DRAFT
February 7, 2019

MEMO

TO: City of Portland

FROM: Jennifer Conley, PE, PTOE

SUBJECT: Existing Conditions - Draft Report
Commercial Street Operations and Master Plan, Portland, Maine

DATE: February 7, 2019

INTRODUCTION

WSP USA has been tasked with collecting data and analyzing the operations of the Commercial Street corridor in Portland, Maine, identifying concerns and conflict areas, and developing alternatives to ensure that the needs of all users will be served efficiently and safely throughout the corridor study area. This report presents the existing conditions observations, data collected, analysis results, and public feedback gained for the Commercial Street Operations and Master Plan.

PROJECT PURPOSE

The purpose of this project is to improve the operations along Commercial Street for all users, including local residents, businesses, visitors, and the fishing and marine community. To understand the key issues and opportunities, the team has collected data and observations along the corridor, analyzed data, and engaged with stakeholders. This data and understanding will be used to then develop alternatives to address the issues.

REPORT PURPOSE

The purpose of the Existing Conditions report is to present and discuss current and historical data and observations collected within the study area, evaluate and analyze this information, and present how these observations and data translate into the corridor's key issues.

STUDY AREA

The study area initially extended along Commercial Street in Portland, Maine, between its intersection with India Street to the east and Park Street to the west. The study area was later extended west to include the intersection of Commercial Street at Beach Street based on field observations confirming that the traffic signal at that intersection is negatively affecting operations throughout the study area. The study area is shown in Figure 1.

Figure 1: Project Locus Map

DATA COLLECTION

WSP collected and aggregated several types of data to gain an understanding of the corridor and how conditions vary between seasons and days of the week. The types of data included:

- Safety data, including High Crash Locations and bicycle and pedestrian data
- Count data, including vehicles, bicycles, and pedestrians
- Multimodal data, including transit, ferry, and cruise ship operations
- Signal timing data
- Observations

WSP obtained historic data and cruise ship schedules from the City of Portland to determine the appropriate peak and off peak seasons to inform data collection. Based on the historic data, the peak season occurs during the summer when tourism activity is highest and cruise ships visit almost daily. For purposes of this study, the off peak season occurs in the fall when tourism has declined significantly and cruise ships dock less frequently if at all. WSP collected traffic, pedestrian, and bicyclist volume data throughout the corridor during the late summer and late fall in order to capture the peak and off peak seasons and determine variations between them. WSP compiled previously collected traffic and pedestrian volume data from other studies, reports, and projects in the corridor, and then additional data as needed to supplement the previously available data.

WSP also recorded pedestrian demand, geometrics, and signal timing data at key crossings and intersections throughout the corridor. The City of Portland provided signal timing data for the signalized intersections along Commercial Street and WSP recorded supplemental signal timing data at each of the signalized intersections in the field.

WSP also collected and reviewed existing bus and trolley networks, parking data, cruise ship schedules and passenger data, ferry schedules, and bicycle facilities within the vicinity of the Commercial Street corridor.

SAFETY DATA

Safety data provided by the City of Portland, Maine DOT, and PACTS was reviewed to gain an understanding of High Crash Locations (HCLs), where bicycle and pedestrian crashes occurred.

Per Maine DOT, HCLs are defined as having a crash rate that exceeds the critical rate (average crash rate for similar intersection or roadway segment) and having experienced at least eight (8) crashes within the past three (3) years.[1] Table 1 shows the critical rate factor and number of crashes at each of the high crash locations within the corridor, shown in Figure 2.

[1] http://www.itemaine.org/trafficdata/highcrashlocations/

Table 1: Study Area High Crash Locations and Critical Crash Rate Factors[2]

SEGMENT	INTERSECTION	2013-2015 CRITICAL RATE FACTOR (CRASHES)	2014-2016 CRITICAL RATE FACTOR (CRASHES)
Memorial Park to Maple St		1.34 (9)	1.75 (11)
Union Wharf to Chandlers Wharf		1.81 (10)	2.21 (12)
Custom House St to Franklin St		3.42 (17)	3.96 (20)
	Park St	2.44 (20)	2.14 (17)
	High St	1.49 (10)	1.71 (11)

Figure 2: Study Area 2013-2015 & 2014-2016 High Crash Location Intersections and Study Segments[3]

The table and figure shows crash locations clustered around Maple St and High Street and then on the blocks east of Union Street and west of Franklin Street. Bicycle and pedestrian crash data was also identified, as shown in Figure 3 and Figure 4.

[3] http://www.arcgis.com/home/webmap/viewer.html?webmap=f9fb5c973dd04b51b667df8ee75ccab4&extent=-71.3194,43.239,-69.2911,44.0785

Figure 3: Study Area 2010-2015 Beach Street - Cross Street Bicycle & Pedestrian Crashes

Figure 4: Study Area 2010-2015 Cross Street - Franklin Street Bicycle & Pedestrian Crashes

The figures indicate that bicycle and pedestrian crashes were more prevalent in the eastern half of the corridor, particularly between Chandler's Wharf and Franklin Street. Of particular note are the two pedestrian crashes shown in front of the Casco Bay Lines ferry terminal, just west of Franklin Street.

COUNT DATA

WSP collected vehicular traffic, pedestrian, and bicyclist volume data in August/September 2018 during the peak season and November 2018 during the off peak season. Volume data was collected during the weekday PM peak period (4:00 PM to 7:00 PM) and the Saturday midday peak period (12:00 PM to 3:00 PM) at intersections within the study area. Additional peak season traffic volume data was collected on Commercial Street over 24 hour periods on weekdays and Saturdays.

TRAFFIC DATA

WSP collected 24 hour traffic volume data along Commercial Street using an Automatic Traffic Recorder (ATR) and Turning Movement Counts (TMCs at nine intersections along Commercial Street on the dates shown in Table 2.

Table 2: Daily (ATR) and Turning Movement Count (TMC) Dates

DATE	ATR	TMC
Thurs. 8/23/2018	X	X
Sat. 8/25/2018	X	X
Thurs. 8/30/2018		X
Sat. 9/1/2018	X	X
Thurs. 11/1/2018		X
Sat. 11/3/2018		X

An ATR collected traffic volume data during the peak season along Commercial Street just west of Dana Street, which reported a weekday daily volume of approximately 14,000 vehicles (6,800 westbound and 7,200 eastbound). The weekday PM peak hour occurred from 4:45 to 5:45 PM when approximately 980 vehicles (530 westbound and 450 eastbound) traveled along Commercial Street. The ATR reported a Saturday daily volume of approximately 14,400 vehicles (6,900 westbound and 7,500 eastbound), which indicates that its often used as heavily on the weekend as it is during the week. The Saturday midday peak hour occurred from 1:15 to 2:15 PM when approximately 940 vehicles (450 westbound and 490 eastbound) were recorded on Commercial Street. Figure 5 and Figure 6 show the hourly volumes along Commercial Street for the respective days counted.

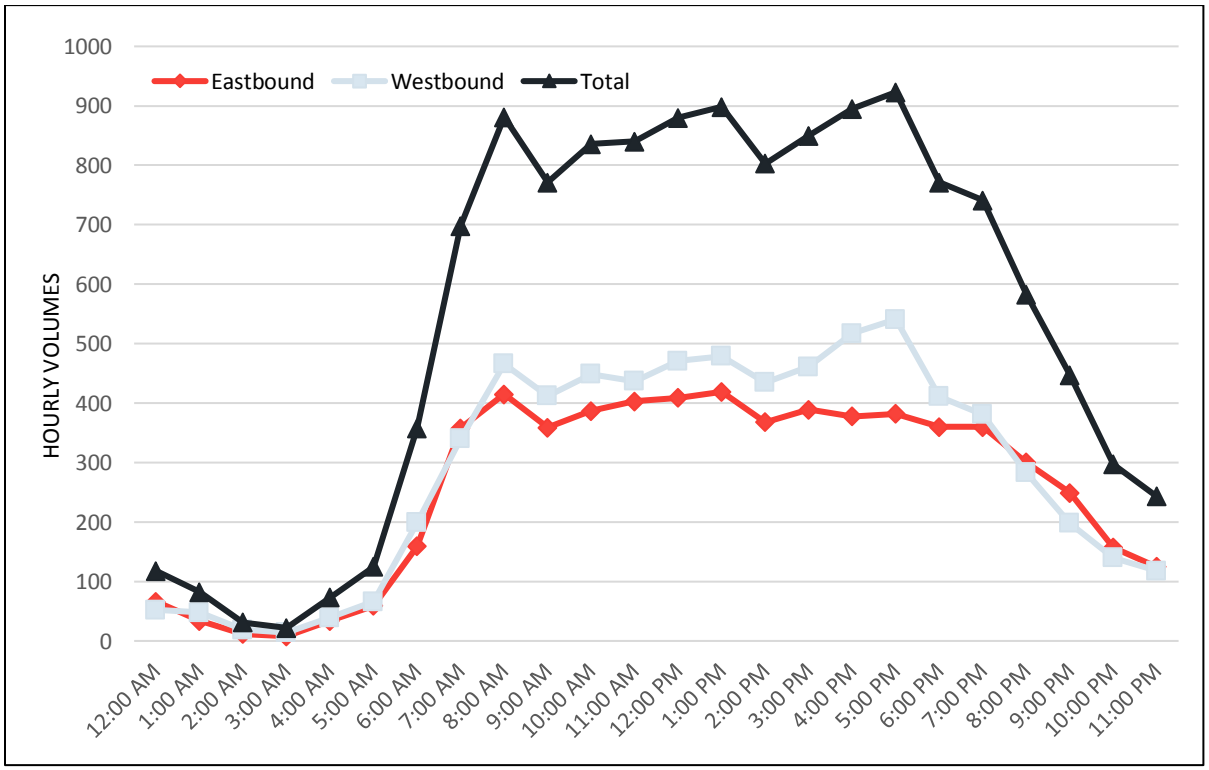


Figure 5: Thursday, August 23 Hourly Volumes: Commercial Street west of Market Street

