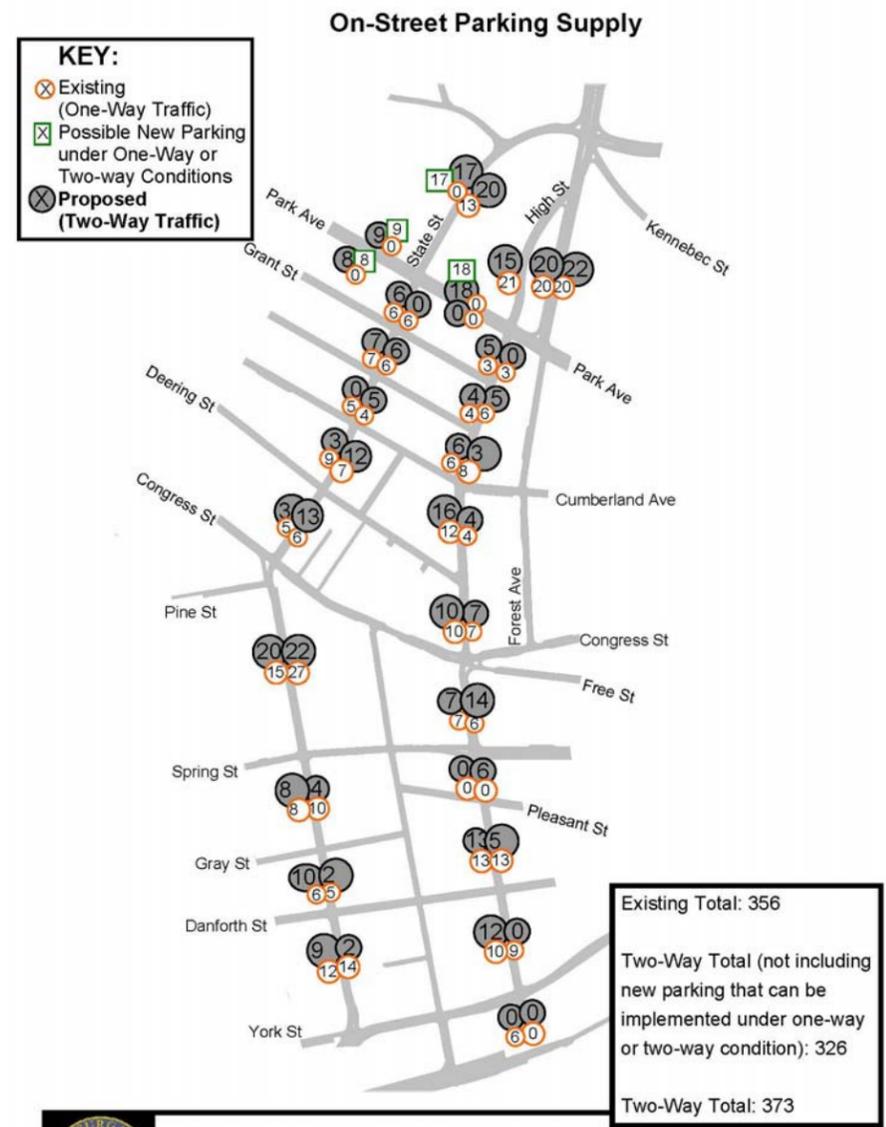


Loadings and Deliveries	
Location	Delivery Type/Location
Residences along State and High Street	UPS and Fed Ex drivers were surveyed; each park anywhere that is available – typically not legal parking and run out to deliver packages. If not parking is available they will go to side streets and use a hand truck – however it can be difficult with the one way flow to get back on their route. It was observed during spot counts that sometimes trucks will completely block lanes to make a delivery under the one way scenario.
King of the Roll	Deliveries from Congress or Vernon Place
1 Longfellow Square	Deliveries from Congress
184 State Street	Deliveries from Congress
188 State Street (Miyake)	Deliveries from Pine Street
190 State Street	Deliveries from Pine Street
The Frame Shop	Deliveries from Pine Street
The Portland Club	Deliveries from the parking lot or on street as needed
State Street Congregational Church/St. Luke's Cathedral/Episcopal Diocese of Maine	Deliveries from the front
Mercy Hospital	Deliveries from Parking Lot
St. Dominics Roman Catholic Church	Deliveries from Gray Street
El Rayo Tacqueria	Deliveries from parking lot
The Little Tap House	Deliveries from Spring Street
The Cumberland Club	Deliveries from the rear parking lot
Portland Museum of Art	Deliveries from Spring Street
WCSH	Deliveries from the parking lot
Starbucks	Deliveries from Free Street
Namaste Salon and Spa	Deliveries from Congress Street or High Street as needed
The State Theater	Deliveries from High Street – block the road during deliveries
Immanuel Baptist Church	Deliveries from Deering Street or High Street as needed
The Westin	Deliveries from High Street or Forest Avenue as needed
YMCA	Deliveries from parking lot
Citgo	Deliveries from parking lot

5.4 On-Street Parking

The conversion of High and State Streets to two-way will reduce the existing on-street parking supply. The loss of parking is primarily related to the creation of turning lanes at signalized intersections. The results of the analysis indicate an on-street parking supply reduction of approximately 9% or 30 parking spaces out of 356 spaces. The graphics to the right show the location existing parking spaces, potential lost parking spaces, as well as locations where new parking spaces may be possible. Key details are noted below.

