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MEMORANDUM

DATE: June 26, 2020

TO: City of Ilwaco

FROM: Dana Beckwith, PE, PTOE
Richard Martin, EIT

SUBJECT: Ilwaco Comprehensive Plan Update Traffic Planning Support **P18-085-000**

This memorandum summarizes the traffic impact analysis associated with the Transportation Element of the Comprehensive Plan update for the City of Ilwaco, Washington. The purpose of this analysis is to evaluate the existing transportation infrastructure throughout the City of Ilwaco, to identify potential improvements required to adequately serve future traffic conditions based on standards established by the Washington State Department of Transportation (WSDOT), the City of Ilwaco, and Pacific County.

This traffic impact analysis considers the following elements:

- Introduction
- Existing Conditions
- Safety Analysis
- Traffic Data Analysis
- Pedestrian and Bicycle Facility Evaluation
- Transportation Demand Management Strategies
- Regional and Local Agency Comprehensive Plan Review
- Mitigation Strategy and Budget Estimates
- Results and Recommendations

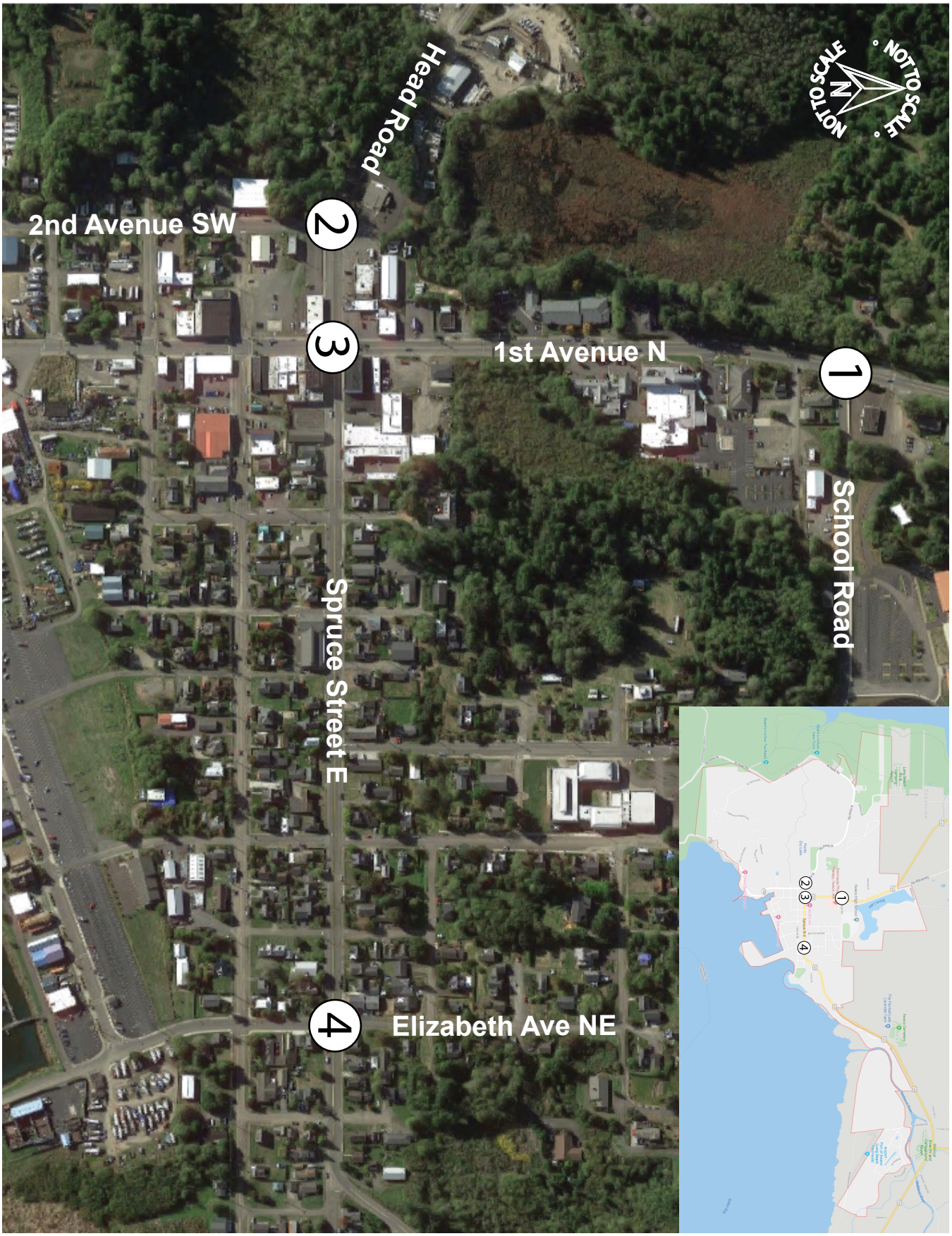
INTRODUCTION

Project Description

The City of Ilwaco is located in the southwest corner of the State of Washington, south of the City of Seaview and north of Cape Disappointment State Park. It is located along a segment of State Highway 101 that connects the city to Astoria and Raymond, among other communities along the coast. One of the main employers and trip generators in the City is the Port of Ilwaco. The Port generates land, water, and air traffic, detailed later in the memorandum.

There is one signalized intersection within the City, located at the intersection of 1st Avenue / Spruce Street (US 101). Four study intersections were identified through coordination with City staff for capacity and crash analysis, as shown in Figure 1:

- 1st Avenue N (US 101) / School Road
- 2nd Avenue SW / N Head Road / Spruce Street W (US 101)
- 1st Avenue N / Spruce Street E (US 101)
- Spruce Street E (US 101) / Elizabeth Avenue NE



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Ⓧ = Study Intersection

Figure 1: Vicinity Map

Limited infrastructure is present for alternative modes of transportation throughout the city. There is one bike lane in the city and intermittent pedestrian infrastructure. There are four transit stops that serve three bus lines. Further information about alternative modes is detailed in the Existing Conditions section.

The evaluation summarized in this memorandum provides information necessary to update the Transportation Element of the Ilwaco Comprehensive Plan.

EXISTING CONDITIONS

Existing transportation conditions were evaluated in the vicinity of study intersections in Ilwaco, WA. All modes of travel were evaluated, including pedestrian, bicycles, transit and motor vehicles. The existing transportation conditions for the roadways relevant to the four study intersections are summarized in Table 1.

Transit Infrastructure

Ilwaco hosts several transit facilities in the study area.

Pacific Transit System, headquartered in Raymond, Washington, provides bus service to Ilwaco via three bus lines:

- Line 20 – *Long Beach Peninsula:* Runs weekdays and Saturday between Ilwaco and Oysterville.
- Line 24 – *Ilwaco/Astoria:* Runs weekdays between Ilwaco and Astoria.
- Line 50 – *Ilwaco to Astoria to South Bend:* Runs weekdays from Ilwaco to Astoria to South Bend.