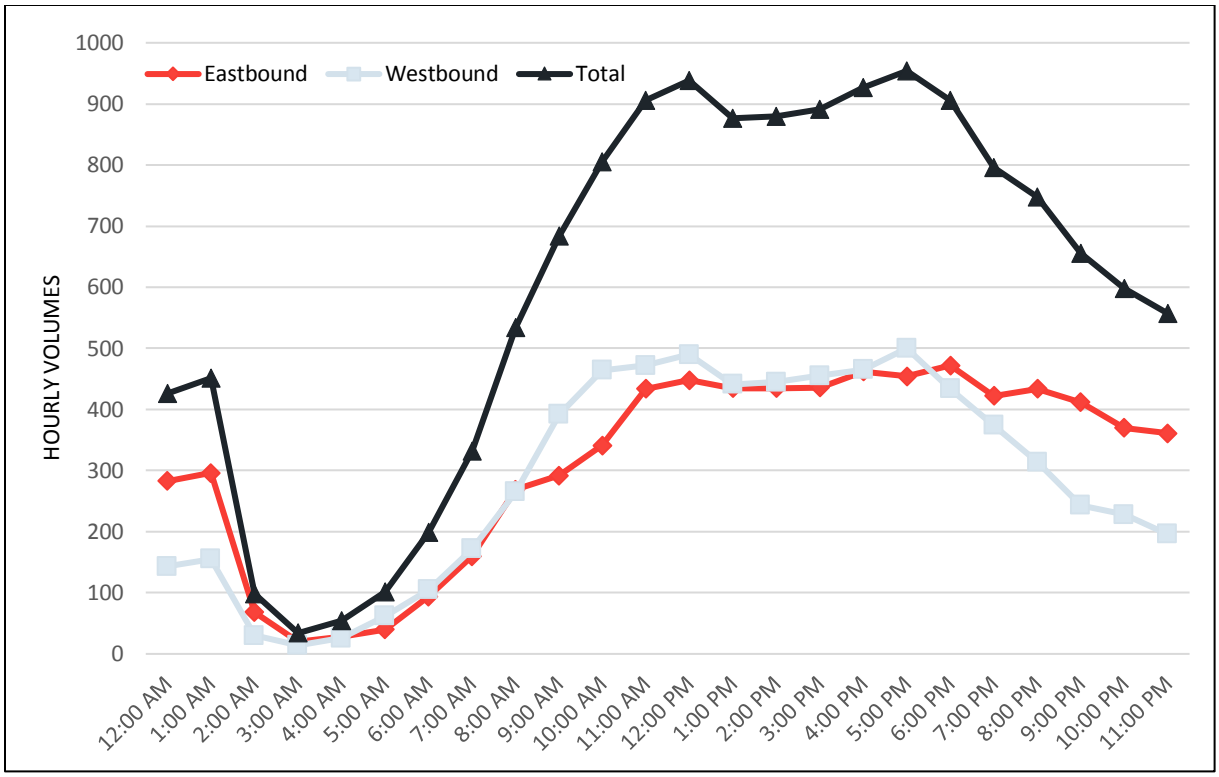


Figure 6: Saturday, August 25 Hourly Volumes: Commercial Street west of Market Street

The figures illustrate that weekday bi-directional traffic volumes are highest from 4:00 – 7:00 PM and that Saturday traffic volumes remain high from 11 AM – 7PM. The figures also show that corridor volumes increase earlier in the day on weekdays (7:00 AM vs. 10:00 AM) but decrease much later (2:00 AM vs. 8:00 PM) on Saturday.

Turning Movement Count data is summarized in Figure 7, which shows locations either from previous counts or counts conducted for this project. TMCs were conducted at nine intersections along Commercial Street during the weekday PM peak period (4:00 PM to 7:00 PM) and the Saturday midday peak period (12:00 PM to 3:00 PM. Data collected indicated that the weekday PM and Saturday midday peaks hours varied throughout the corridor as shown in Table 3.

Figure 7: Count Locations and Dates

Table 3: Intersection Peak Hours

	Weekday PM		Saturday Midday	
	Peak Season[1]	Off Peak Season[2]	Peak Season[3]	Off Peak Season[4]
Intersection with Commercial Street				
Franklin St/Maine State Pier	4:45 to 5:45 PM	5:00 to 6:00 PM	1:00 to 2:00 PM	12:45 to 1:45 PM
Pearl St/Custom House Wharf	3:45 to 4:45 PM	5:00 to 6:00 PM	3:00 to 4:00 PM	1:00 to 2:00 PM
Moulton St/Long Wharf	4:30 to 5:30 PM	5:00 to 6:00 PM	1:15 to 2:15 PM	12:45 to 1:45 PM

1. Based on TMCs collected on Thursday, August 23, 2018 and Thursday, August 30, 2018.
2. Based on TMCs collected on Thursday, November 1, 2018.
3. Based on TMCs collected on Saturday, August 25, 2018 and Saturday, September 1, 2018.
4. Based on TMCs collected on Saturday, November 3, 2018.

As shown in the table, during the peak season, the peak hour varies between intersections during both the weekday PM and Saturday midday peak hours. During the off peak season, peak hours are more consistent with no variation between intersections for the weekday PM peak hour and only a 15 minute variation between intersections during the Saturday midday peak hour. The weekday PM peak hour occurs earlier during the peak season than the off peak season and the Saturday midday peak hour occurs earlier during the off peak season than the peak season. During the peak season, the Pearl Street / Custom House Wharf intersection weekday PM peak hour occurred earlier while its Saturday midday peak hour occurred later than the other proximate intersections.

SEASONAL VOLUME COMPARISON

WSP reviewed the traffic volumes collected throughout the corridor during the peak and off peak seasons. Figure 8 illustrates how traffic volumes varied along Commercial Street just east of Pearl Street between the peak and off peak seasons for both the weekday PM and Saturday midday peak hours. The data shows that the weekday PM and Saturday midday peak hour traffic volumes were similar to each other during each season and that peak season volumes were higher than off peak season volumes. Based on TMC data collected at multiple intersections, the peak season traffic volumes were 13 to 31 percent higher than the off peak season traffic volumes during the weekday PM peak hour and 5 to 21 percent higher during the Saturday midday peak hour. On average, the peak season traffic volumes were 25 and 13 percent higher during the weekday PM and Saturday midday peak hours respectively.

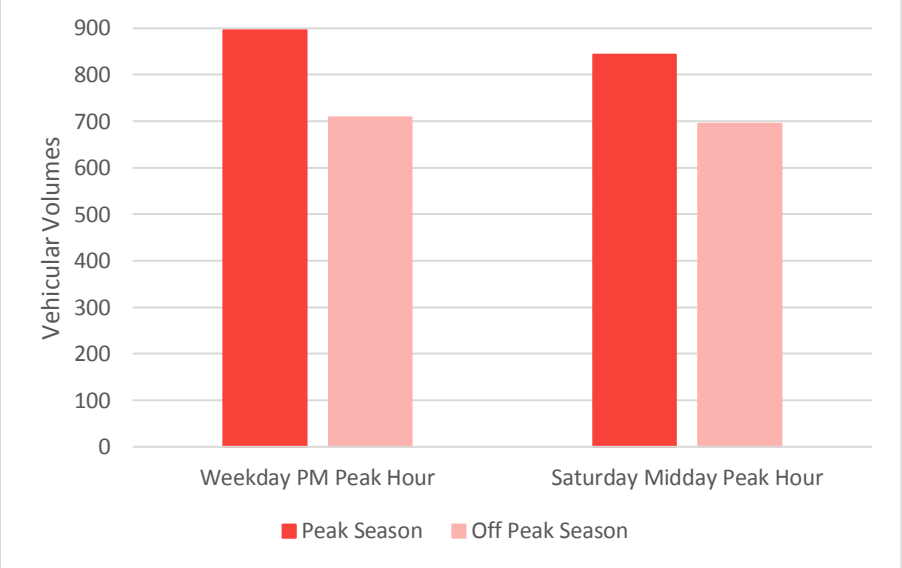


Figure 8: Traffic Volume Comparison on Commercial Street east of Pearl Street

WSP also compared peak season traffic volume data during the weekday PM peak hour at the intersection of Franklin Street at Commercial Street on days when cruise ships were and were not in port, which is illustrated in Figure 9. Based on the available data, vehicular traffic volumes were lower along Commercial Street on days when a cruise ship was in part. Additional data would be needed to confirm this relationship; however, based on information gathered from local stakeholders, locals often avoid Commercial Street during large events that bring an influx of vehicular or pedestrian traffic.

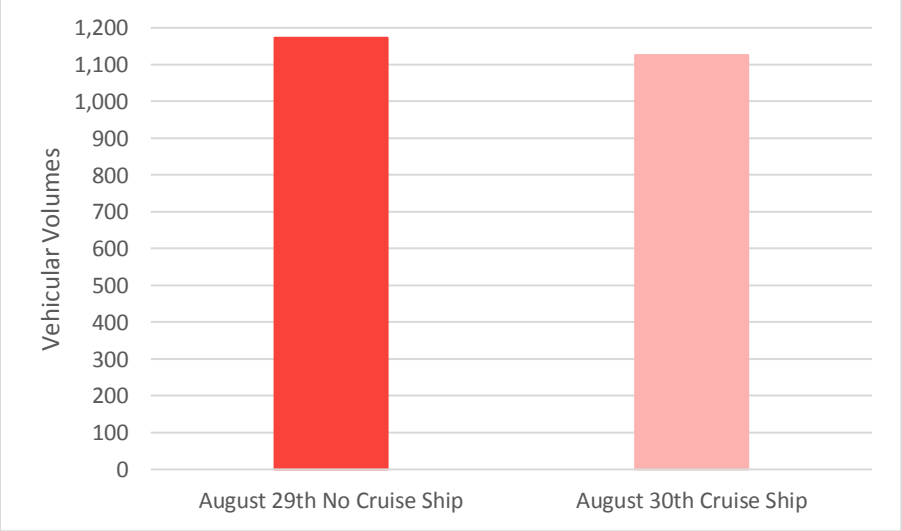


Figure 9: Cruise Ship vs Non-Cruise Ship Traffic Volumes at Franklin Street and Commercial Street

In addition, WSP reviewed the directional traffic volume splits along Commercial Street just east of its intersection with Pearl Street to determine directional volume splits and any variations between the peak and off peak seasons, as well as weekday versus the weekend traffic patterns. Overall, directional volume splits were consistent, with approximately 55 percent of traffic traveling eastbound and 45

percent traveling westbound along Commercial Street during the weekday PM and Saturday midday peak hours during both peak and off peak seasons. This suggests that traffic that enters the corridor headed east may return using other routes or that more traffic enters Commerical Street within the study area and turns east towards Franklin Street rather than turning west towards Beach Street.

PEDESTRIAN DATA

WSP collected pedestrian volume data on the following days:

- Thursday, August 23, 2018
- Saturday, August 25, 2018
- Thursday, November 1, 2018
- Saturday, November 3, 2018

No cruise ships were scheduled to arrive or depart on those dates. Pedestrian volume data was collected at nine intersections along Commercial Street during the weekday PM peak period (4:00 PM to 7:00 PM) and the Saturday midday peak period (12:00 PM to 3:00 PM). The data indicated that the pedestrian weekday PM and Saturday midday peak hours varied throughout the corridor as shown in Table 4.

Table 4: Intersection Pedestrian Peak Hours (Total Pedestrian Volumes)

	Weekday PM		Saturday Midday	
	Peak[1]	Off Peak[2]	Peak[3]	Off Peak[4]
Commercial Street Intersection				
Franklin St/Maine State Pier	5:00 to 6:00	4:00 to 5:00	1:15 to 2:15	1:00 to 2:00
Pearl St/Custom House Wharf	4:45 to 5:45	4:45 to 5:45	2:15 to 3:15	12:45 to 1:45
Moulton St/Long Wharf	3:00 to 4:00	4:45 to 5:45	1:00 to 2:00	12:45 to 1:45

1. Based on TMCs collected on Thursday, August 23, 2018 and Thursday, August 30, 2018.
2. Based on TMCs collected on Thursday, November 1, 2018.
3. Based on TMCs collected on Saturday, August 25, 2018 and Saturday, September 1, 2018.
4. Based on TMCs collected on Saturday, November 3, 2018.