- On State and High Streets south of Congress Street a loss of 27 spaces are estimated. It should be noted that some additional on-street parking is being established as part of the Spring Street construction project in 2015 and those additions spaces are not accounted for.
- On State and High Streets between Congress Street and Park Avenue a loss of only 3 parking spaces is estimated.
- In conjunction with lane configuration changes on Park Avenue an additional 27 new parking spaces is estimated.
- Given roadway needs on High Street between Park Avenue and Forest Avenue 10 parking spaces will be lost.
- There may be an opportunity to gain 20 parking spaces on State Street between Park Avenue and Forest Avenue. It should be noted that the Friends of Deering Oaks opposes this parking.
- The study did not quantify the opportunity to adding parking on cross streets, which could offset parking loss. Portland Street, Spring Street and Cumberland Avenue are locations where the City may be adding additional on-street parking spaces.



5.5 Bicycle Safety / Mobility

Bicycle users will see some improvement as the change helps reduce wrong-way bicycle crashes, provides more direct routing, may reduce vehicle speeds and results in safer left-turn bicycle movements. Vehicles currently have more room to pass bicycles under the existing one-way configuration, and thus the change will eliminate this benefit. The Bicycle Coalition of Maine has reviewed the plan and supports the change with implementation of formal shared lane conditions (BCM letter is located in the Appendix).

5.6 Pedestrian Safety / Mobility

Pedestrian mobility should improve with vehicular speeds more in line with speed limits (mostly at off-peak) and improved driver/pedestrian visibility at unsignalized crossings. The incidence of speeding should be reduced. Under the current one-way configuration, an unsignalized pedestrian crossing is potentially unsafe due to the “dual threat” condition where a vehicle yields to a pedestrian in one lane, but motorist sight to the pedestrian from the second lane is obstructed by the yielding vehicles. The conversion will result in more intersection vehicle turn movements that will increase potential conflicts with pedestrians. A multi-modal pedestrian level of service analysis was conducted and little change in performance was identified.

5.7 Winter Maintenance

Under the current two-lane, one-way configuration, only one lane of traffic may be available during the initial stages of a winter snow storm. It was determined through the feasibility analysis that the City would have to prioritize State and High Streets for winter maintenance to ensure reasonable safety and mobility. Accordingly, the Department of Public Services estimated a cost of \$9,100 per storm (or \$72,800 annually) to ensure the two subject streets were well maintained during the winter. A summary of the cost method is provided below.

The cost of removing snow (6" of snow) on State Street and High Street if converted to two-way and using a hired contractor:

- 1 snow blower \$250.00 @ hr. 4 HRS. each street 1,000.00 = \$2,000.00
- 10 tri axles \$70.00 @ hr. 4 HRS. each street = \$5,600.00
- Overtime cost for posting street no parking sign and supervisor and other miscellaneous costs = \$1,500.00

- Cost per storm \$ 9,100.00
- If the number of 6" storms (average) and 8 storms per year the cost would be \$72,800 annually.

[Note: A re-assessment in October 2015 by the Department of Public Services places the costs at approximately \$10,700 per snow removal event, for a revised annual cost of \$85,000 to \$107,000 for an average winter.]

5.8 National Experiences with One-Way Conversions to Two-Way

The table at the right and on the following page highlights experiences at several communities across the country with a focus on northern climate communities. The tables note the experiences of seven municipalities who have completed the conversion from one-way streets to two-way streets, following the trends of over 100 municipalities across the country. These conversions occurred between 1994 and 2014 – the older studies are able to provide more quantifiable results while the newer studies are more qualitative. The City of Lowell, MA. has a great detail as it is a New England local with some streets of similar AADT's to State and High Streets (Central Street). Overwhelmingly the experiences in other cities include safety improvements due to lower incidence of speeding, increased property values, some increased congestion but more direct routes, some loss of parking, and a general improvement pedestrian and bicycle conditions.

New England Conversion Experience Showing Changes Implemented:						
Lowell, MA						
	Shattuck St	Merrimack St	Market St	Central Street	Middle St	Palmer St
Timeline	9/2014	9/2014	9/2014	9/2014	9/2014	9/2014
Approx AADT	6,600	13,000	7,600	21,800	-	2,700
# Lanes	2	2	2	2	2	2
Approx Lane Width	10'-11'	12'	13'	Varies	12'	11'
Parking	One side	Both sides	Both sides	Varies	One side	One side
Bike Lanes	No	No	No	No	No	No
Accessibility	Not known	Improved	Improved	Improved	Improved	Improved
Vehicle Flow	-	More delays noted (within first 6 months)	More delays noted (within first 6 months)	More delays noted (within first 6 months)	-	-
Vehicle Safety	Not known	Not known	Not known	Not known	Not known	Not known
Pedestrians	Not known	Not known	Not known	Not known	Not known	Not known
Bicyclists	Not known	Not known	Not known	Not known	Not known	Not known
Heavy Vehicles/Deliveries	Difficulties Noted	None Noted	None Noted	None Noted	None Noted	None Noted
Public Transit	On Route	On Route	On Route	Off Route	Off Route	Off Route
Sidewalks	Yes	Yes	Yes	Yes	Yes	Yes
Resident Opinions	Not known	Not known	Not known	Not known	Not known	Not known
Commuter Opinions	Negative	Negative	Negative	Negative	Negative	Negative
Businesses	Not known	Not known	Not known	Not known	Not known	Not known
Property Values	Anticipated increase	Anticipated increase	Anticipated increase	Anticipated increase	Anticipated increase	Anticipated increase
Crime	Not known	Not known	Not known	Not known	Not known	Not known
Other Notes	Returned to one-way flow: narrow width; difficult heavy vehicle movements as no geometry changes were to be made	Some left turns restricted to allow better traffic flow	-	-	-	-