All three lines stop at the Port of Ilwaco with a transit stop located just west of Pearl Street SE. Additionally, Line 20 currently has three bus stops along 1st Avenue N (US 101) north of downtown that include:

- The Ilwaco High School
- The Ilwaco Timberland Library
- Intersection of 1st Avenue N at Spruce Street E

Existing Bicycle and Pedestrian Infrastructure

The city's only dedicated bicycle infrastructure is a 1st Avenue S bike lane on the west side of the road from Eagle Street SW to Waterfront Way. Other roadways within the city require bicycles to share the roadway.

Sidewalks are generally continuous along Spruce Street E (US 101) and Lake Street SE within the downtown area of Ilwaco. Spruce Street W does not have sidewalks on the north side of the road for a small section before it turns into N Head Road. Continuous sidewalks are present along 2nd Avenue SW (though sometimes overgrown with vegetation) until the intersection at Spring Street SW. A full inventory of existing sidewalks is available in Figure 2. From a visual evaluation, the conditions of the sidewalks vary. Pedestrian ramps need to be evaluated to determine if they meet current ADA compliance and a program developed to upgrade those that don't.

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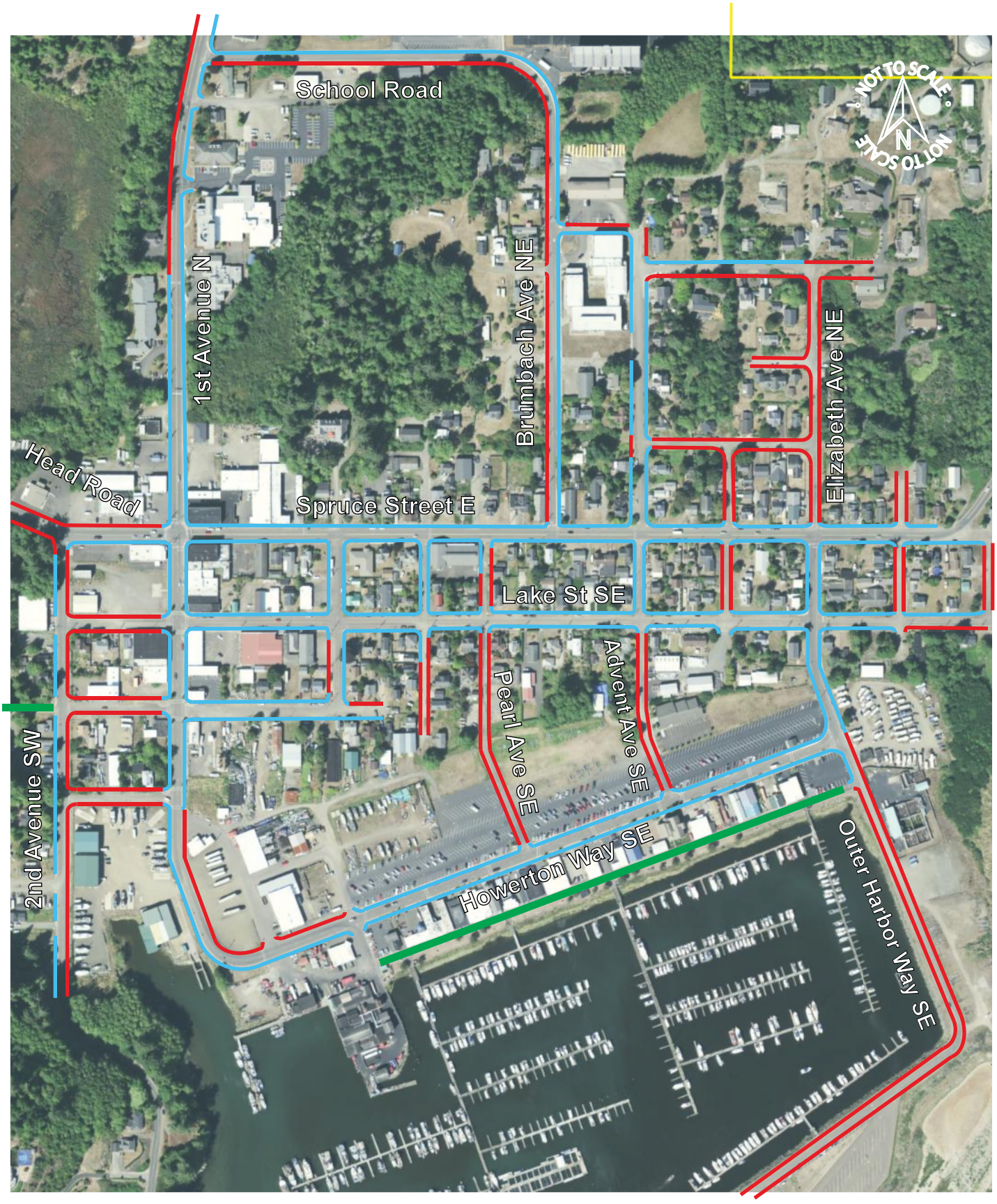
Table 1 Existing Conditions Within Study Area

Roadway	Functional Classification[1]	Posted Speed Limit	Sidewalks[2]	Transit	Bike Lanes	Lane Geometry	On-Street Parking
1st Ave N (US 101)	Arterial	35 mph	Both sides downtown	Pacific Transit System Line 20	None	One 9'-10' lane in each direction	Both sides
Spruce St E (US 101)		25 mph	Both sides	None	None	One 9'-10' lane in each direction	Both sides
Cpt Robert Gray Dr (SR 100)		25 mph	None	None	None	One 10' lane in each direction	None
1st Ave S	Major Collector	25 mph	Both sides until Jessie's Drive	None	West side from Eagle St to Waterfront Wy	One 9'-10' lane in each direction	Both sides
2nd Ave SW		25 mph	West side only	None	None	One 9'-10' lane in each direction	West side
Brumbach Ave NE		20 mph	Continuous on east side intermittent along west	None	None	One 12' lane in each direction	Intermittent along both sides
N Head Rd		25 mph	None	None	None	One 9'-10' lane in each direction	None
Howerton Wy SE		25 mph	Both sides between Waterfront Wy SE and Elizabeth Ave SE	Pacific Transit Lines 20, 24 and 50	None	One 14' lane in each direction	North Side
Spruce Street W		25 mph	South side only	None	None	One 12' lane in each direction	Both sides
Elizabeth Ave SE		25 mph	Both sides until Port	None	None	One 9'-10' lane in each direction	None

[1] Based on the Transportation Element of the 2015 City of Ilwaco Comprehensive Plan.
[2] Sidewalk inventories fully detailed in Figure 2.

The Discovery Trail connects Cape Disappointment to the City. The trail is paved between 2nd Avenue SW and the intersection with N Head Road to the west. Access to the trail head at 2nd Avenue SW is limited and unimproved.



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- Existing Sidewalk
- No Existing Sidewalk
- Multi-Use Facility

Figure 2: City of Ilwaco Sidewalk Inventory

Air and Water Infrastructure

The Port of Ilwaco is a major shipping and fishing hub. The Port hosts mooring space for commercial and recreation vessels and provides trailer parking for launching such vessels at the end of Outer Harbor Way SE. Cape Disappointment hosts a National Motor Lifeboat School, and provides mooring for such vessels at US Coast Guard Station Cape Disappointment. The Port also owns and operates the Port of Ilwaco Airport on Stringtown Road east of downtown Ilwaco. This airport is not part of the City of Ilwaco, but provides facilities for local air travel in the region. The airport can accommodate small single-engine airplanes[1].