The table indicates that for the time period for which data was collected, the pedestrian volumes peak in the late afternoon to early evening during the weekday PM peak and that pedestrian volumes peak later at intersections closer to Franklin Street during the peak season, but the opposite occurs during the off peak season. The data shows that there is less of a trend during the Saturday peak hour, but that pedestrian volumes peak in the early to mid-afternoon.

During the off peak season, the Saturday midday peak hour of the pedestrian volumes occurred between 12:45 and 2:00 PM at every Commercial Street intersection except for Center Street and Beach Street; the peak hour at these intersections occurred earlier in the afternoon. During the peak season, the Saturday midday peak hour occurred between 1:00 and 2:15 PM at every intersection except for Commercial Street at Pearl Street; the peak hour at this intersection occurred later, between 2:15 and 3:15 PM.

PEDESTRIAN SEASONAL COMPARISON

WSP reviewed the pedestrian volumes collected throughout the corridor during the peak and off peak seasons. Figure 10 and Figure 11 show the variation in pedestrian volumes at intersections with high

pedestrian demand - Commercial Street at Pearl Street and Commercial Street at Moulton Street - between the peak and off peak seasons for each peak hour (cruise ships were not in port for either count).

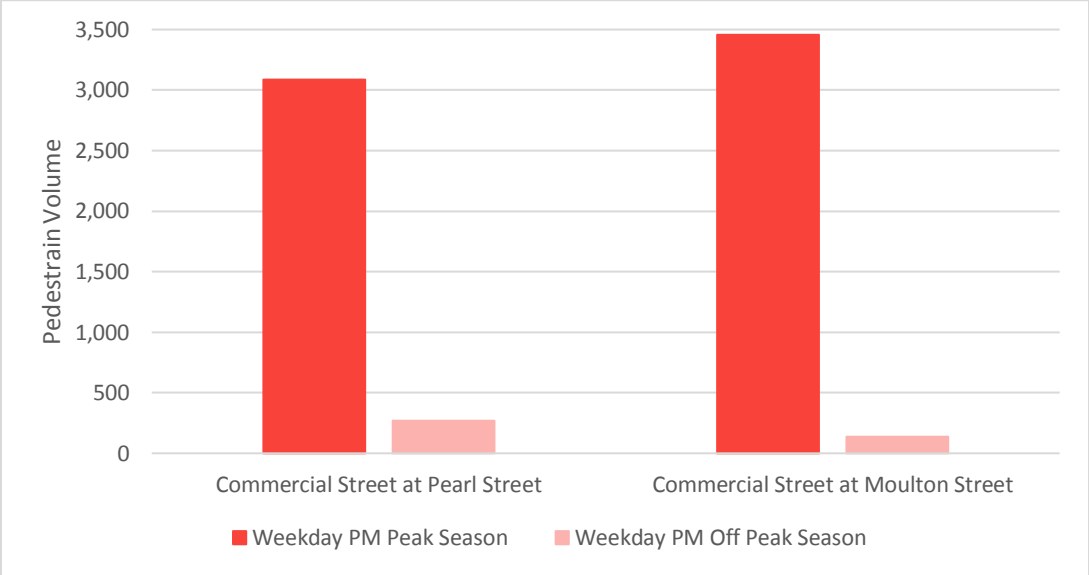


Figure 10: Weekday Pedestrian Volume Comparison

Figure 11: Saturday Pedestrian Volume Comparison

Typical peak hour Saturday pedestrian volumes were higher than typical peak hour weekday pedestrian volumes during both the peak and off peak seasons. Peak season pedestrian volumes at the intersection of Commercial Street at Pearl Street were higher than the off peak season pedestrian volumes by a factor of 11 during the weekday PM and Saturday midday peak hours. Peak season pedestrian volumes at the intersection of Commercial Street at Moulton Street were higher than the off peak season pedestrian volumes by factors of 25 and 10 during the weekday PM and weekday Saturday midday peak hours, respectively. See Table 5 for a detailed comparison.

Table 5: Peak Season vs. Off Peak Season Pedestrian Volumes Comparison (Peak Hour Volumes)

Volume Location	Weekday PM		Peak :	Saturday Midday		Peak :
	Peak Season[1]	Off Peak Season[2]	Off Peak Ratio	Peak Season[3]	Off Peak Season[4]	Off Peak Ratio
Pearl Street at Commercial Street						
Crossing N/S Along Commercial	2,396	100	24.0	3,468	201	17.5
Crossing E/W Across	690	170	4.0	946	189	5.0
Total	3,086	270	11.5	4,414	390	11.5
Moulton Street/Long Wharf at Commercial Street						
Crossing N/S Along Commercial	2,612	86	30.5	3,404	379	9.0
Crossing E/W Across	842	53	16.0	1,330	117	11.5
Total	3,454	139	25.0	4,734	496	9.5

1. Based on TMCs collected on Thursday, August 23, 2018 and Thursday, August 30, 2018.
2. Based on TMCs collected on Thursday, November 1, 2018.
3. Based on TMCs collected on Saturday, August 25, 2018 and Saturday, September 1, 2018.
4. Based on TMCs collected on Saturday, November 3, 2018.

*No cruise ships were in port any of these days

The significant increases in pedestrian volumes between the off season and peak season shown in the table are likely driven by tourists and local residents alike; these increases in volume result in increased friction along commercial street.

In addition, WSP compared peak season pedestrian volume data during the weekday PM peak hour at the intersections of Franklin Street at Commercial Street and Pearl Street at Commercial Street with and without the presence of a cruise ship in the port. Site observations and community feedback indicates that cruise ship passenger activity is most intense during the middle of the day and does not align with the pedestrian peak hour, and thus peak pedestrian volumes were not found to be higher on days with cruise ships. In addition, based on information gathered from local stakeholders, commuters and residents tend to avoid Commercial Street during large events which mitigates the impact of cruise ship passengers disembarking and then walking along Commercial Street.

SIGNAL TIMING DATA

The City of Portland provided signal timing data for the following signalized intersections:

- Commercial Street at Franklin Street
- Commercial Street at Union Street
- Commercial Street at Center Street
- Commercial Street at Beach Street

WSP also recorded field observed signal timing data at each of these intersections to supplement the signal timing data provided by the City of Portland for use when creating the Synchro model, which were used to analyze delays and queues along the corridor. The signal timing data is included in the Appendix.

FRANKLIN STREET

The Commercial Street at Franklin Street intersection operates at a 150 second cycle length with the following phases and concurrent pedestrian phasing.

- An eastbound Commercial Street advance phase (to protect left turns) with an eastbound right turn overlap
- An eastbound/westbound Commercial Street phase
- A southbound only Franklin Street phase
- A northbound only Maine State Pier phase

UNION STREET

The intersection of Commercial Street at Union Street is not timed in sync with other nearby intersections. Based on field recorded timings the intersection typically operates at a cycle length between 90 and 100 seconds. The phasing at the intersection includes five-second leading pedestrian interval (LPI) phases that precede eastbound/westbound northbound/southbound phases that each have concurrent pedestrian phasing. During field observations, it appeared that the detection at the intersection was failing or that Union Street was receiving green time, even when no vehicles were present.

CENTER STREET

The intersection of Commercial Street at Center Street operates as an uncoordinated signal with no consistent cycle length per the signal plan. Based on field recorded timings, the intersection typically operates at a cycle length of between 70 and 80 seconds. While in the field, five phases were observed:

- A pedestrian-only phase
- A westbound advance phase (to protect left turns)
- An eastbound/westbound phase
- A northbound only phase
- A southbound only phase
- The signal also has a protected eastbound and westbound left-turn phase (per City provided timing plans), although it was not actuated during the field visit

BEACH STREET

Based on the City's signal timing data, the intersection of Commercial Street at Beach Street has a cycle length of 150 seconds. Field observations indicated that phase progression can vary depending on actuation, but that the Commercial Street left-turn/through advance phase typically follows the Beach Street / Driveway phase. Field observations from multiple site visits in both the summer and off-season months showed that westbound queues from Beach Street impacted traffic as far east as Center Street and beyond. In addition, site observations at the Beach Street intersection shows eastbound left-turn queues regularly exceed 12-15 vehicles. Field observations at the intersection also indicate that the majority of southbound Beach Street traffic turns right onto westbound Commercial Street, and

although there appears to be a delay on this associated detector, observations indicate this delay could be increased to 10 or 12 seconds to reduce false calls, after vehicles have turned right.

MULTI-MODAL DATA

In addition to vehicle and pedestrian counts, additional multi-modal data was collected to thoroughly understand corridor operations and usage by all users.

CRUISE SHIP & FERRY SCHEDULES

In 2018, cruise ships docked in Portland from late April through early November while the Casco Bay Lines ferry service operates year-round.[4] The cruise ships varied in size, from a scheduled capacity of 56 passengers to nearly 5,000. Passengers disembark from cruise ships near Commercial Street at India Street at the Ocean Gateway Pier and from there, many continue by foot to the corridor or board trolley, shuttles, and other vehicles to see attractions and destinations further afield in greater Portland. On those days when the largest ships dock, feedback from local residents indicates that cruise ship passengers can overwhelm sidewalk spaces, especially those near the cruise ship terminal.

Table 6 and Figure 12 indicate how the scheduled cruise ship capacity fluctuates by month and by day during the busiest arrivals season and illustrate that arrivals peak during September and October, when an average of over 1,500 passengers per day arrive in Portland.

Table 6: Scheduled Cruise Ship Scheduled Passenger Volume by Month, April – October, 2018[5]

MONTH	TOTAL PASSENGERS	AVERAGE PASSENGERS PER DAY*
April	2,689	448
May	3,274	106
June	16,736	558
July	9,171	296
August	14,921	481
September	55,690	1,856
October	48,054	1,550

**Average of only those days a cruise ship was present*

[4] Ferry schedules vary significantly throughout the year
[5] City of Portland Cruise Ship Schedule: https://www.portlandmaine.gov/2046/Schedule