Other Municipalities Conversion Experience Showing Changes Implemented			
	Louisville, KY Brook Street/First Street	Charleston, SC Upper King Street	Fargo, ND 1 st Avenue/NP Avenue
Timeline	2011	1994 (originally converted to one-way in 1956)	May 2013
Approx AADT	Varies 3000 - 5000	9,000-10,000	1 st Ave: Not known NP Ave: 4000-6000
# Lanes	2	2-3 lanes	1 st ave: 2 lanes (1 in each direction) NP Ave: 4 (2 in each direction)
Approx Lane Width	By University of Louisville: First Street: 62 foot curb to curb with medians and on street parking Brook Street: 10 ft lanes with specialized on street parking and buffered bike lanes; On residential streets: 36 ft on Brook Street and 42 ft on First Street (buffered parking with bike lanes SB, sharrows NB)	10 – 13 ft lanes, 3 lanes wide in some sections but mostly 2 lanes (one lane in either direction)	1 st Ave: Approximately 40 ft total with turn pockets and some bike lanes/sharrows, lanes approximately 12 ft wide NP Ave: Approximately 65 ft total with turn pockets
Parking	Parallel parking both sides	Some stretches have parallel parking on one or both sides south of the highway but many sections have no parking up by the highway	Parallel parking in most locations
Bike Lanes	Buffered bike lanes on S Brook Street, sharrows in residential areas; no bike lanes in southern portion of 1 st St, buffered bike lane SB and sharrows NB in residential areas	No bikes lanes or marked sharrows	None
Accessibility	Improved	Improved	Provided more direct travel routes
Vehicle Flow	Not noted	Slower speeds	Not known
Vehicle Safety	Reduced crashes by 36 – 60% with an increase in crashes on other similar streets	Not known	Touted as being safer
Pedestrians	Increased pedestrian volume	Increased safety due to slower vehicle speeds; more pedestrian vehicle conflict points however pedestrians felt safer and pedestrian volume increased	Better movements
Bicyclists	Increased bicyclist volume	Not known	Better movements
Heavy Vehicles/ Deliveries	Not known	Not known	This is a challenge
Public Transit	On public transit routes	Not known	No change in routes
Sidewalks	Sidewalks on both sides of the street	Sidewalks on both sides on the street	Yes
Resident Opinions	Welcomed the conversion	Welcomed the two way conversion	Not known
Commuter Opinions	Not known	Voiced opposition to the change	Not known
Businesses	Increased revenue seen by shop owners	Increased business use seen as a catalyst to revitalization	Huge boom in retail
Property Values	Property values increased 39%; increase value allowed for more property taxes to be collected	Statistically significant increase in property values	Increased City revenue from taxes
Development	Increased development and revitalization of existing structures	Not known	Not known
Crime	Reduced crime by 23% overall: auto theft by 1/3 with a 36% climb on nearby streets, 42% reduction in robberies	Not known	Not known
Other Notes		One-way streets were seen as difficult for tourists to navigate, these were converted in the 1950s and some of the new interest in the downtown was spurred in part by Hurricane Hugo (in 1989)	Some left turns are prohibited during peak hours of travel; adds congestion to areas that are already suffering failing levels of service; Challenges include snow removal and limited lane widths