SAFETY ANALYSIS

Crash Data Review

Crash data for a five-year period from January 2014 through December 2018 was obtained from the Washington State Department of Transportation. This data was reviewed to identify traffic safety concerns at the study intersection. A copy of the crash data is included in Appendix A.

The crash rate presented in Table 2 is based on the number of crashes per million entering vehicles (MEV). Typically, an intersection is considered unsafe if its crash rate exceeds the threshold of 1.0 crashes per MEV.

Table 2: Five Year Crash Rate

Location	Crash History (Years)	Number of Crashes	Crashes per year	Annual Traffic Entering (veh/yr)*	C.M.E.V. **
1st Avenue N (US 101) / School Road	5	1	0.2	1,533,000	0.261
2nd Avenue SW / N Head Road / Spruce Street W		0	0	438,000	0
1st Avenue N (US 101) / Spruce Street E		2	0.4	1,533,000	0.261
Spruce Street E (US 101) / Elizabeth Avenue NE		1	0.2	1,022,000	0.196

Note: * From WSDOT Traffic GeoPortal
** C.M.E.V. – Crashes per million entering vehicles.

Table 2 shows that none of the study intersections exceed the 1.0 crashes per MEV safety threshold. A further evaluation of crashes by type is summarized in Table 3. No crashes were reported in 2014 or 2015, and no rear-end or single-vehicle crash types were reported. Furthermore, no crashes occurred at the intersection of 2nd Avenue / Head Road / Spruce Street during the analysis period.

As shown in Table 3, the crash types varied and no specific reoccurring crash patterns were identified. No fatalities or severe injury crashes were reported during the study period.

[1] WSDOT Airport Facilities and Services Report, https://www.wsdot.wa.gov/aviation/planning/systemplan/conditionassessment/ReportViewer.aspx

Table 3: Crash Types at Study Intersections

Crash Type	Intersection Data by Year			
YEAR	**2016**	**2017**	**2018**	**Total**
1st Avenue N (US 101) / School Road				
Bike-involved	0(0)	0(0)	1(1)	1(1)
1st Avenue N (US 101) / Spruce Street E				
Entering at angle	(0)	1(0)	0(0)	1(0)
From opposite direction	1(0)	0(0)	0(0)	1(0)
Spruce Street E (US 101) / Elizabeth Avenue NE				
From same direction - all others	0(0)	1(0)	0(0)	1(0)
Total	1(0)	2(0)	1(1)	**4(1)**

Note: X(X)= Total Crashes (Injury Crashes)

TRAFFIC DATA ANALYSIS

2019 Existing Conditions

An intersection performance analysis was conducted to document the existing operations for the study intersections and to develop a baseline for analyzing future intersection operational needs associated with the proposed development. Intersection operations were analyzed for the current peak hour performance. The PM peak period (4:00 to 6:00 PM) was analyzed for this evaluation. Traffic count data was gathered on Wednesday, October 16, 2019. Existing traffic volumes and lane configurations are shown in Figure 3. The detailed turn movement count data has been included in Appendix B.

The level of service analyses presented in this memorandum has been completed using the Synchro (Version 10) analysis software. Synchro is based on the Highway Capacity Manual (HCM) 6th Edition methodology. The study intersections analyzed includes the following local intersections:

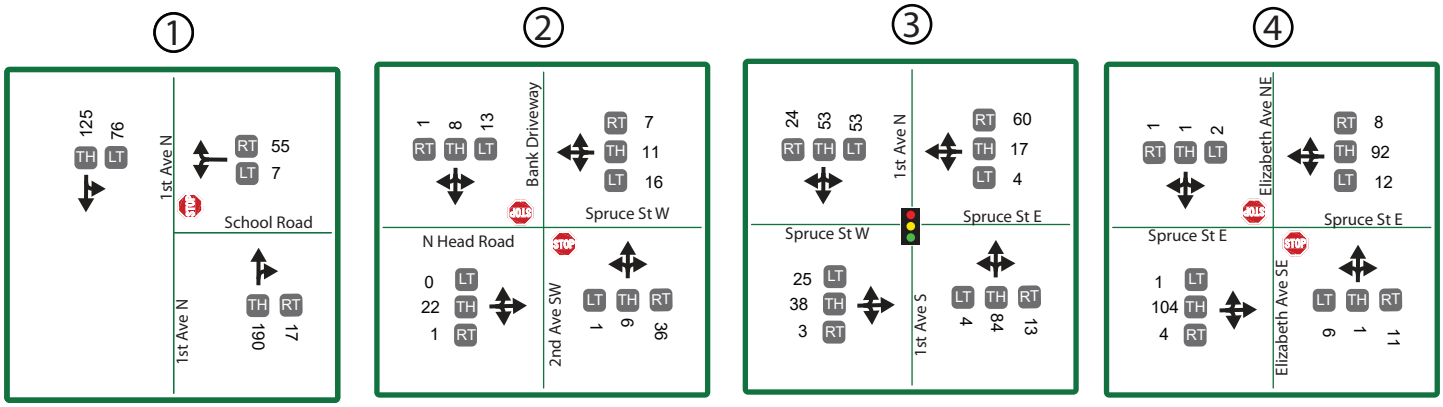
- 1st Avenue N (US 101) / School Road
- 2nd Avenue SW / N Head Road / Spruce Street W (US 101)
- 1st Avenue N / Spruce Street E (US 101)
- Spruce Street E (US 101) / Elizabeth Avenue NE

The City of Ilwaco utilizes level of service standards to identify the maximum levels of congestion acceptable to the community and the threshold to determine transportation system deficiencies and improvement needs. The City utilizes the following level of service standards[2]:

- Arterial Streets: Level of Service D or better
- Collector Streets: Level of Service C or better

WSDOT also utilizes level of service standards and has jurisdiction over four state highways in the vicinity of Ilwaco: SR 100, US 101 and Alternate US 101. All four have a State-designated[3] minimum level

[2] City of Ilwaco Comprehensive Plan, page 14. Identifies level of service definitions.
[3] WSDOT Functional Classification Map, https://www.wsdot.wa.gov/data/tools/geoportal/?config=FunctionalClass



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Traffic Signal Stop Sign

= Lane Configuration (X) = Study Intersection

LT TH RT = Left / Through / Right Turn

Figure 3: Traffic Volumes
2019 Existing Conditions
Weekday PM Peak Hour

of service standard of LOS C or better. As part of the Comprehensive Plan update, it is recommended that the City of Ilwaco adopt a LOS standard for State Highways of LOS C or better.

The following Table 4 summarizes the existing traffic operations for the study intersections. For signalized intersections, the average total delay is reported. For unsignalized intersections, the highest control delay is reported. The detailed analysis results have been included in Appendix C.