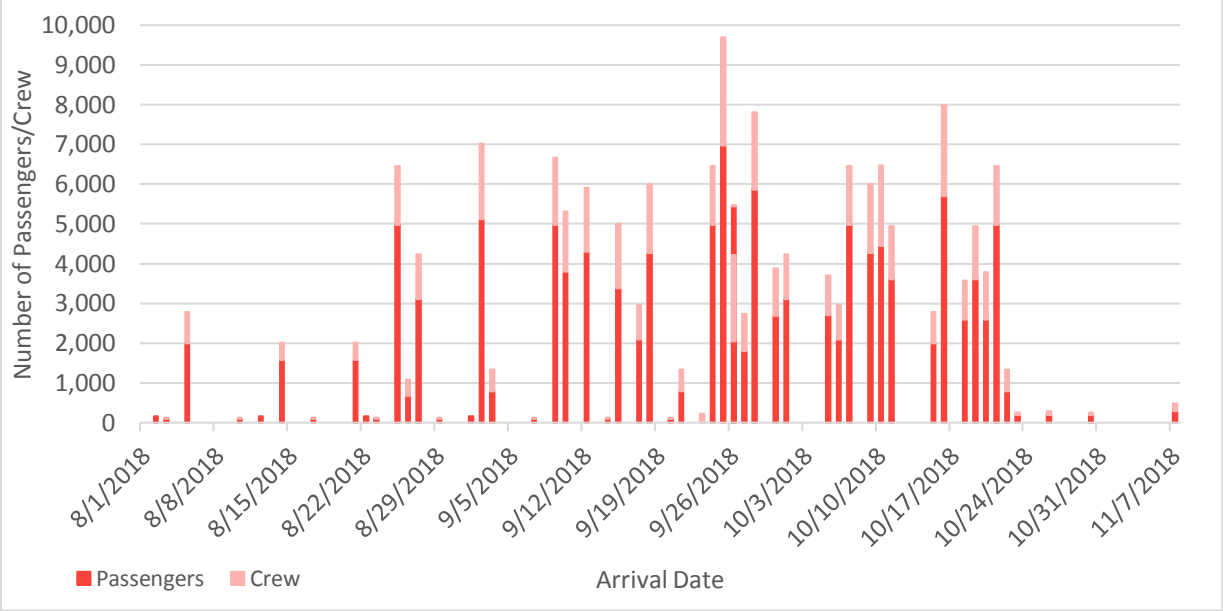
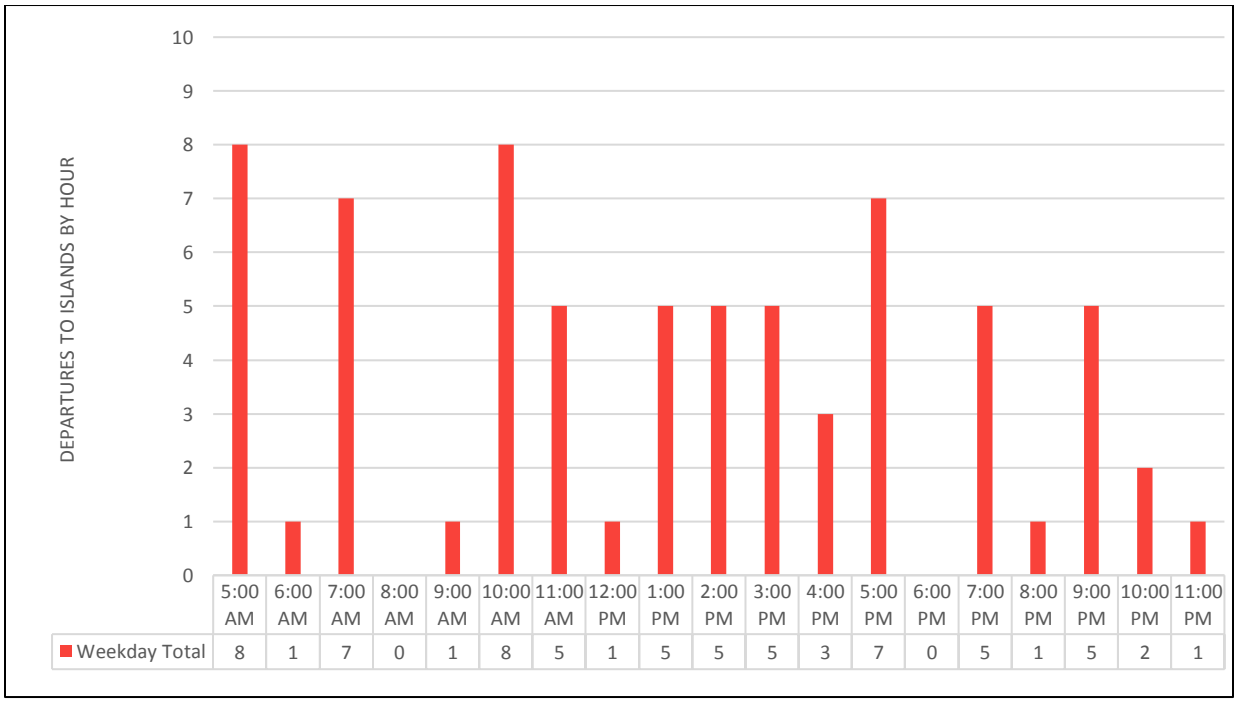


Figure 12: Cruise Ship Scheduled Passenger Volume Arriving in Portland by Date (Aug. – Nov. 2018)

The Casco Bay Lines ferry provides year-round passenger, freight, postal, and vehicle ferry service to the islands of Casco Bay and docks in Portland at the Maine State Pier. They provide service to eight islands as well as specialty cruises. Figure 13, Figure 14, and Figure 15 summarize the total (to all islands) ferry departure frequency by hour in the summer and winter season.[6]



	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
Weekday Total	8	1	7	0	1	8	5	1	5	5	5	3	7	0	5	1	5	2	1

Figure 13: Casco Bay Lines Summer Weekday Island Ferry Departures by Hour

[6] https://www.cascobaylines.com/schedules/

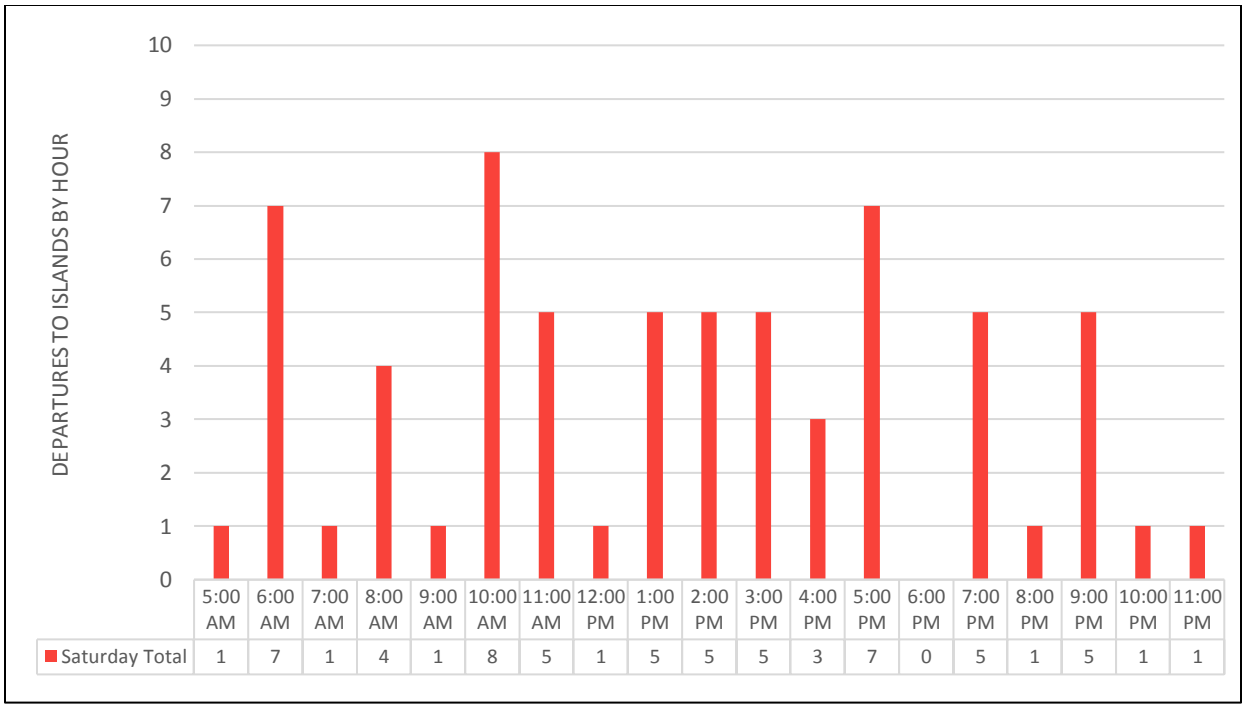


Figure 14: Casco Bay Lines Summer Weekend Island Ferry Departures by Hour

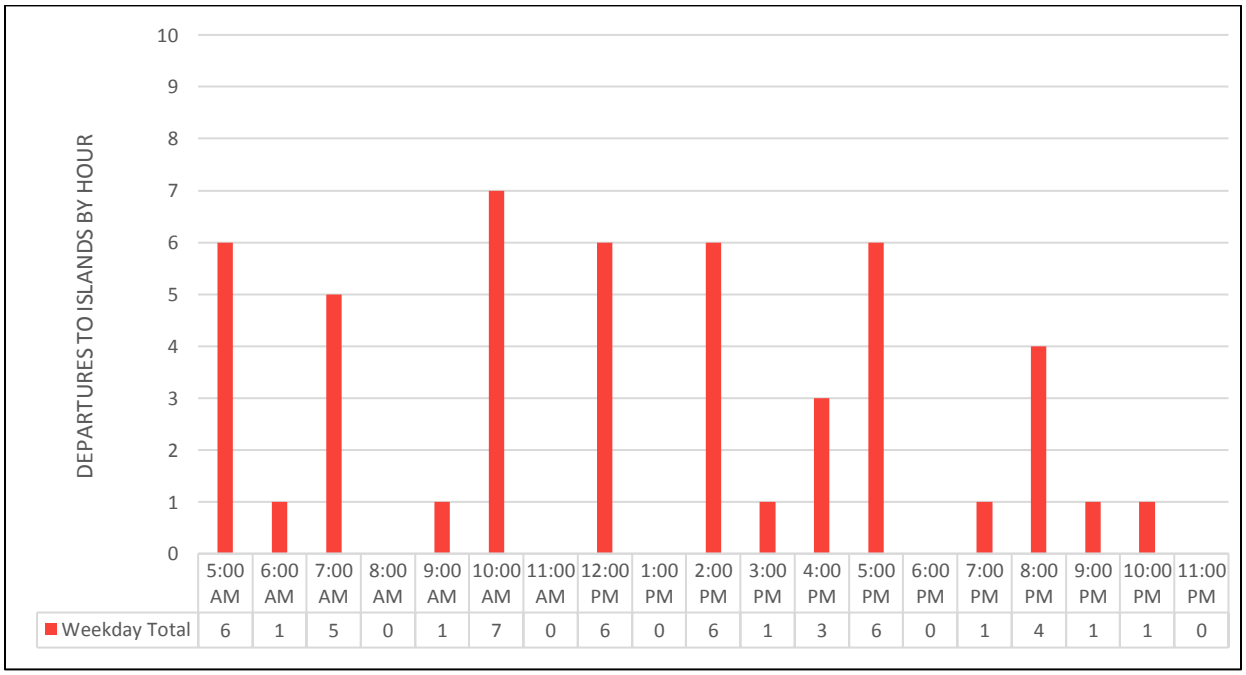


Figure 15: Casco Bay Lines Winter Weekday Island Ferry Departures by Hour

The figures show that on average, there are 70 weekday summer ferry trips per day, 66 weekend summer trips per day, and 49 winter weekday trips per day. Figure 13 shows that weekday trip frequencies peak before and after typical work hours, with a steady number of trips during typical work hours and in the evening.