Other Municipalities Conversion Experience Showing Changes Implemented			
	Providence, RI Empire Street/Weybosset Street	Woonsocket, RI Main Street	Alma, MI Superior Street/Center Street
Timeline	1/2012	1/2013	7/3/2005
Approx AADT	Not known	Not known	Superior Street: 6,000 Center Street: 5,000
# Lanes	3 (Empire) / 2 (Weybosset)	2	2
Approx Lane Width	12 ft	11 ft (32 ft total)	Approx 36 ft overall, 13 ft lanes
Parking	Parallel parking on both sides – some reconfiguration from the previous diagonal design (loss of parking)	Parking one side	There are 1250 parking spaces in the CBD, which includes parallel parking, municipal parking lots, and private parking lots; the conversion will result in the loss of no more than 5 parking spaces; 613 of those are occupied during the peak parking demand period.
Bike Lanes	No separate bike lanes; it was signed as a shared use lane	No existing or future bike lanes	No striped bike lanes
Accessibility	Increased	Anticipated increase	Not known
Vehicle Flow	Not known	Anticipated to slow	Vehicle volumes at intersections remained nearly identical in total with a redistribution of movements
Vehicle Safety	Not known	Not known	Not known
Pedestrians	New pedestrian signals at limited intersections and crossings; improved streetscaping	Anticipated improvements	Not known
Bicyclists	Improved safety with more visible shared use markings	Anticipated improvements	Not known
Heavy Vehicles/ Deliveries	Not known	Not known	Not known – largely residential
Public Transit	On Route; no change	On route; no change anticipated	Not known
Sidewalks	Widened to include protected turnouts for bus stops and vehicle drop off lanes; significant streetscaping with bollards, ornamental lighting, planters and bike racks.	New sidewalks with streetscaping and period street lighting	Sidewalks with esplanades
Resident Opinions	Not known	Disbelief that this can bring about new development and revitalization	Not known
Commuter Opinions	Not known	Not known	Not known
Businesses	Not known	Anticipated increase in patronage and incentives for renovation	63% in favor of the change; 24% didn't care either way
Property Values	Not known	Not known	Not known
Development	No apparent change	Anticipated increase with incentives	Not known
Crime	Not known	Not known	Not known
Other Notes	Implementation required considerable public service announcements and initial signage to prepare drivers after 40 years of one way traffic	\$4M in City, State and Federal funds was used; downtown commercial revitalization was the driving force, with an additional priority placed on bicycle and pedestrian safety; area had significant amount of loitering	This was done with the intention of revitalizing the central business district; estimated to cost \$140k

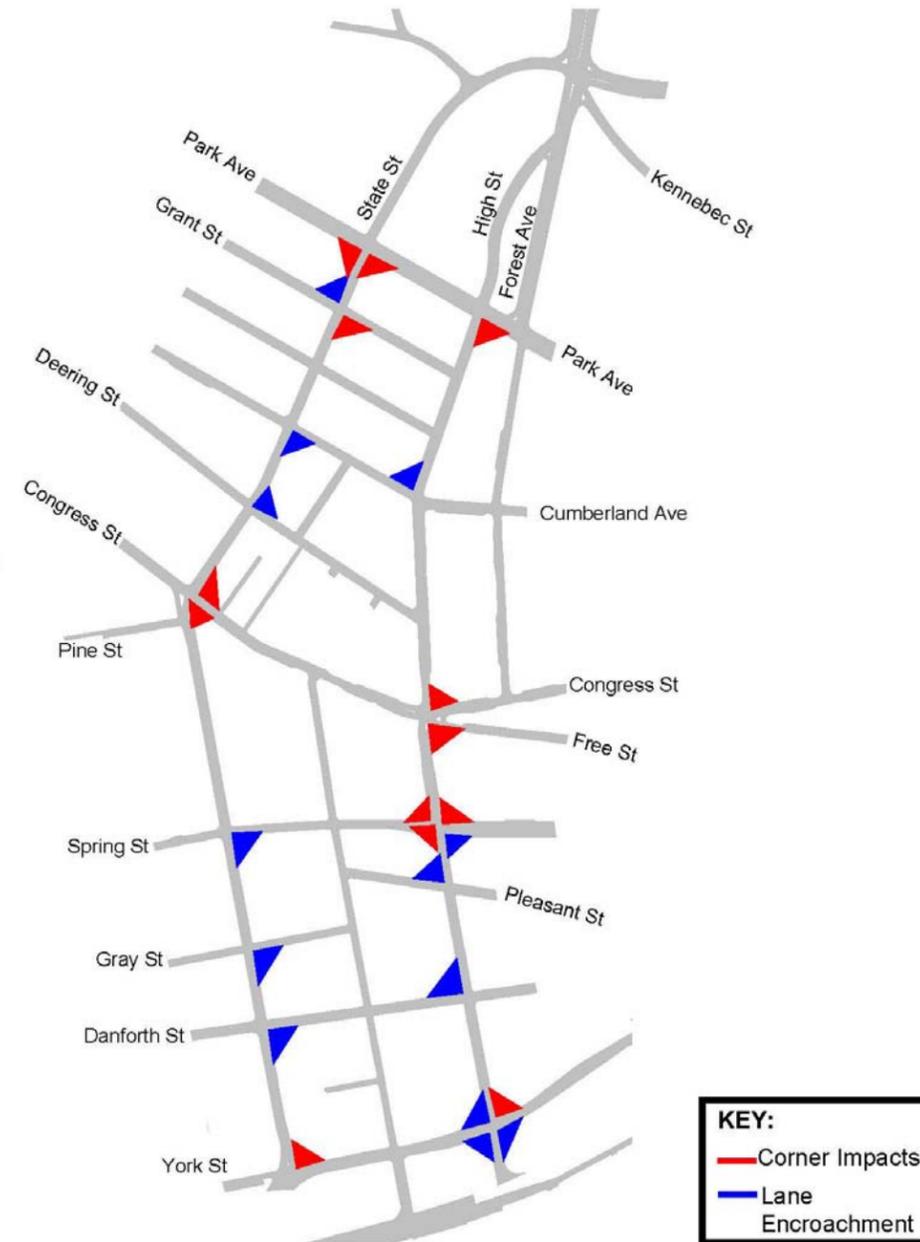
5.10 Intersection Modifications to Enable Two-way Traffic