Table 4: Existing Intersection Performance Summary

Intersection	Year 2019		
	Control Delay (Sec)	Level of Service	V/C
1st Avenue N (US 101) / School Road	10.9	B	0.11
2nd Avenue SW / N Head Road / Spruce Street W (US 101)	9.7	A	0.04
1st Avenue N / Spruce Street E (US 101)	5.4	A	0.18
Spruce Street E (US 101) / Elizabeth Avenue NE	10.3	B	0.03

Under 2019 existing conditions, all study intersections operate at an acceptable level of service.

2040 Horizon Year Conditions

A Future Conditions Analysis was conducted to determine the expected traffic operating conditions for the study intersections for the 2040 horizon year assigned by the City.

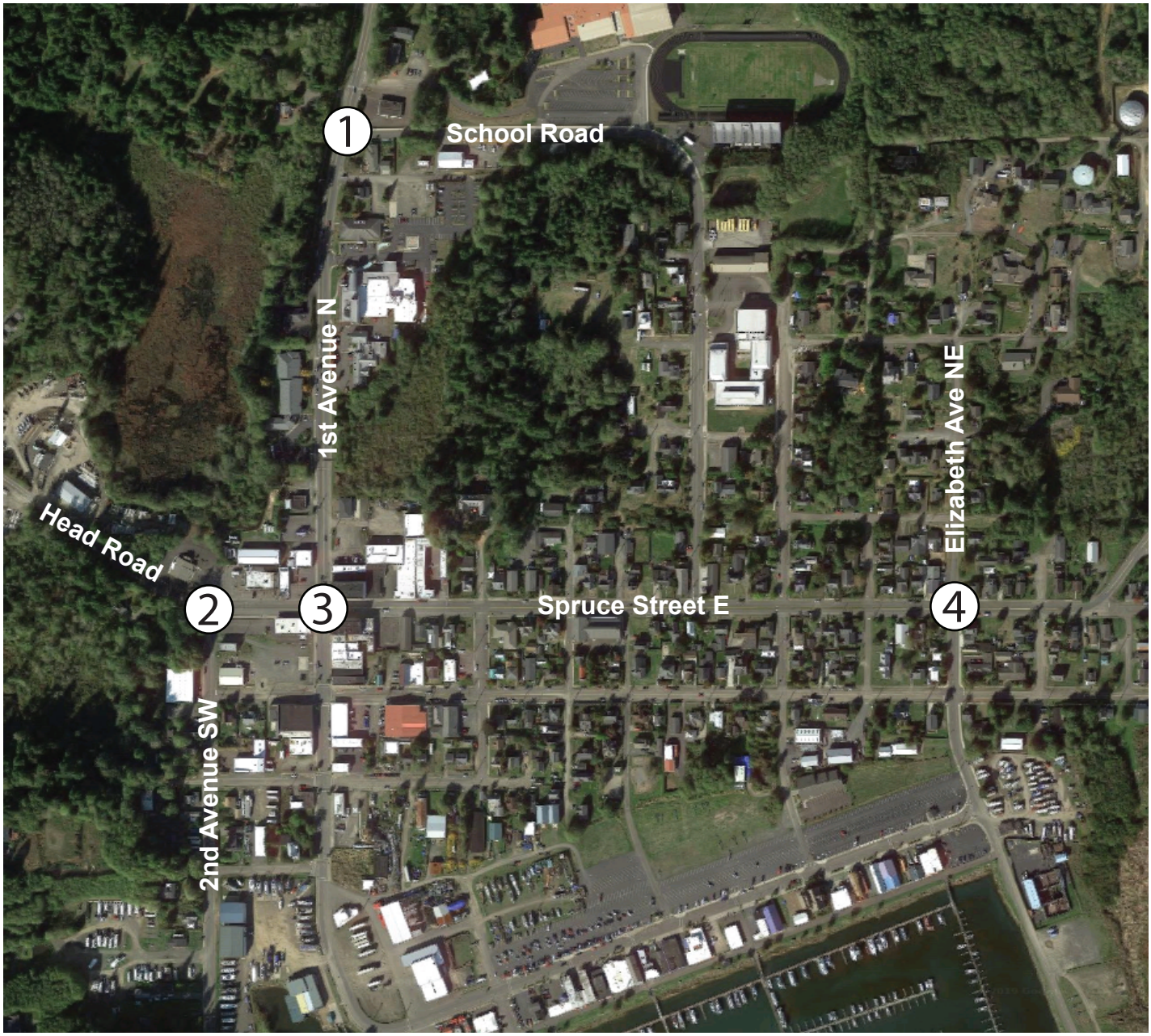
Background Growth

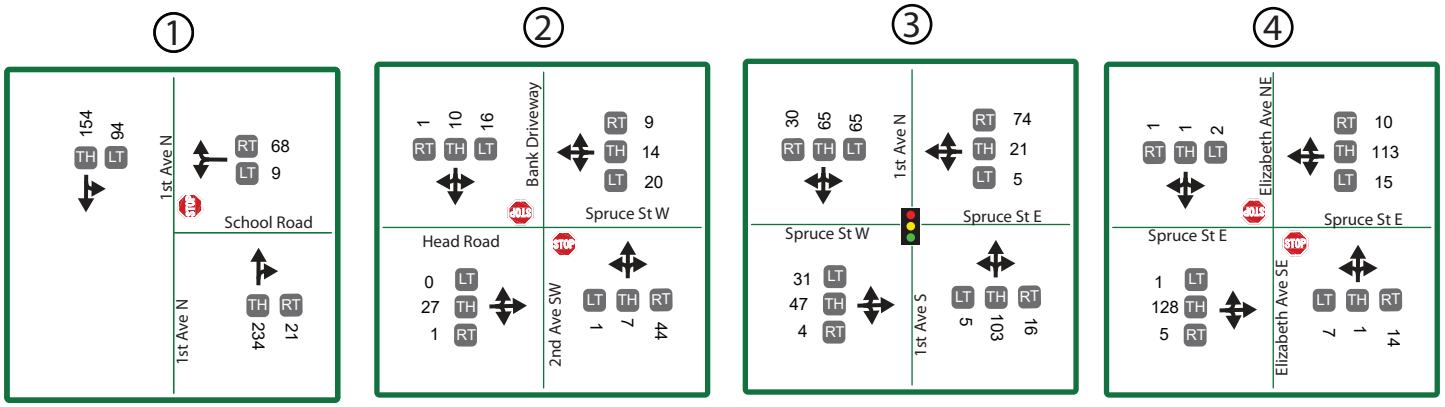
A background growth rate of 1.1 percent per year was used to project future conditions, consistent with the Land Use element of the Ilwaco Comprehensive Plan.[4] The growth rate was determined by studying population and employment growth projections. The population projections are provided in the Land Use Element of the Comprehensive Plan and were developed in coordination with Pacific County and The Washington State Office of Financial Management. The employment projections were provided by the Washington Employment Security Department. Population growth was projected to be 0.75 percent per year, while employment growth was projected to be 1.1 percent per year. Based on the available information, the employment growth was used in developing the future traffic volumes. This rate was considered the more conservative without over-counting the forecasted volumes.

2040 Horizon Year Performance

The following Table 5 summarizes the traffic operations for the study intersections. Under 2040 horizon year conditions, all study intersections operate at an acceptable level of service. A queueing analysis was performed, and no queueing penalties were found in the system. The average and 95th percentile queues for the signalized intersection of 1st Avenue (US 101) / Spruce Street is found in Table 6. Based on the capacity and queueing analyses, no turn lane or signal warrant analysis is necessary. Figure 4 shows the future volumes.