BUS & TROLLEY NETWORKS

Commercial Street is served by commercial trolley tour buses as well as by nearby route transit buses. Commercial trolley tour buses stop along Commercial Street near the Moulton Street intersection, with tour times and schedules varying by month and season.[7]

Metro's Route 8, which serves Downtown Portland and Portland Peninsula, runs along Commercial Street for the one block between Franklin and India Streets with a stop at Casco Bay Lines. Routes 21, 24A, and 24B serve South Portland and run parallel to Commercial Street along York Street from Union Street to the Casco Bay Bridge.[8] From these routes, passengers can transfer to other Greater Portland bus routes at the Monument Square and Metro Pulse transfer centers.

Portland can also be accessed from its airport, Amtrak Station, and by inter-city bus (Concord and Greyhound Lines). The airport provides access to several Midwestern and east coast destinations on multiple airlines. The Portland Amtrak station is a 5-10 minute drive from Commercial Street and provides access to and from Boston and other destinations in Maine, New Hampshire and Massachusetts on the Downeaster line, with up to five daily trains in each direction. Concord bus lines provide service from the Portland Transportation Center to and from New York City (2 trips per day), Boston (28 trips per day), and regional destinations in Maine including Orono (University of Maine), Bangor, Waterville (Colby College), Augusta, Lewiston (Bates College), and Auburn, ME.[9] Greyhound serves Portland on Congress Street with service to and from Boston and Bangor.[10]

PARKING DATA

WSP reviewed parking data throughout the corridor from the 2016 City of Portland Parking Study for Downtown, the Old Port, and the Eastern Waterfront. Supplemental off street parking survey data was recorded by WSP along Commercial Street during the on peak and off peak seasons. During field observations, it was noted that both on-street metered spaces and off street surface lots were parked at a high rate of usage, which aligns with data in the 2016 Parking Study.

The Survey subdivided the City into several zones, of which Zones 3-6 are adjacent to the Commercial Street study area. A summary of the supply by parking facility is shown in Table 7.

[7] https://www.portlanddiscovery.com/tours/portland-maine-trolley-tour/
[8] https://gpmetro.org/DocumentCenter/View/338/GPMETRO-Port-Peninsula-Map?bidId=
[9] https://concordcoachlines.com/stop/portland-maine/
[10] http://bustracker.greyhound.com/stops/10219/Lewiston_ME

Table 7: Portland Parking Inventory (Zones 3-6) are closest to Study Area (Table A1 from Parking Study)

Table A1: Study Area Parking Supply Inventory Results

	Downtown/Old Port				Central Waterfront		Eastern Waterfront	Study Area (1-7)	1/4 mi Buffer Area
	1	2	3	4	5	6	7		
Total On-Street	577	553	337	367	131	94	192	**2,251**	N/A
Total Surface Lot Spaces	1,098	1,079	1,029	438	1,267	482	1,012	**6,405**	257
Total Garage Spaces	1,597	2,019	480	1,468	150	468	831	**7,013**	1,050
Total Capacity	**3,272**	**3,651**	**1,846**	**2,273**	**1,548**	**1,044**	**2,035**	**15,669**	**1,307**
Effective Capacity	**2,916**	**3,258**	**1,645**	**2,027**	**1,387**	**935**	**1,822**	**13,990**	**1,176**

Based on the data in the table, the total *Effective Capacity* (defined as 90% of the total structured and off street parking supply and 85% of on-street parking supply) was 5,994 parking spaces across Zones 3-6.

The study found that for its study area (Downtown, Old Port, Eastern Waterfront), peak season weekday parking demand peaked at noon, when parking demand exceeds effective capacity by 6%, and that peak season Saturday parking demand peaked at 2:00 PM, when total demand in the area was at approximately 70% of the area's effective capacity.

Specific parking surveys were also conducted on several streets, including Commercial Street. Figure 16 and Figure 17 illustrate Commercial Street on street parking occupancy throughout the day on Thursday and Saturday in December 2016. The figures illustrate that on Thursday, on street parking demand does not consistently surpass capacity until the 4:00 PM hour, after which on-street demand exceeds supply until at least 9:00 PM. However, on Saturday, on-street parking demand exceeds supply from as early as 1:00 PM through 9:00 PM.

Figure 16: Portland Parking Study: Thursday December 1, 2016 On Street Parking Occupancy

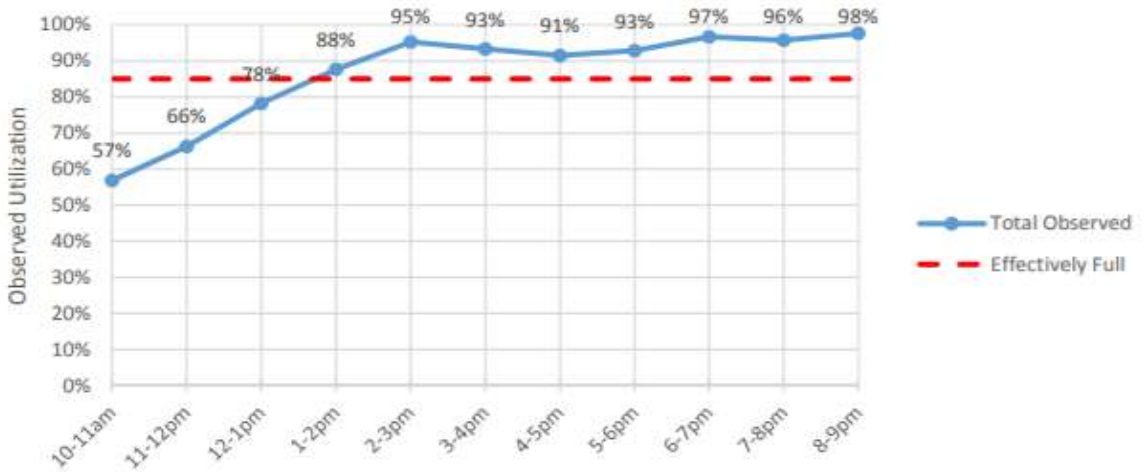


Figure 17: Portland Parking Study: Saturday, December 3, 2016 On Street Parking Occupancy

Given that overall parking only reaches 70% effective capacity on Saturdays, the data in the figure below suggests that either weekend parking locations misalign with where they are needed, that those seeking parking are unaware of these additional parking locations, or both.

The parking study also included block by block occupancy data along commercial street as well as average parking duration and turnover data. Examples of these are shown in Figure 18.

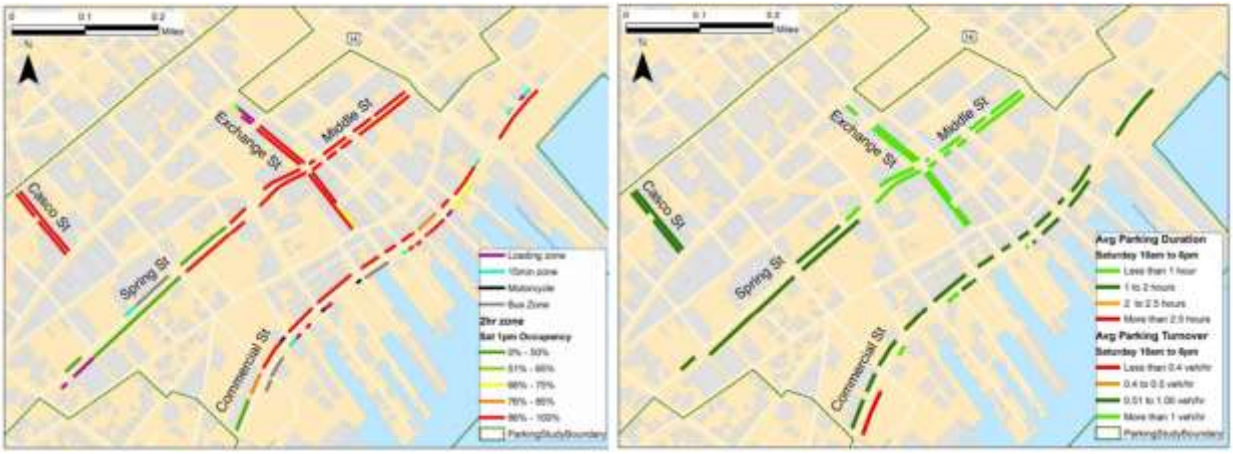


Figure 18: Saturday 6 PM Metered On-Street Occupancy (L), Saturday 8AM - 6PM Avg Parking Turnover (R) – 2016 Portland Parking Survey Report

Within Zones 5 and 6, there is currently limited structured parking, consisting primarily of a private residential parking structure on Chandler's Wharf and a public use garage for patrons using the Casco Bay Lines Ferry at Franklin Street. However, as shown in Figure 19 (denoted as Figure 5 in the Parking Study Report) there are several surface parking lots within the study area.

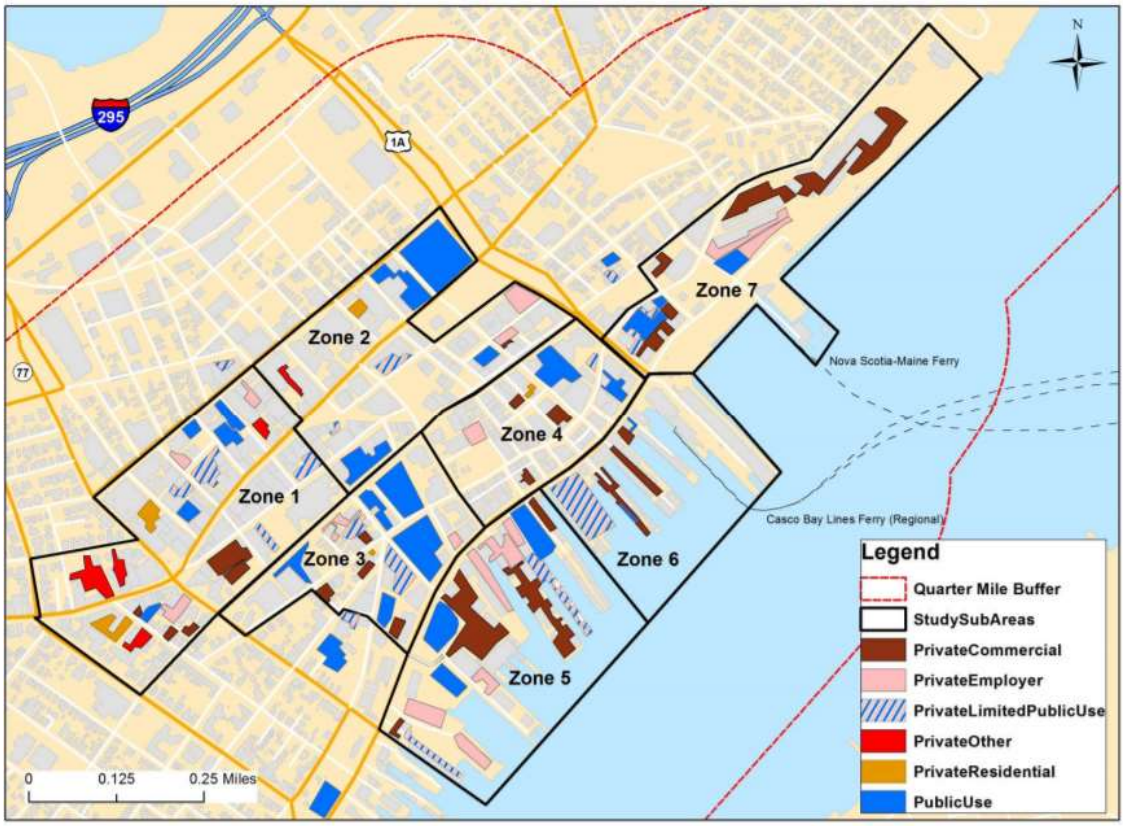


Figure 19: Study Area Parking Facilities (Adopted from Figure 5 of September 2017 Parking Study)

Analysis from the Parking Study shows that parking occupancy in Zone 6 exceeds the average occupancy from 10:00 AM to 8:00 PM on a typical Saturday and that Zone 5 exceeds average occupancy from 10:00 – 4:00 PM on a typical Thursday.