With the introduction of new turn movements under two-way flow, some intersection corners will need to be modified. A detailed engineering evaluation was performed. The evaluation strikes a balance between the urban context, actual truck activity (relatively low truck volumes), and allowing some movements to encroach into opposing lanes. This balance is about not creating wide open intersections – that are unsafe for pedestrians – for few truck movements. The evaluation of modification needs was primarily based upon use of a bus as the design vehicle. A large semi-trailer truck (WB-50) was used at the Forest Avenue/State Street intersections and York Street/Commercial Street area intersections. The graphic to the right notes locations that need corner modifications and where truck encroachment is assumed. Some noteworthy locations that will need modification include:

- State Street/Park Avenue – Adjustments to southern corners.
- State Street/Congress Street (Longfellow Square) – Adjustments to the easterly corners. This location will also require prohibiting left-turn movements from northbound State Street due to the inability to provide a dedicated turn lane (through traffic would be stuck behind waiting left turning vehicles).
- High Street/York Street – Corner and lane alignment modifications. This will include some widening along the southerly edge of York Street (abutting Irving).
- High Street/Congress Street (Congress Square) – Corner and lane alignment improvements.
- High Street/Cumberland Avenue will need adjustment but alignment will continue to be less than optimal due to the configuration of the intersection.
- State Street/York Street – left-turn movements from State Street would be prohibited to ensure the intersection work at acceptable levels of service. Additionally, the Casco Bay Bridge approach will need modification to add a left lane onto State Street.

It should be noted that coordination with MaineDOT took place and revisions to the concept design were incorporated. These changes were mostly associated with alignment of travel lanes through intersections. Given existing roadway conditions not all intersections will have optimal lane alignment, not atypical in an older urban context.

Figure 8: Possible Required Geometry Changes Based on City Bus as the Design Vehicle



5.11 Pro/Con Summary

The following tables present a general summary of pros and cons of the two-way conversion of various measures. This information was used to help present key outcomes of the evaluation. Some of the measures were qualitative based and some quantitative. The measures provided are generally related to the Goals and Objectives of the Study and broadly consist of:

- East of Getting Around
- Quality of Life and Economic Development
- Logistics
- Cost
- Safety.

	PROS	CONS	Stakeholder Benefit
EASE OF GETTING AROUND			
Traffic Speed	- Vehicle speeds calmed all day	- Slight loss of travel time	Residents: Neutral Business: Neutral Commuters: Negative
Traffic Diversion	- More direct routes - Traffic decrease on some streets - Diversion to Fore River Parkway possible with better signage	- Traffic increase on some streets (State between York and Danforth)	Residents: Neutral (Depends on location) Business: Positive (easier access) Commuters: Positive (to in-city destinations)
Vehicle Mobility	- Level of service will not degrade substantially	- Delay at some intersections - Slight increase in Travel time across Peninsula	Residents: Neutral Business: Neutral Commuters: Negative
N-Hood Accessibility	- Improved accessibility to Study Area Streets will be more direct	- Some intersection movements will be prohibited	Residents: Positive Business: Positive Commuters: Positive
Public Transit	- Provides future route flexibility and more direct routes	- Increased congestion can slightly increase travel time	Residents: Positive Business: Positive Commuters: short term negative; long term

	PROS	CONS	Stakeholder Benefit
QUALITY OF LIFE and ECONOMIC DEVELOPMENT			
Adherence to Complete Streets Policy	- Supports vision and objective of study - providing balanced support for all modes of travel	- Maintaining status quo does not move City towards Complete Streets Policy	Residents: Positive Business: Positive Commuters: Negative (automobiles no longer have automatic priority)
Parking	- Increased parking supply near Deering Oaks	- Less parking in south study area; overall a loss of approximately 9% of parking spaces	Residents: Generally negative Business: Generally negative Commuters: Neutral
Heavy Vehicles/Deliveries	- Requires less circulation due to improved accessibility - Low truck volumes	- Improvements required at many intersections - Truck encroachment - Westin valet parking movements an issue - Truck delivery could impede flow	Residents: Positive (less circulation) Business: Neutral (more accessibility/possible deliver issues) Commuters: Neutral

	PROS	CONS	Stakeholder Benefit
QUALITY OF LIFE and ECONOMIC DEVELOPMENT			
Property Values	- Property values may increase, according to other cities' experience	- Minor property acquisition may be required	Residents: Mostly Positive Business owners: Neutral Commuters: Neutral
Economic Development	- Opportunity for retail development may be higher according to other cities' experience	- None	Residents: Positive OR Neutral Business owners: Positive Commuters: Neutral
Crime	- Crime may be reduced according to other cities' experience. - The conceptual plan has been forwarded to the Police Department for comment.	- The conceptual plan has been forwarded to the Police Department for comment.	Residents: Positive Business owners: Positive Commuters: Neutral
Effect on Historic Environment	- Re-establishing historic street grid pattern, ability to preserve neighborhood feel	- Impact to Longfellow Square	Residents: Neutral Business: Neutral Commuters: Neutral