[4] See City of Ilwaco Comprehensive Plan, page 6 for growth rate definitions.





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Traffic Signal Stop Sign

= Lane Configuration (X) = Study Intersection

LT TH RT = Left / Through / Right Turn

Figure 4: Traffic Volumes
2040 Horizon Year
Weekday PM Peak Hour

Table 5: 2040 Horizon Year Intersection Performance Summary

Intersection	Year 2040		
	Control Delay (Sec)[a,b]	Level of Service	V/C
1st Avenue N (US 101) / School Road	11.7	B	0.14
2nd Avenue SW / N Head Road / Spruce Street W (US 101)	10.0	B	0.07
1st Avenue N / Spruce Street E (US 101)	5.6	A	0.22
Spruce Street E (US 101) / Elizabeth Avenue NE	10.7	B	0.03

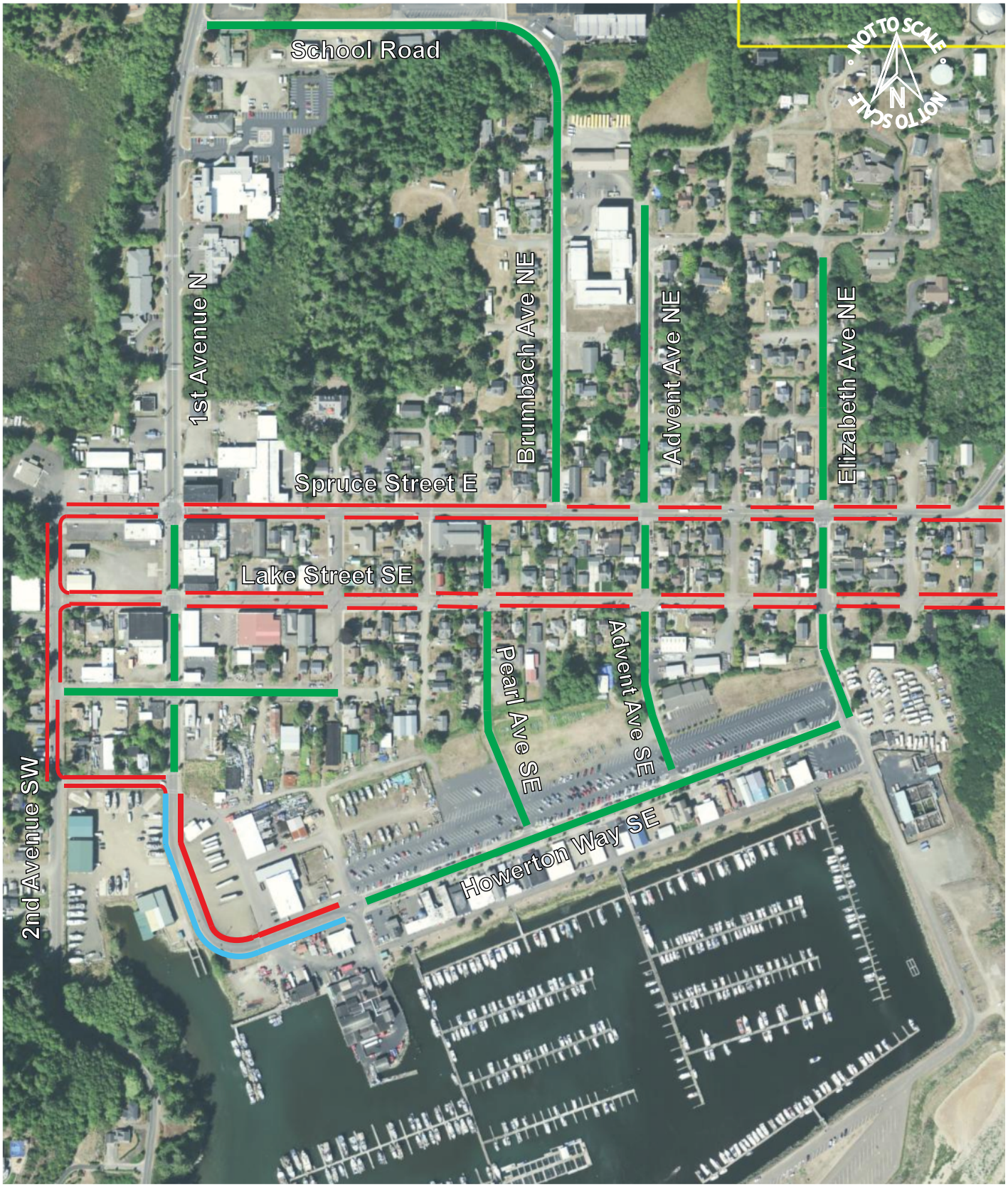
Note: [a] For signalized intersections, the average total delay is reported.
[b] For unsignalized intersections, the highest controlled approach delay is reported.

This capacity analysis reports the projected travel demand during a typical weekday during the Fall of the year when school is in session and fishing season is at its peak. Under these conditions, no capacity-related issues were observed to be present at the study intersection. It is acknowledged that these conditions are different during peak weekend periods during the summer, when tourism peaks for residential vacation rentals and Cape Disappointment State Park. The detailed analysis results have been included in Appendix D.

PEDESTRIAN AND BICYCLE FACILITY EVALUATION

The primary pedestrian and bicycle routes considered in this evaluation deal with serving such traffic between downtown Ilwaco and the Port. Elizabeth Avenue SE and 1st Avenue S are the primary roadways connecting the two areas of the city for motor vehicle traffic. Sidewalk infill has occurred at Elizabeth Avenue SE between Spruce Street E and Howerton Avenue since the last Comprehensive Plan update. Sidewalk infill for roadways connecting downtown to the Port is still needed along 1st Avenue S, Pearl Avenue SE, and Advent Avenue SE. Many of the existing pedestrian ramps need to be evaluated for meeting current ADA standards. Existing pedestrian infrastructure is detailed in Figure 2.

Bicycle infrastructure should be considered for ways to serve the community on Ilwaco. These considerations should include connecting gathering places, places of employment and places of interest. At a minimum, these should include schools, the Port, the hospital, parks and Downtown. Roads most supportive of bike lanes and/or sharrows include School Road, Lake Street SE, Brumbach Avenue NE, Advent Avenue, 1st Avenue S, Spruce Street, Howerton Avenue, and Elizabeth Avenue. The specific recommendations for bike lanes vs sharrows are provided in the TDM analysis later in the memorandum. Furthermore, consideration should be made for direction connections to the Discovery Trail from Downtown and the Port. Existing and proposed bicycle infrastructure is detailed in Figure 5.