The Parking Study also contains recommendations about how to reduce parking demand and more efficiently manage existing supply. Key take-aways are listed below:

- Explore the formation of a Transportation Management Association (TMA) to serve as a single entity to manage employer and employee parking needs and provide tailored and aggregated services
- Pilot higher on-street parking rates in high demand areas. The WSP team believes exploring this further is valuable. Based on the data, rates could even vary along Commercial Street, by time of day, and by season
- Coordinate with surface lot managers to provide reduced weekend rates and late-shift passes for restaurant workers
- Increase the use and viability of car-sharing programs
- Implement a downtown circulator to connect residents and tourists from downtown to the waterfront: WSP believes this, along with improved headways on key existing routes would benefit residents and tourists alike

In addition to reviewing the parking study data, WSP observed parking data during site visits and also utilized August 29, 2018, aerial drone footage to help conduct a broader survey. The following bullets are based on the video drone footage and sight observations (video observations in *italics)*

- *Union St. – Franklin St. street parking at 90%+ capacity; fewer than 3 available angle parking spaces*
- *Center St. – Maple St.: 75% of available capacity (construction equipment occupied parking)*
- *West of Center Street: 90%+ capacity*
- *Surface lots east of Center Street were at 80% of capacity*
- *Lot between Center and Cross Street was at 70% capacity*
- *Browns Wharf lot was at 90%+ capacity*
- *Aqua Diving lot was at 60%+ of capacity*
- *Harbor View Park dirt lot was 75% of capacity*
- October 25, 2018, 4:00 PM: No available parking between Market St and Custom House St
- Parking availability increases west of Union and Center Streets, parking availability decreases from 3:00 PM toward 5:00 PM
- There is minimal parking wayfinding signage, especially entering Portland the corridor

Based on these observations, WSP recommends that additional parking and curbside management be evaluated and then implemented to achieve 10-20% on-street parking availability to accommodate residents and workers making short-trips along the corridor. As the data and observations indicate that parking demand is not uniform throughout the corridor, WSP agrees with the 2016 Parking Survey recommendations to evaluate both increased and variable pricing throughout the corridor to provide options for those willing to walk further while also ensuring on-street availability.

WSP also recommends evaluating a loading zone pricing scheme for commercial vehicles and deliveries. A similar program was developed in Washington DC, that allows delivery operators to purchase annual and daily passes in addition to metered parking.

BIKE OPERATIONS / FACILITIES

There are currently no bike lanes or separated bike lane facilities within the study area other than a segment of Commercial Street from 0.25 miles west of Beach Street that ends at approximately the location that the Casco Bay Bridge crosses overhead. In addition, none of the intersecting side streets within the study area have any bike facilities, although several streets have planned facilities, per the April 14, 2014, version of the City's Bikeway and Pedestrian Network.[11] The West Commercial Street pathway is currently under design from the current Westerly Terminus to Station Match Buildings; there are future plans to extend to vicinity of High Street.

[11] http://www.portlandmaine.gov/DocumentCenter/View/4885/Bikeway-and-Pedestrian-Network?bidId=

Although Portland currently does not have a bike share system, multiple news articles suggest planning is underway to implement a system soon.[12] [13] The team will stay updated on any developments related to the expansion of the bike share system.

The Greater Portland Council of Governments (GPCOG) provided the team with 2016 Strava data to help understand cycling activity and intensity. Strava[14] is a company with a mobile phone app that cyclists, pedestrians, and runners can use to track their trips. The available data includes ride, commute, intersection count, and origin-destination data. Because Strava data is only provided by those persons who are using the app, it is not appropriate to use to assess absolute count volumes without calibration counts; however, it can be used to illustrate relative counts or ridership activity. Figure 20 illustrates ridership intensity within Portland, with more highly traveled routes shown in red. Based on the 2016 Strava data, cyclist volumes on Commercial Street near Franklin Street were exceeded only by activity on the Casco Bay Bridge, a short segment of York Street, Baxter Boulevard, and the East End Trail. This indicates that Commercial Street is a relatively important corridor for Portland cyclists.

Figure 20: 2016 Strava Data: Relative Cyclist Activity in Portland

Strava's detailed data allows one to visualize how volumes change on a block by block basis. This is shown in Figure 21, which illustrates the number of Strava "tagged" rides and rides designated as commute trips along Commercial Street at each segment east of the cross-street shown.

[12] https://www.wmtw.com/article/portland-taking-first-steps-to-begin-bike-sharing-program/22679854
[13] http://www.theforecaster.net/portland-may-pave-the-way-for-bike-share-services/
[14] https://www.strava.com/about

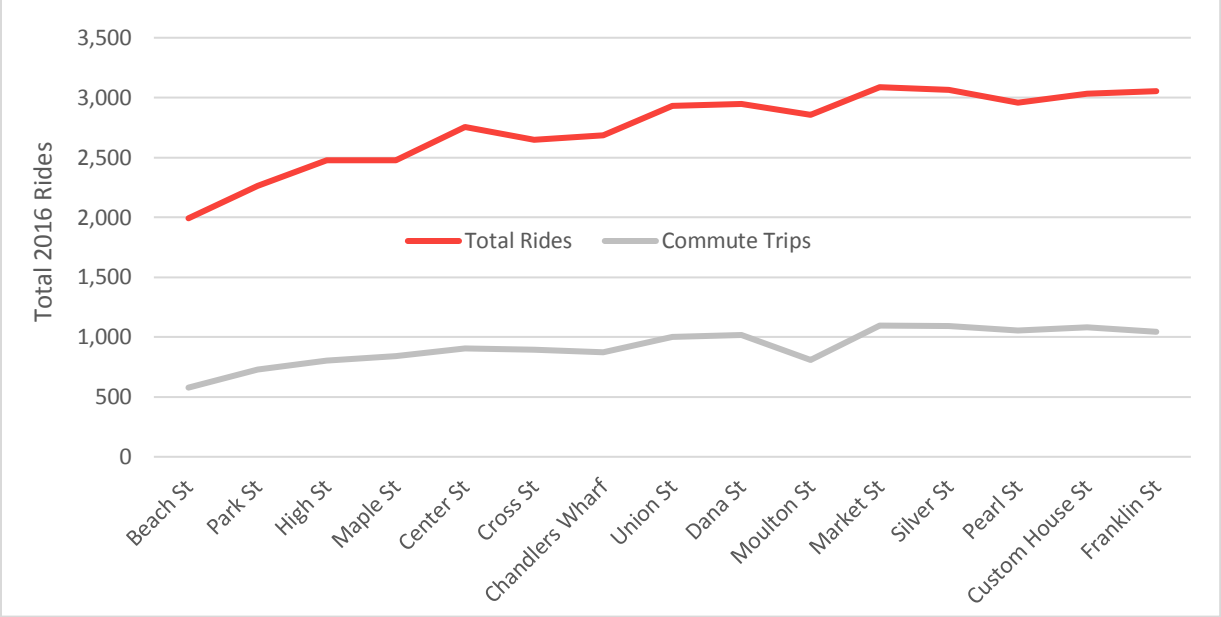


Figure 21: 2016 Strava Ride & Commute Data along Commercial Street east of Cross Streets

The figure illustrates that based on the Strava data, both ridership and commute trips increase from west to east along the corridor. This is further confirmed by Table 8, which shows cyclist volumes by intersection. As shown in the table, ridership volumes exceed the study area average at each intersection from Union Street to India Street, and fall below the average west of Union Street.

Table 8: 2016 GPCOG Strava Data: Cyclist Volumes by Intersection (Shaded Exceed Corridor Average)

INTERSECTION	RIDES
Beach	2,639
Park	3,061
High	2,993
Maple	3,070
Foundry Ln	3,134
Center	3,355
Cross	3,279
Chandlers Wharf	3,333
Union St	3,596
Dana St	3,507
Moulton St	3,496
Market St	3,625
Silver Street / Portland Pier	3,664
Pearl Street	3,707
Custom House St	3,713
Franklin St	3,960
India Street	4,134
Avg	3,427

Strava data can also be used to better understand trip origins and destinations, as shown below:

- Cyclists originating near the Pearl Street at Commercial Street intersection are most likely to travel to the Portland Transportation Center, stay in the Old Port area, or travel to the University of Southern Maine
- Cyclists originating near the Center Street at Commercial Street intersection are most likely to end their trip somewhere in the Old Port
- Cyclists originating near Park Street are most likely to end their trip in the West End

FIELD OBERVATIONS

WSP visited the site on multiple days during the peak and off peak seasons and observed the Commercial Street corridor, noting information on vehicles, pedestrians, and commercial vehicles related to fishing operations as well as deliveries. Site visits and field observations were conducted on: Friday, August 24, 2018; Wednesday, August 29, 2018; Thursday, October 25, 2018; and Tuesday, December 11, 2018. Aerial drone video footage collected during the 3:00 hour on Wednesday, August 29, 2018, was also observed to gain an understanding of the corridor.

VEHICULAR OBSERVATIONS

During both the peak and off peak seasons, vehicular queues were observed in both directions at multiple locations within the study area. Eastbound queues were more minor and were mainly noted at signalized intersections due to inefficient signal timing or during the peak season as heavy pedestrian volumes and bait trucks slowed vehicular traffic progression.

Traffic delays and queuing were worse in the westbound direction, which stemmed from queues extending from the Commercial Street at Beach Street intersection. These queues were observed extending to High Street at 3:00 PM and continued to worsen throughout the evening, peaking at 5:30 PM, which when combined with other operations, impacted traffic operations as far east as Pearl Street. These queues also prevented vehicles on southbound cross-streets from turning onto Commercial Street. The other factors that exacerbated queues and operations included signal timing inefficiencies at Center Street and Union Street, interactions with pedestrians at unsignalized crosswalks, and commercial delivery operations, and parking movements. Pedestrian activity was observed and documented to be especially heavy at Pearl Street.

The signal timing inefficiencies included either faulty signal detection or antiquated signal timing parameters. At the intersection of Commercial Street and Franklin Street, eastbound Commercial Street continued to receive a green signal indication, even after all eastbound vehicles had cleared the intersection. Similarly, there were multiple instances where minor street approaches had cleared and the phase remained in green or minor street approaches were called when no vehicles were present on the approach. This lost time resulted in significant delays and unsafe driving conditions, as a vehicle was observed running the red light. Similar issues were recorded at the Commercial Street at Center Street intersection, where a vehicle was also observed traveling through the intersection on red. While other intersections along Commercial Street utilize concurrent pedestrian phasing, the intersection of Commercial Street at Center Street has an exclusive pedestrian phase, which increases delay for both pedestrian and vehicular traffic.