	PROS	CONS	Stakeholder Benefit:
LOGISTICS			
Winter Operations	None	<ul style="list-style-type: none"> - Roadway width is narrowed with snow given one lane - Additional actions will need to be taken by city, with cost implications 	<p>Residents: Negative (harder to walk)</p> <p>Business: Negative (harder to access)</p> <p>Commuters: Negative (harder to drive)</p>
Police/Fire Response	None	- Have significant concerns about conversion	<p>Residents: Neutral</p> <p>Business: Neutral</p> <p>Commuters: Neutral</p>

	PROS	CONS	Stakeholder Benefit
COST			
Comparative Capital Costs	- Complete Streets and Traffic Signal costs required under current conditions	<ul style="list-style-type: none"> - Intersection adjustment cost - CB Bridge approach needs improvement - Net Traffic Signal cost higher than No-Build option - MDOT may require additional investment such as repaving - Additional snow clearance - Possible additional turn lanes 	<p>Residents: Negative if tax increase implications</p> <p>Business: Negative if tax increases passed on to them</p> <p>Commuters: Neutral</p>

	PROS	CONS	Stakeholder Benefit
SAFETY			
Pedestrian Safety & Mobility	<ul style="list-style-type: none"> - Pedestrian safety improved with slower vehicular speeds off-peak, lower-volume time periods. - Improved driver/pedestrian visibility at unsignalized crossings 	- Results in more intersection vehicle turn movements that conflict with pedestrians	<p>Residents: Positive</p> <p>Business: Positive (easier to get to stores)</p> <p>Commuters: Neutral</p>
Bicyclist Safety & Mobility	<ul style="list-style-type: none"> - Eliminates wrong-way bicycle crashes - More direct routing - Vehicle speeds reduced - Left-turn movements safer 	- Vehicle passing option reduced	<p>Residents: Positive</p> <p>Business: Neutral</p> <p>Commuters: Neutral [Eliminates wrong-way crashes (good) but also reduces passing options (bad)]</p>
Vehicular Safety	<ul style="list-style-type: none"> - Overall improved vehicular safety due to lower speeds - Severity of crashes should improve 	- Low-impact intersection crashes may increase due to increase in conflicts	<p>Residents: Positive</p> <p>Business: Positive</p> <p>Commuters: Positive (Fewer serious crashes trumps chance of more fender benders)</p>

5.12 Cost

The preliminary construction cost estimate (2015 Dollars) for the project is estimated at \$3,225,000. A detailed breakdown of this cost is summarized as follows:

- Traffic Signal Upgrade Cost - \$2,000,000
- Intersection Geometry Adjustment Cost - \$240,000
- Widening Cost at York/High Intersection - \$40,000
- Casco Bay Bridge Modification Cost - \$300,000
- Signage and Pavement Markings Cost – Assumed to be in 25% Contingency
- Sub-Total Cost - \$2,580,000
- Contingency at 25% - \$645,000
- Total Preliminary Construction Cost Estimate - \$3,225,000

It should be noted that the above cost estimate does not include final design/engineering and construction engineering oversight costs. That cost is estimated to be \$806,250.

During the study process there were discussions regarding the possible need for a pavement overlay to address issues with pavement marking removal and visual complications with new markings and removed markings. It is estimated that a pavement overlay of both streets would cost approximately \$1,350,000. Given that implementation of a two-way conversion is long-term project, it was assumed that the conversion would take place at a time when standard pavement maintenance would be required.

It should be further noted that the existing traffic signal systems within the study area are old and will need upgrading. A significant portion of \$2,000,000 cost for traffic signal system replacement will need to be spent regardless of a two-way conversion.

5.13 Concept Plans for Conversion to Two-Way

The concept plans illustrate preliminary design modifications that are required as part of a conversion to a two-way configuration. The plans

illustrate lane configurations, turn lanes, impacts to on-street parking, lane widths, and corner modifications. The plans are located in the Appendix.

6.0 SUMMARY CONCLUSIONS

Study staff provides the following summary conclusions with reverting State and High Streets to a two-way configuration:

Overall positive benefits in the areas of:

- Neighborhood livability
- Pedestrian safety
- Better accessibility due to more direct routing to downtown destinations
- Reductions in incidence of speeding
- Improved transit routing options
- More street network redundancy due to two-way streets.

Overall negative impacts in the areas of:

- Loss of on-street parking (with additional losses in the winter due to snow)
- Increase in travel delay and travel time with two-way traffic on State-High Streets
- Modifications to intersection corners to accommodate turning vehicles
- Additional winter operations costs (in the range of \$85,000 to \$107,000 per year, assuming \$10,700 per snow removal operation).

Public safety staff conclude that there will be significant impacts to response times to emergencies.