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- Existing Bike Lane
- Proposed Bike Lanes
- Proposed Bike Sharrows

Figure 5: City of Ilwaco Bicycle Infrastructure

FUTURE TRANSPORTATION SYSTEM NEEDS

The Transportation Element of the Comprehensive Plan lists the following concerns that may impact the City of Ilwaco transportation system:

1) Encourage heavy commercial and industrial truck traffic on US 101 to use the Elizabeth Avenue SE – Howerton Avenue – 1st Avenue S couplet to access the Port of Ilwaco.
2) Promote the use of the Alternate US 101 to relieve traffic congestion in Ilwaco during peak traffic periods.
3) Reduce traffic congestion at Spruce Street E and 1st Avenue N by adding turn lanes.
4) Investigate safe bicycle routes that connect major interest points in the city to ensure rider safety.
5) Improve pedestrian circulation and safety throughout the city, with an emphasis on providing sidewalks between downtown and the Port of Ilwaco.
6) Work with Pacific Transit to increase service to Ilwaco from Long Beach and other destinations within the county.

Regarding each of the listed concerns, the following considerations were developed:

1) To encourage heavy vehicles to use the Elizabeth Avenue SE – Howerton Avenue – 1st Avenue S couplet to access the Port of Ilwaco, improve advance signing to provide direction into the Port area. In addition, Port businesses to promote the desired route for freight movements into and out of the Port area.
2) Improve the existing signing at the intersection of US 101 at Alternate US 101. Redirect Long Beach traffic along Alternate US 101. This would identify Ilwaco as the only destination along the US 101 main route. Change the designation of the main and alternate routes to emphasize the route that bypasses Ilwaco. Similarly, provide signing for southbound traffic north of the 40th Street / US 101 intersection to direct them to Alternate US 101. Signage that details this fact would encourage these vehicles to do so.
3) The capacity analysis showed little delay during the typical weekday PM peak period during fishing season. If turn lanes are to be added to the intersection of Spruce Street E at 1st Avenue N, justification must come from peak tourism season or from outside of the capacity and queueing analyses. As congestion increases, the first turn lanes to be investigated are southbound left-turn and westbound right-turn lanes.
4) Develop the City's bike network:
    a. A simple approach is to provide shared lane markings (sharrows) for those roadways were bikes are anticipated to travel the most. Sharrows should be considered along School Road, Advent Avenue NE and SE, Elizabeth Avenue NE and SE, Spruce Street E and W, Lake Street SE and SW, Pearl Avenue SE, Howerton Way, 1st Avenue S, and Main Street SW and SE.

b. Develop a plan that considers bike lanes on roadways with sufficient pavement width and right-of-way to accommodate those lanes. Consider pavement improvements and bike lanes along 2nd Avenue SW, Lake Street SW and SE, Eagle Street SW, Spruce Street W, and Spruce Street E (US 101). This will encourage bike traffic between Discover Trail, Downtown Ilwaco, the Port and other points of interest. A map of existing and potential bicycle facilities is presented in Figure 5.

5) Continue to develop the City's pedestrian network:

   a. Provide paving and sidewalk infill along both sides of 1st Avenue S, Advent Avenue SE, Quaker Avenue SE, and Pearl Avenue SE to connect downtown and the Port of Ilwaco.

   b. Develop a plan to bring existing sidewalks and pedestrian facilities up to current ADA.

   c. The lot of land bounded by 1st Avenue S and Jessie's Drive – Taxlot Number 73048003014 – is a gravel lot offering no infrastructure for pedestrians, bicycles, or other modes of transportation. While the intersection to the north provides a crosswalk for pedestrians to access sidewalks, creating sidewalks on the east side of 1st Avenue S and the north side of Howerton Avenue to Waterfront Way would provide better access for pedestrians and incentivize them to walk between Downtown and the Port.

6) Pacific Transit Services monitors citizen feedback on transit services. Continue to coordinate with Pacific Transit on ridership needs and system expansion opportunities when warranted by demand.

7) Require short-term vacation rentals such as AirBnB or VRBO, hotels, inns, RV parks and motels to provide options for alternative modes of transportation. This can include pamphlets detailing the bicycle and pedestrian options in and around the City, transit passes for local bus services, or bicycles to ride around the City.

CAPITAL IMPROVEMENT NEEDS AND BUDGET ESTIMATES

The Transportation Element of the most recent Ilwaco Comprehensive Plan lists roadway capital improvements to take place between 2015 and 2021. This table is reproduced as Table 6 with the end date extended to 2026. Additional projects have been added to the end of the table as projected future improvements. The table includes budget estimates and elements necessary to determine mitigation strategy.

Table 6: 2015-2020 Transportation Improvement Plan

Priority / Year	Street	Project Description	Class	Estimated Cost	Funding Sources
1 / 2016	Adelia & Spruce Streets	Reconstruction and paving from US 101 cut-off to Lake Street, including parking area	Local	$496,000	TIB, local
2/ 2016	Capt. Robert Gray Drive	Chip seal from Stringtown Road to Ortelius Drive	Local	$124,925	TIB, local
3/2018	Cook's Road NE	Rebuild hazardous intersection with US 101	Local	$523,000	TIB, local
4/2016	Discovery Trail Extension	Extend the Discovery Trail from Main Street to Cook's Hill	Pedestrian / Bicycle	$1,728,000	State Ped/ Bike, local
5/2016	Advent Avenue & Hemlock Street	Pave from Spruce to Quaker, (sidewalks from Spruce to Willow) and Hemlock from Advent to Brumbach Avenues	Local	$506,000	TIB, local
6/2016	Scarborough Lane	Chip seal and add storm drains	Local	$249,000	TIB, local
7/2017	Lake Street	Pave and add sidewalks from Adelia to Williams	Local	$600,000	TIB, local
8/2017	Pearl & Myrtle Avenues	Pave Pearl from Spruce to Howerton & chip seal Myrtle from end to Main	Local	$389,000	TIB, local
9/2017	Ortelius Drive	Chip seal and add storm drains from Stringtown to Capt. Robert Gray Dr.	Local	$344,000	TIB, local
10/2019	Vandalia Cul-de-sacs	Chip seal from Capt. Robert Gray Dr. to end of each cul-de-sac	Local	$126,000	TIB, local
11/2016	Sidewalk improvements	Repair various city sidewalks	Various	$20,000	TIB
12/2018	Reservoir Rd.	Chip seal from Wecoma to dead end	Local	$69,000	TIB, local
13/2017	Miscellaneous chip seal	Advent, Myrtle, Ash, Eagle, Main SE, & Pearl	Local	$26,064	Local
14/2019	Main Street SW	Repair sloughing street and connect to Discovery Trail	Local	$218,000	TIB, local
15/2018	Whealdon Street	Chip seal and dedicate gravel road on city property within city limits	Local	$321,000	TIB, local
16/2020	Quaker Street Extension	Develop road to Black Lake / old city shop	Local	?	TIB, local
-	Citywide	Bike sharrows on School Road, Advent Avenue, Elizabeth Avenue, Spruce Street, Lake Street, Pearl Avenue, Howerton Way, 1st Avenue S, and Main Street	Various	$22,059	State Ped/ Bike, TIB, local
-	Spruce Street	Bike Lanes, including pavement, bike symbols, and bike lane lines	Arterial	$98,400	State Ped/ Bike, TIB, local
-	Lake Street	Bike Lanes, including pavement, bike symbols, and bike lane lines	Local	$710,400	State Ped/ Bike, TIB, local
-	2nd Avenue	Bike Lanes, including pavement, bike symbols, and bike lane lines	Major Collector	$197,820	State Ped/ Bike, TIB, local
-	2nd Avenue to Harbor	Bike Lanes, including pavement, bike symbols, and bike lane lines	Various	$190,665	State Ped/ Bike, TIB, local
-	Citywide	Sidewalks on 2nd Avenue SW, Elizabeth Avenue, School Road, Pearl Avenue SE, Advent Avenue SE, Myrtle Street SE	Various	$3,050,025	State Ped/ Bike, TIB, local
-	Citywide	Upgrade major intersection pedestrian ramps to meet ADA standards.	Various	-	State Ped/ Bike, TIB, local

REGIONAL AND LOCAL AGENCY COMPREHENSIVE PLAN REVIEW

This review was conducted to determine if the goals of the Transportation Element of the City of Ilwaco's Comprehensive Plan align with those of the region and surrounding agencies.