Aerial drone footage provided by GPCOG provided additional context to corridor operations. Although the video footage was recorded prior to the peak period on a Wednesday, it allowed for a greater and broader understanding of vehicular operations, conflict zones, and driver behavior, as well as the ability determine segment travel time. Via the drone footage, a tractor-trailer was tracked from when it entered the corridor from Franklin Street until it turned into Browns Wharf, during which time it traveled just under 8 mph over this approximately 2,300 foot section of Commercial Street.

Another observation made possible by the drone footage was that during approximately 60% of signal cycles at the Franklin Street intersection, westbound vehicles were almost immediately slowed or stopped by pedestrians crossing the crosswalk in front of Ri Ra Irish Pub, as shown in Figure 22. This stoppage frequency highlights the need for additional traffic control at the crosswalk.

Figure 22: Westbound vehicles departing Franklin St intersection impeded at Ri Ra Crosswalk

PEDESTRIAN & SIDEWALK OBSERVATIONS

High pedestrian volumes along Commercial Street affect vehicles attempting to turn onto side streets, which slows traffic progression, as these crossings are not currently managed or metered in any way. Overall, vehicles typically yield to pedestrians crossing Commercial Street and side streets along Commercial Street. In addition, vehicles leave gaps for pedestrians to cross Commercial Street when queuing extends through crosswalks.

Multiple pedestrian impediments such as sidewalk seating for businesses, advertising "A-frames," and vendors in various locations reduced effective sidewalk widths and made travel more difficult, as shown in Figure 23 at Tiqa restaurant, the Marriott Courtyard Hotel, and Arabica Coffee This resulted in pedestrians often walking in the streets - even in the off peak season when pedestrian volumes were lower. This issue is exacerbated during the peak season when pedestrian volumes increase, as additional businesses utilize sidewalk seating, and sidewalk vendors are more active.

Figure 23: Outdoor Seating Reducing Effective Sidewalk Width

In addition, there were locations where effective sidewalk widths were reduced by poles, trees, street signs, fire department call box, and other structures, as shown in Figure 24. These locations included:

- Outside of Tiqa restaurant: *effective width of 5'1"*
- The north side of Commercial Street on the west corner of Moulton Street where a fire department call box blocks pedestrian travel on the bump out leading to the crosswalk: *Still has an effective width of 8'3" recorded but requires change of path*
- The north side of Commercial Street on the western corner of Silver Street where street signs and a telephone pole block pedestrian travel on the bump out leading to the crosswalk: *Effective width of 5'8" recorded*
- The north side of Commercial Street near the western corner of Silver Street, where two trees located in the center of the sidewalk and additional street furniture blocks the sidewalk: *Effective width of 5'5" recorded*

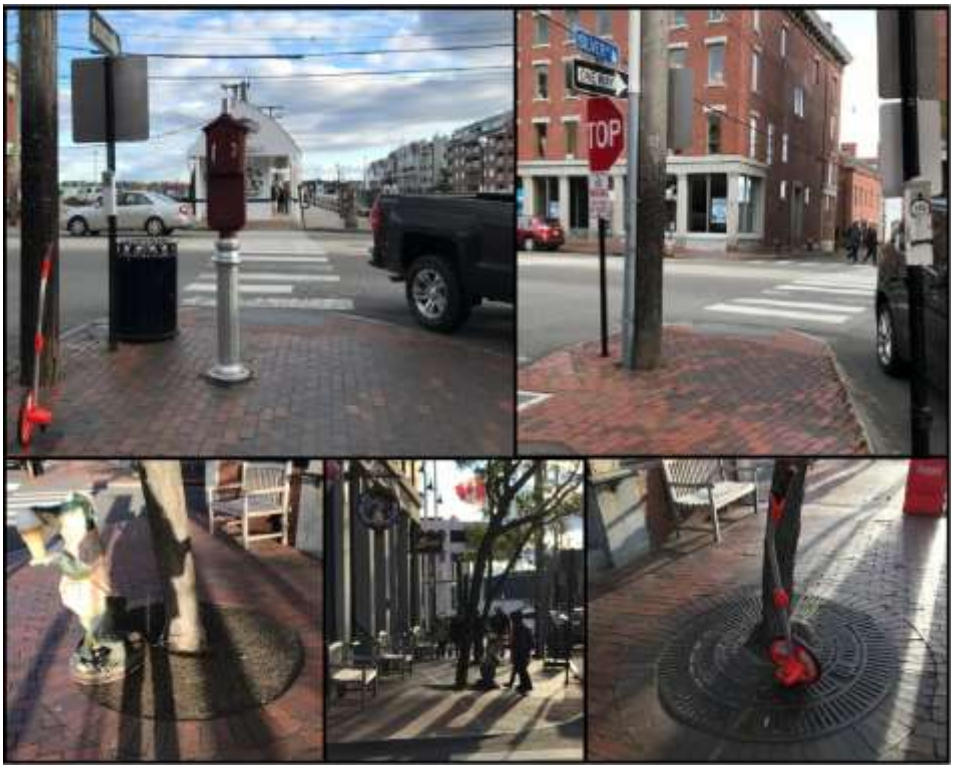


Figure 24: Structures Impacting Effective Sidewalk Width

To analyze the context of these widths in conjunction with peak season volumes, a preliminary peak hour pedestrian level of service (LOS) was determined. Figure 25 illustrates an example of what walkways look like at each respective pedestrian level of service and the flow rate per foot of width (persons per min per foot) that corresponds to each LOS.

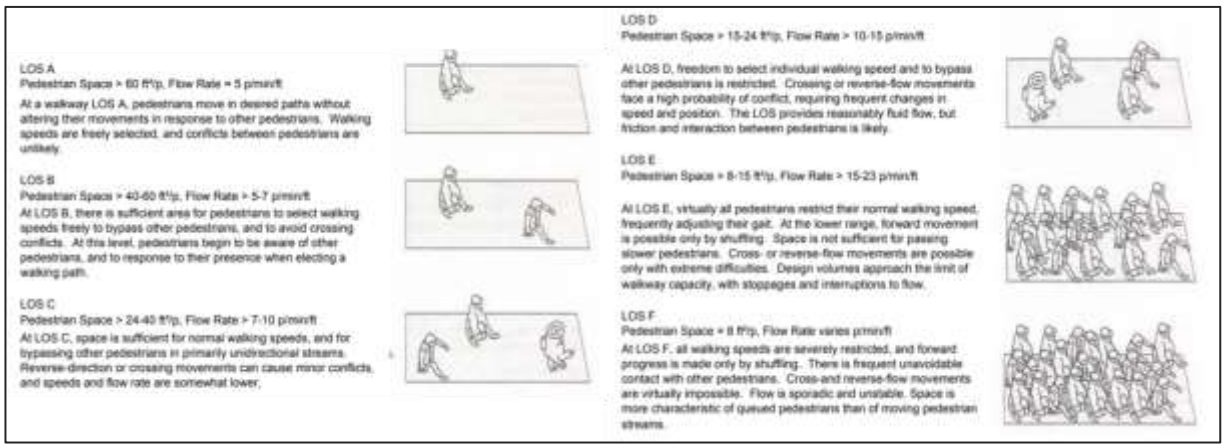


Figure 25: Pedestrian LOS Examples & Calculations[15]

Based on the highest pedestrian flow rate recorded during the peak season data collection (2,008 pedestrians in an hour near Custom House Wharf on Saturday, 8/25) and the minimum effective width recorded on this side of Commercial Street (just over 5 feet at tree planters) the resulting pedestrian LOS would be B. However, these effective widths were recorded during the off-peak season, when pedestrians were not loitering or window shopping to further reduce the effective sidewalk width (see Figure 26).

Furthermore, many of these "pinch points" are often blocked by either people or the furniture or tree zone, which results in localized congestion and confusion, as pedestrians must not only navigate each other, but remain aware of trucks, cars, and adjacent street activity. Figure 26 illustrates an example of such a pinch point and heavy volumes. Finally, pedestrians often travel in groups or platoons, as they exit destinations (or the Casco Bay Ferry), which further increases congestion.

Figure 26: High pedestrian volumes near RiRa Irish Pub; "Pinch Point" at the Blue Lobster

[15] https://www1.nyc.gov/assets/planning/download/pdf/plans/transportation/td_pedloschaptertwo.pdf

COMMERCIAL DELIVERIES / FISHING OPERATIONS

During the peak season observations, commercial deliveries and bait trucks cause significant impacts. Commercial delivery trucks stack end to end in the center lane, which makes it difficult for vehicles to turn left into or out of the side streets and limits sight distances for crossing pedestrians, as shown in Figure 27. This still image taken from aerial drone footage, shows four vehicles in the center turn lane between Custom House Street and Pearl Street, including two box delivery trucks. The box truck at the top (furthest west) of the photograph, blocks eastbound left-turning vehicles onto northbound Pearl Street, and also reduces sight distance for pedestrian crossings. The box truck and van in the middle of the photograph block westbound left-turns onto Custom House Wharf and similarly limit drivers' sight distance of pedestrians.

Figure 27: Still Image from Aerial Drone Video; Wednesday, August 29, 2018

The above photo is representative of median delivery and pick-up drop-off operations – and their impacts - that occur throughout the corridor. However, some locations are more optimal than others for this activity. Figure 28 shows a different box truck in the center turn lane, mid-block, east of Union

Street. This location results in far fewer impacts vs. the location of the vehicles in Figure 27, as it does not impede left-turning traffic or block pedestrian sight lines.

Figure 28: Box Truck Unloading in Center Lane East of Union Street (August 29, 2018 Drone Footage)

Through its history, Portland's marine and fishing industry has long been at the forefront of its economy and culture. Commercial Street's mixed-use development pattern and multi-modal transportation demands present challenges for both delivery vehicles and bait trucks and other marine services vehicles, as high pedestrian volumes and street activation desires conflict with active waterfront uses and operations. Bait trucks must back-down wharves, and this maneuver is often unexpected for drivers and pedestrians alike. During site visits, bait trucks were observed performing multi-point turns in the corridor to turn into or out of piers, which blocked both directions of Commercial Street.

Figure 29 illustrates current and previous bait operations locations within the study area and illustrates that current bait operations occur at:

- Deakes Wharf
- Holyoke Wharf
- Portland Fish Pier
- Union Wharf
- Custom House Wharf

Figure 29: Bait Truck Operations Locations

During the off peak season observations, commercial deliveries and fishing operations were less frequent. On October 25, a delivery truck was observed making deliveries along Commercial Street heading east using the center lane as a loading zone. The delivery truck did not disrupt traffic as there was plenty of room for vehicles to travel around the truck in either direction during the off peak season. Several other delivery trucks were observed making one stop deliveries throughout the corridor utilizing the two-way left turn lane as a loading zone with similar results. No bait trucks were observed during the off peak season site visit.