APPENDIX



TYLIN INTERNATIONAL



CITY OF PORTLAND

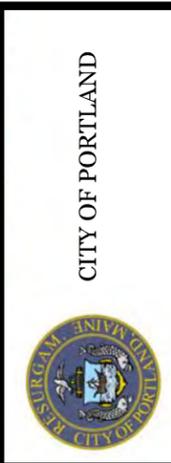
PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY

PROJ. MANAGER	T. Errico	BY	DATE
DESIGN DETAILED			
CHECKED-REVIEWED			
DESIGNS DETAILED			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE
P.E. NUMBER
DATE



TYLIN INTERNATIONAL



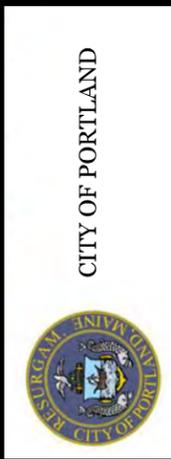
PROJ. MANAGER	T. Errico	BY	DATE
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGNS-DETAILED			
DESIGNS-DETAILED			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY

SIGNATURE	P.E. NUMBER	DATE



TYLIN INTERNATIONAL



PROJ. MANAGER	BY	DATE
CHECKED-REVIEWED		
DESIGNS-DETAILED		
DESIGNS-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE	DATE
P.E. NUMBER	

PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY

Filename: ... \Sheets\Cut Sheets\Larger 4.dgn

Username: T. Errico

Date: 4/27/2015



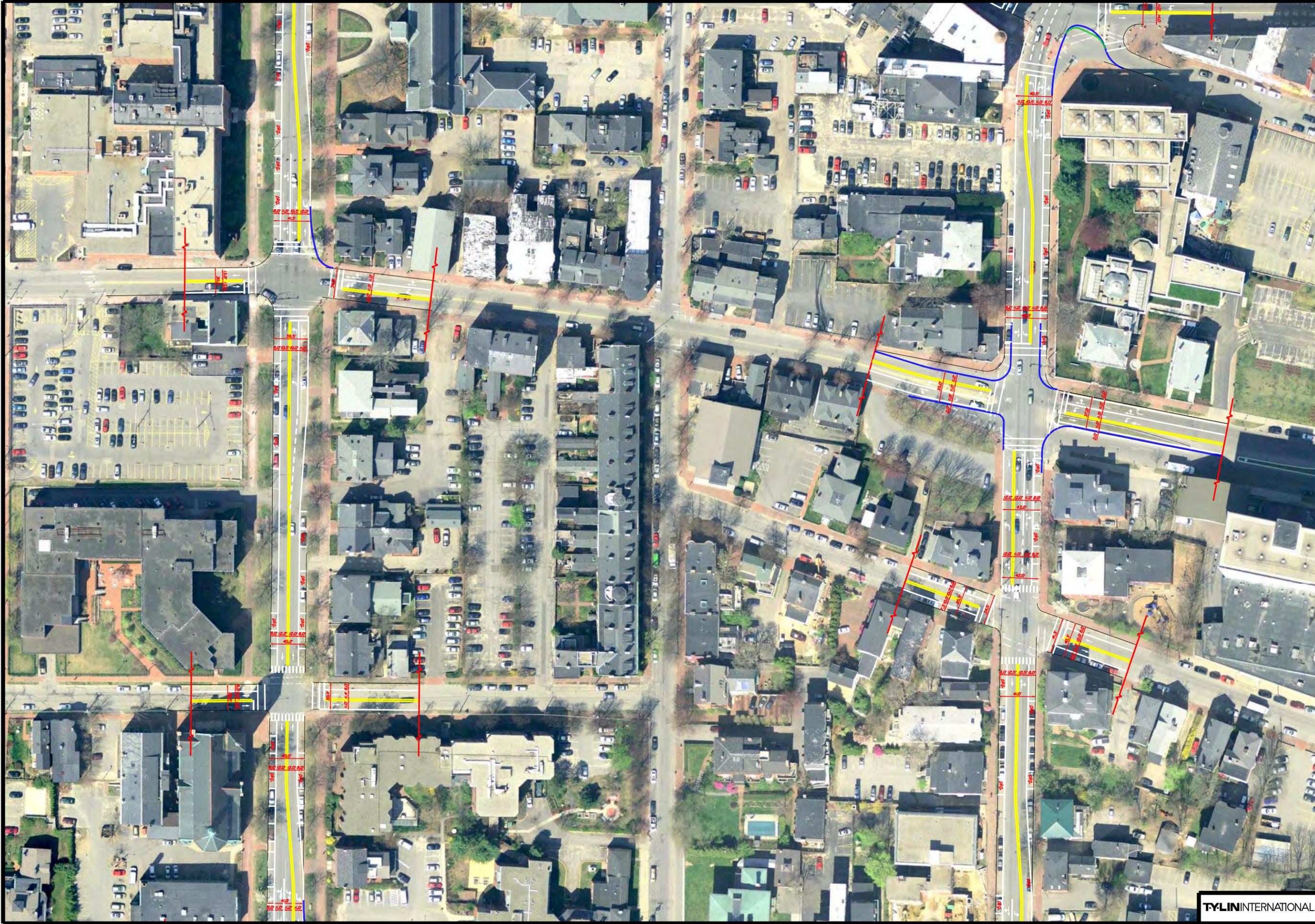
CITY OF PORTLAND

PROJ. MANAGER	BY	DATE
T. Errico <td></td> <td></td>		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGNS-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY

OF

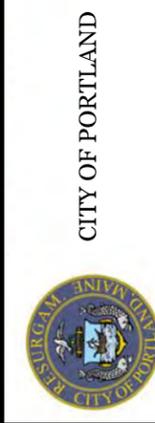
TYLIN INTERNATIONAL



TYLIN INTERNATIONAL

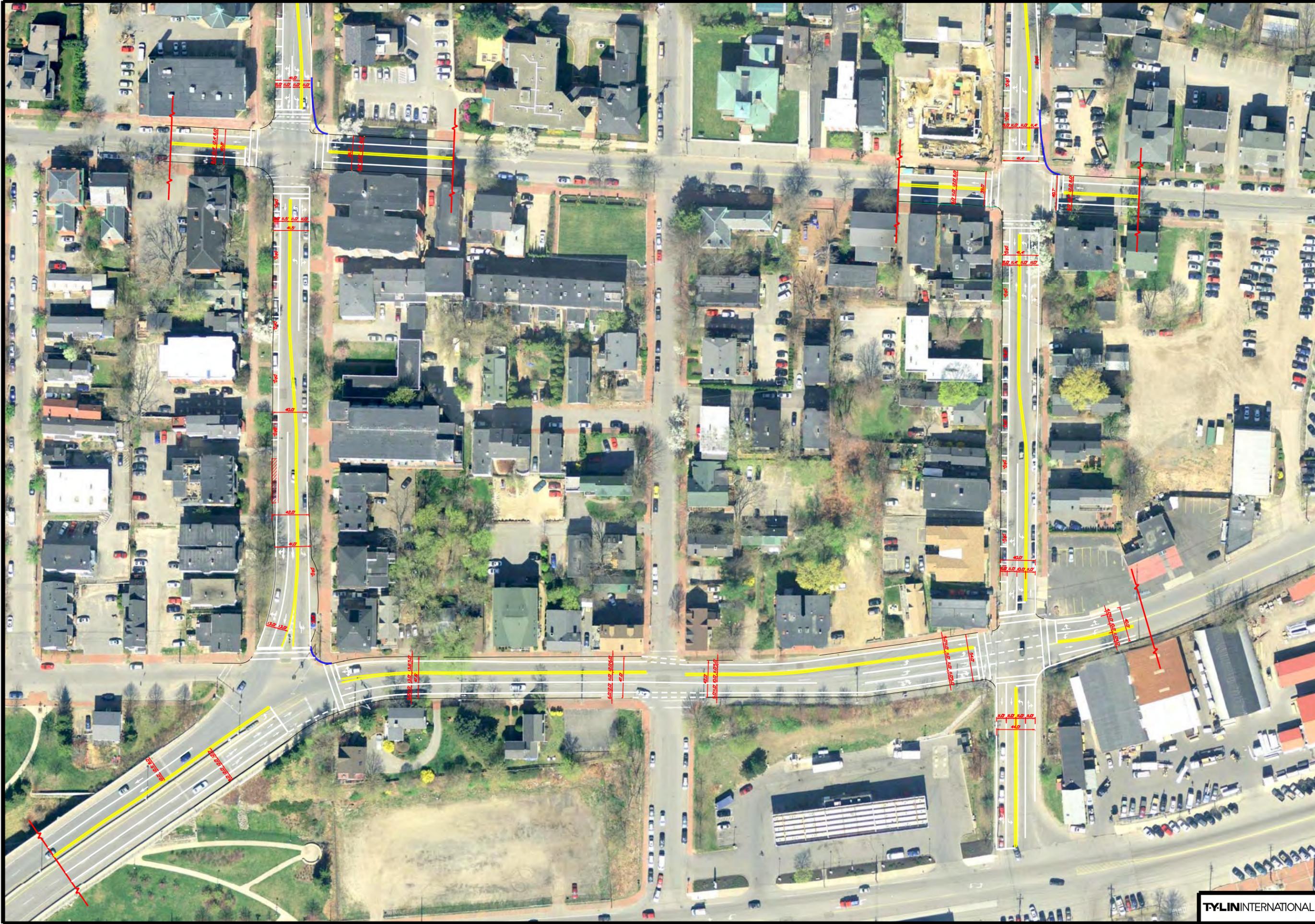
PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY

PROJ. MANAGER	BY	DATE
T. Errico		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGNS-DETAILED		
DESIGNS-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

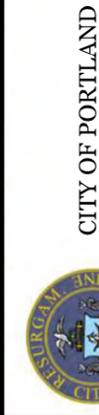


CITY OF PORTLAND

SIGNATURE	DATE
P.E. NUMBER	



PORTLAND
STATE AND HIGH STREET
CONVERSION STUDY



CITY OF PORTLAND

PROJ. MANAGER	BY	DATE
T. Errico		

DESIGN-DETAILED	CHECKED-REVIEWED	DESIGNS-DETAILED	DESIGNS-DETAILED	REVISIONS 1	REVISIONS 2	REVISIONS 3	REVISIONS 4	FIELD CHANGES

SIGNATURE	P.E. NUMBER	DATE