The Cowlitz-Wahkiakum Council of Governments developed a Regional Transportation Plan (RTP) for the Southwest Washington Regional Transportation Planning Organization. This plan was developed to coincide with the vision and policy of the Washington and Oregon Transportation Plans. The plan includes the transportation system goals and policies for the counties surrounding the City of Ilwaco including: Grays Harbor, Lewis, Cowlitz, Wahkiakum and Pacific Counties. A review of the guiding principles, goals, and policies of the RTP yielded the following items:

Washington State Transportation System Plan Policy Goals

- **PRESERVATION**: To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services.
- **SAFETY**: To provide for and improve the safety and security of transportation customers and the transportation system.
- **MOBILITY**: To improve the predictable movement of goods and people throughout Washington state.
- **ENVIRONMENT**: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment.
- **STEWARDSHIP**: To continuously improve the quality, effectiveness, and efficiency of the transportation system.
- **ECONOMIC VITALITY**: To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy.

Oregon Transportation Plan Policy Goals

- **MOBILITY AND ACCESSIBILITY**: Provide a balanced, efficient, and integrated transportation system that ensures interconnected access to all areas of the state, the nation, and the world. Promote transportation choices that are reliable, accessible, and cost-effective.
- **MANAGEMENT OF THE SYSTEM**: Improve the efficiency of the transportation system by optimizing operations and management. Manage transportation assets to extend their life and reduce maintenance costs.
- **ECONOMIC VITALITY**: Expand and diversify Oregon's economy by transporting people, goods, services, and information in safe, energy efficient, and environmentally sound ways. Provide Oregon with a competitive advantage by promoting an integrated freight system.
- **SUSTAINABILITY**: Meet present needs without compromising the ability of future generations to meet their needs from the joint perspective of the environment, economy, and communities. Encourage conservation and communities that integrate land use and transportation choices.
- **SAFETY AND SECURITY**: Build, operate, and maintain the transportation system so that it is safe and secure. Take into account the needs of all users: operators, passengers, pedestrians, and property owners.
- **FUNDING THE TRANSPORTATION SYSTEM**: Create sources of revenue that will support a viable transportation system today and in the future. Expand ways to fund the system that are fair and fiscally responsible.

- **COORDINATION, COMMUNICATION, AND COOPERATION**: Foster coordination, communication, and cooperation between transportation users and providers so various means of transportation function as an integrated system. Work to help all parties align interests, remove barriers, and offer innovative, equitable solutions.

SW Washington Regional Transportation Planning Organization Policy Element

The Southwest Washington Regional Transportation Plan consists of the following policy elements:

- **Guiding Principles**
  - Preserve and improve the regional transportation system through partnerships in order to maximize investment.
  - Provide an integrated transportation system that encourages the use of all modes by offering accessible, safe, and efficient travel options.
  - Encourage the preservation and enhancement of public transportation programs and infrastructure throughout the Southwest Washington RTPO and explore opportunities for expanding service to increase access to jobs, services, and other key destinations.
  - Support the region's economic vitality through ensuring the transportation network addresses inter- and intra-regional accessibility and mobility needs for both people and goods.
- **Goals**
  - **Goal 1**: Promote and support a transportation system that strengthens the region's economic competitiveness.
  - **Goal 2**: Preserve and enhance the region's existing transportation infrastructure and facilities.
  - **Goal 3**: Develop an integrated non-motorized transportation system.
  - **Goal 4**: Maintain, modernize, and enhance a sustainable and comprehensive public transportation system.
  - **Goal 5**: Maintain and enhance a regional transportation system that is safe and accessible for multiple travel modes.

The following considerations were developed regarding the goals set forth in the RTP.

- **Goal 1**: Promote and support a transportation system that strengthens the region's economic competitiveness.
  - TDM measures are recommended to improve tourism, one of the main economic drivers in the region that utilize ground transportation. Improved access to the Port, Cape Disappointment and other points of community interest for all travel modes will encourage greater visitation to Ilwaco.
- **Goal 2**: Preserve and enhance the region's existing transportation infrastructure and facilities.
  - Capital improvements and traffic capacity have been analyzed. Improvements have been identified to enhance the existing transportation network for all travel modes and preserve the existing infrastructure.
- **Goal 3**: Develop an integrated non-motorized transportation system.
  - Existing non-motorized transportation modes have been identified and improvements to the transportation system are recommended with regards to bicycle, pedestrian, and transit facilities in and around the City of Ilwaco.

- **Goal 4**: Maintain, modernize, and enhance a sustainable and comprehensive public transportation system.
  - Continued coordination with Pacific Transit System and neighboring communities is encouraged to maintain and promote public transportation services in underserved areas and expand the system to support increases in ridership.
- **Goal 5**: Maintain and enhance a regional transportation system that is safe and accessible for multiple travel modes.
  - Bike facilities, a more complete sidewalk system, improved ADA-accessible pedestrian ramps and improvements to routing of freight along US 101 and Alternate Route 101 are recommended to maintain and enhance safe and accessible travel.

The goals of the Transportation Element of the updated Ilwaco Comprehensive Plan align with those set forth in the regional RTP.

RESULTS AND RECOMMENDATIONS

An evaluation of the City of Ilwaco's existing transportation system was conducted to support the update to the City's Transportation Element of the Comprehensive Plan. Study intersection were identified through coordination with City staff.

A crash analysis was conducted for the years 2014 to 2018 to identify any safety deficiencies. The crash analysis did not identify any reoccurring crash patterns or crash rates that would identify an ongoing safety issues at the study intersections.

Capacity and queueing analyses were conducted to determine existing and future year 2040 capacity operations at four study intersections. Based on these analyses, no capacity deficiencies were identified, and no mitigations are recommended at the study intersections.

A review of the existing pedestrian and bicycle infrastructure in the city identified areas of improvement for both modes of transportation. Additions and improvements to infrastructure for these modes were identified to encourage active transportation modes. The need to identify and upgrade pedestrian facilities have also been identified to bring existing infrastructure up to current ADA standards.

A review of regional and local agency plans to determine the compliance of the proposed update of the Transportation Element of the Ilwaco Comprehensive Plan was performed. The goals of the planned update were found to align with those of the region.