Other waterfront desires including making it more accessible for pedestrians (residents and visitors) with the safety and needs of an active marine and fishing community and balancing future development with the needs of the long-standing fishing and marine operations.

INTERSECTION VEHICULAR OPERATIONS ANALYSIS

Signalized intersections within the study area were analyzed using both peak and off peak volumes and signal timing data. Analysis was based on methodologies outlined in the Highway Capacity Manual (HCM). Level of Service (LOS) and delays were calculated and are summarized below.

LOS is a calculation of control delay for an intersection. LOS is an indication of driver discomfort, frustration, fuel consumption, and lost time. LOS is defined by an index from A (free flow) to F (long delays). LOS control delay values are given in Table 9.

For unsignalized intersections, delay values apply only to the stop controlled movements, since the main street movements are not restricted. For signalized intersections, Control delay is the elapsed time for deceleration, queue time, stopped delay, and final acceleration and is a function of the signal timing parameters, the volumes entering the intersection, and the intersection's capacity based on geometry... Synchro 9 software was used as the analysis tool for determining the LOS at the study area intersections. Synchro implements the methods of the Highway Capacity Manual to analyze intersection capacity and determine LOS.

Table 9: Level of Service Criteria

Average Delay (seconds)		
Level of Service	Unsignalized Intersection Delay Thresholds (sec / veh)	Signalized Intersection Delay Thresholds (sec / veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Source: 2010 HCM

The LOS procedures described above were used to analyze the four signalized intersections within the study area in the following four conditions:

- Peak Season Weekday PM Peak Hour
- Peak Season Saturday Midday Peak Hour
- Off Peak Season Weekday PM Peak Hour
- Off Peak Season Saturday Midday Peak Hour

Because recent peak summer traffic count data was not available at all intersections, off peak season (fall) traffic volumes were increased by 25 percent during the weekday PM peak hour and 13 percent during the Saturday midday peak hour. These factors were selected based on the aforementioned off peak versus peak season volume comparisons conducted along the corridor, as 25 percent and 13 percent were found to be the most common factors for the weekday PM and Saturday midday peak hour, respectively. Table 10 summarizes these analysis results.

Table 10: Intersection Operations Analysis Delays and Corresponding Level of Service

Commercial St. Intersection	Peak Season Weekday PM	Peak Season Sat. Midday	Off Season Weekday PM	Off Season Sat. Midday
Beach Street	70 (E)	30 (C)	32 (C)	16 (B)
Center Street	23 (C)	10 (B)	18 (B)	8 (A)
Union Street	17 (B)	7 (A)	14 (B)	7 (A)
Franklin Street	47 (D)	62 (E)	20 (C)	25 (C)

Delays in seconds per vehicle

The analysis indicates the Commercial Street at Center Street and Union Street intersections operate at delays within the LOS C threshold or better in both the peak and off peak seasons and Weekday PM and Saturday Midday peak hours.

The results indicate that the Commercial Street at Franklin Street intersection operates with delays that correspond to LOS D and E thresholds during the peak season weekday PM and Saturday midday peak hours, respectively. The analysis also indicates that the Franklin Street southbound approach operates at LOS E and F during the Weekday PM and Saturday midday peak hours, respectively; the analysis also indicates the southbound and westbound through movements operating at LOS E during the peak season Saturday peak hour. During the off peak season, the analysis indicates reduced delays that correspond with LOS C delay thresholds.

The analysis also indicates that Beach Street operates at LOS E and C during the weekday PM and Saturday midday peak hours during the peak season, respectively. During the peak season weekday PM peak hour, the analysis indicates the eastbound left-turn movement operates at LOS F and the westbound through movement operates at LOS E. Similarly, the analysis indicates that lower off peak volumes reduce delays to LOS C and B during the weekday PM and Saturday midday peak hours respectively.

In addition to vehicular delays, the analysis indicates long westbound queues at the Beach Street intersection during the weekday evening peak hour, which aligns with field observations where long queues impacted operations with the study area and blocked vehicles on side streets from entering Commercial Street. The Synchro analysis confirms these long queues, as the 95th percentile queue lengths were determined to exceed 1,100 feet during the weekday PM peak hour during the peak and off peak seasons – and over 1,600 feet (the equivalent of approximately Park Street) during the weekday PM peak hour specifically. Due to Synchro's methodology, actual observed queues are longer due to friction with other modes as well as bait truck and commercial delivery operations, which are not captured by the model.

STAKEHOLDER FEEDBACK

In addition to field observations and quantitative data, feedback and input was gathered at a stakeholder meeting on Thursday, October 4 at Casco Bay Lines.

OCTOBER STAKEHOLDER MEETING

The consultant and client teams were introduced to over 50 stakeholders in attendance, including those representing the fishing and lobstering industry, fisheries, hospitality services, non-profits, restaurants, retail, offices, pier owners, and land owners. During the meeting, stakeholders participated in a "dot" exercise to denote where they live or work and any problem areas, the results of which are shown in Figure 30.

Figure 30: Stakeholder Live and Work (Green and Blue Dots), and Issues (Red Dots) Location Results

Attendees were then divided into groups and led through facilitated discussions focusing on:

- What Commercial Street means to them and their business
- What works well and what are problems areas for them
- What suggestions do you then have to improve the flow of cars, trucks, bikes, and people?
- What else should the team know?

After the meeting, the comments were grouped into themes, as shown in Figure 31.

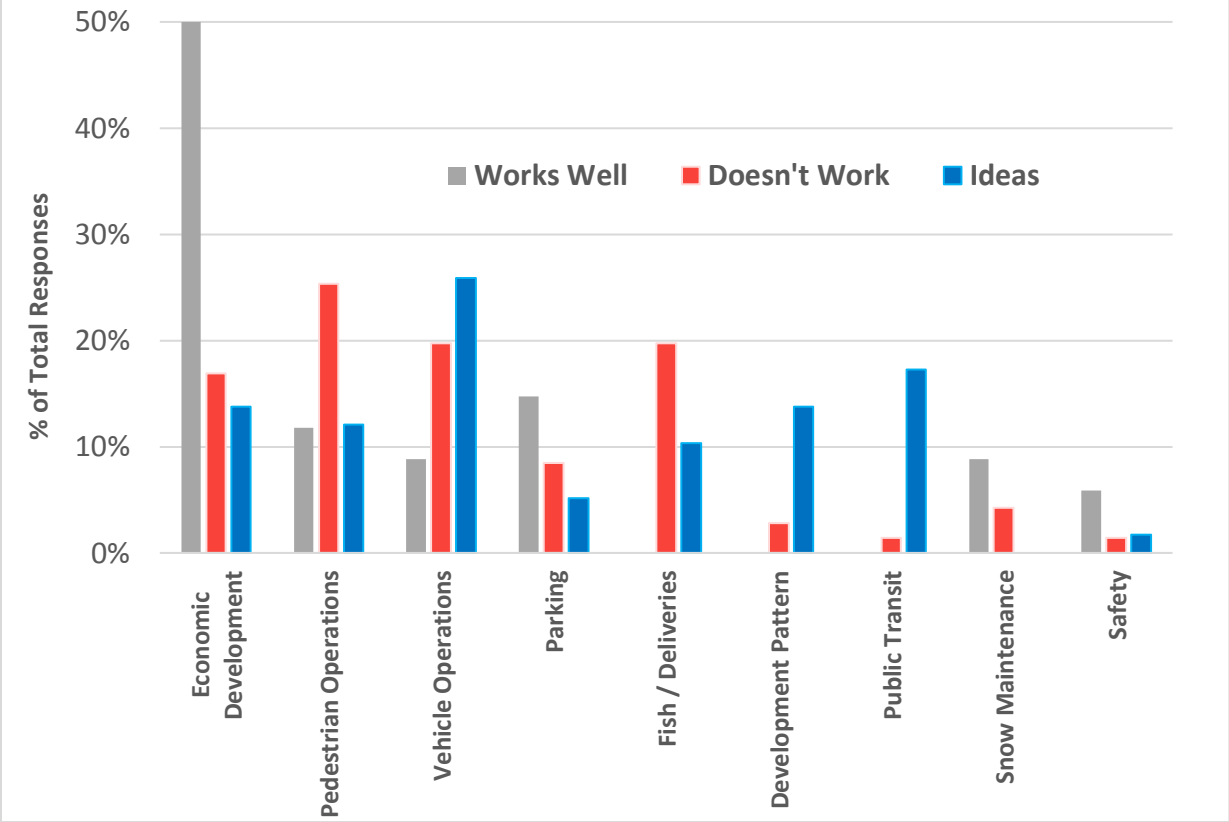


Figure 31: October 4, 2018 Stakeholder Meeting Response Summary

The figure indicates that attendees noted that economic development is strong (i.e., the corridor was active, business was good) but that pedestrian crowding, vehicular traffic, and fish/commercial delivery operations were key issues. Many of the ideas offered centered on actions to improve traffic flow and public transit measures that could provide more multi-modal mobility and accessibility along the corridor to residents and tourists alike. Ideas noted by multiple tables are listed below, while the entire meeting summary is included in the Appendix:

- Free Satellite parking with shuttle and viable transit options for commuters
- Improved signal timing
- Eliminate some crosswalks
- Have tour buses load in Ocean Gateway / Amethyst lot instead of Commercial Street
- Make a commercial corridor on the waterfront side

SUMMARY & KEY ISSUES

To understand the key issues along the Commercial Street corridor, the WSP team has conducted multiple site visits, listened to staff, stakeholder and public feedback, aggregated multi-modal data, and analyzed intersection and corridor operations under multiple conditions.

The team understands the multimodal nature of this mixed-use corridor and the variety of interactions take place throughout the day, and how these may change by seasonally. Specifically, the team has observed the impact that commercial and marine deliveries have on both vehicular and pedestrian operations, and the impact that corridor's mixed-use development and mixed-operations has on the city's vital marine and fishing operations. Table 11 summarizes the key issues and impacts:

Table 11: Summary of Key Issues

Category	Issues
Marine Operations & Waterfront Activation	Difficult for fishing and marine vehicles to access wharves and piers due to competing users
	Lack of designated non-median loading zones
	Need to balance pedestrian waterfront access with marine and fishing industry needs
	Opportunity to identify bait truck and marine vehicle storage prior to loading
Parking	Lack of available on-street parking during peak times
	Opportunity to improve parking wayfinding – both regionally and locally
	Relatively low on-street parking turnover during peak times
	Available Saturday off-street parking is not being utilized to capacity
	Opportunity to improve local and regional transit and shuttle options
Vehicular	Westbound queues from Beach St impact western 2/3 of study area during peak hour
	Inefficient signal settings at Center St, Union St, and Franklin St intersections
	Parked delivery vehicles in center turn lane limits sight distance
	Crosswalk frequency results in chaos, expectancy issues, and slow progression
Pedestrian	Opportunity to implement curb bulb-outs to reduce long crossing distances at intersections
	Reduced effective sidewalk width due to furniture, infrastructure, and advertising elements
	Parking and street design at intersections limits sight distance at crosswalks

The team understands that it is a priority of the stakeholders and public to maintain and flourish marine uses along Commercial Street while also accommodating all corridor users by utilizing data and feedback to develop balanced alternatives.