Appendix

Appendix A: Crash Data

OFFICER REPORTED CRASHES THAT OCCURRED AT THE FOLLOWING INTERSECTIONS IN THE CITY OF ILWACO

SR 100 (aka 2nd Ave, MP 4.66 - 4.68) @ HEAD RD / SPRUCE ST - *No Reported Crashes*

SR 101 (aka Spruce St, MP 11.18 - 11.22) @ ELIZABETH AVE

SR 101 (aka Spruce St, MP 11.55 - 11.59) @ 1st AVE

SR 101 (aka 1st Ave, MP 11.81 - 11.85) @ SCHOOL RD

01/01/2014 - 12/31/2018

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	MILEPOST	A / B	SR ONLY HISTORY / SUSPENSE IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION
State Route	Pacific	Ilwaco	101	11.19		No	3625548	06/05/2017	09:18	No Apparent Injury	0	0	3	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight
State Route	Pacific	Ilwaco	101	11.57		No	3612124	03/17/2016	17:34	No Apparent Injury	0	0	2	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight
State Route	Pacific	Ilwaco	101	11.59		No	3625573	07/12/2017	13:00	No Apparent Injury	0	0	2	0	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Clear or Partly Cloudy	Dry	Daylight
State Route	Pacific	Ilwaco	101	11.83		No	3757943	12/07/2018	11:46	Possible Injury	1	0	1	0	1		Truck (Flatbad,Van,etc)	At Intersection and Related	Overcast	Dry	Daylight

FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
One parked--one moving	Going Straight Ahead	Legally Parked, Unoccupied	West	East	Vehicle Backing	Vehicle Stopped	Exceeding Reas. Safe Speed	Inattention			Right Shoulder Increasing Milepost	747226.82	375753.1
From opposite direction - one left turn - one	Making Left Turn	Going Straight Ahead	East	North	West	East	Improper Turn	Inattention	None		Lane 1 Increasing Milepost	745281.02	375844.09
Entering at angle	Going Straight Ahead	Stopped for Traffic	North	South	West	South	Inattention		Inattention		Lane 1 Decreasing Milepost	745284.67	375936.66
Vehicle Strikes Pedalcyclist		Making Right Turn			East	North			Other	On Wrong Side Of Road	Intersecting Road Increasing Milepost	745407.11	377260.29

Appendix B: Traffic Count Data

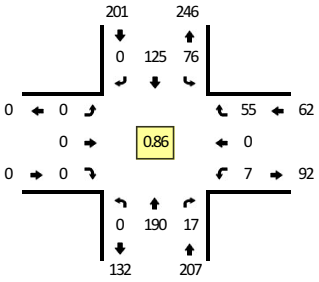
Type of peak hour being reported: Intersection Peak

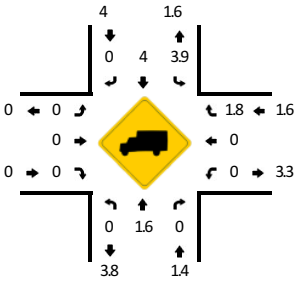
Method for determining peak hour: Total Entering Volume

LOCATION: First Ave N -- School Rd
CITY/STATE: Pacific, WA

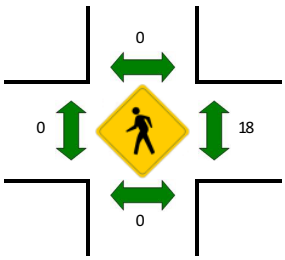
QC JOB #: 15085001
DATE: Wed, Oct 16 2019

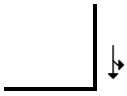
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:55 PM -- 5:10 PM

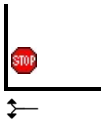


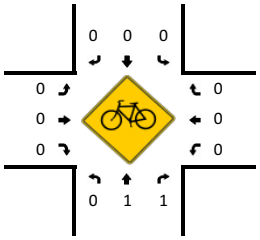


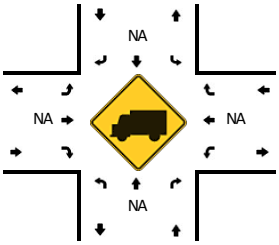
Quality Counts
DATA THAT DRIVES COMMUNITIES

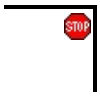


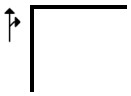


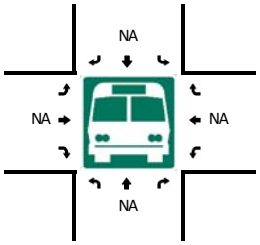












5-Min Count Period Beginning At	First Ave N (Northbound)				First Ave N (Southbound)				School Rd (Eastbound)				School Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	12	0	0	2	7	0	0	0	0	0	0	0	0	5	0	26	
4:05 PM	0	16	2	0	6	9	0	0	0	0	0	0	0	0	3	0	36	
4:10 PM	0	11	1	0	5	12	0	0	0	0	0	0	1	0	0	0	30	
4:15 PM	0	20	0	0	3	7	0	0	0	0	0	0	0	0	1	0	31	
4:20 PM	0	17	1	0	6	12	0	0	0	0	0	0	1	0	4	0	41	
4:25 PM	0	15	0	0	5	9	0	0	0	0	0	0	2	0	3	0	34	
4:30 PM	0	25	1	0	1	12	0	0	0	0	0	0	1	0	4	0	44	
4:35 PM	0	25	3	0	4	6	0	0	0	0	0	0	0	0	2	0	40	
4:40 PM	0	10	0	0	4	8	0	0	0	0	0	0	0	0	4	0	26	
4:45 PM	0	8	1	0	3	17	0	0	0	0	0	0	0	0	3	0	32	
4:50 PM	0	10	1	0	11	7	0	0	0	0	0	0	0	0	4	0	33	
4:55 PM	0	14	3	0	7	17	0	0	0	0	0	0	0	0	9	0	50	423
5:00 PM	0	12	2	0	9	9	0	1	0	0	0	0	1	0	5	0	39	436
5:05 PM	0	22	0	0	8	8	0	0	0	0	0	0	0	0	10	0	48	448
5:10 PM	0	18	4	0	12	10	0	0	0	0	0	0	1	0	4	0	49	467
5:15 PM	0	14	1	0	5	10	0	0	0	0	0	0	1	0	3	0	34	470
5:20 PM	0	13	0	0	6	10	0	0	0	0	0	0	0	0	3	0	32	461
5:25 PM	0	16	0	0	4	10	0	0	0	0	0	0	1	0	6	0	37	464
5:30 PM	0	14	1	0	6	3	0	0	0	0	0	0	0	0	4	0	28	448
5:35 PM	0	10	0	0	6	6	0	0	0	0	0	0	0	0	3	0	25	433
5:40 PM	0	9	0	0	2	8	0	0	0	0	0	0	0	0	2	0	21	428
5:45 PM	0	8	0	0	4	7	0	0	0	0	0	0	0	0	3	0	22	418
5:50 PM	0	8	1	0	10	7	0	0	0	0	0	0	0	0	4	0	30	415
5:55 PM	0	9	0	0	3	5	0	0	0	0	0	0	2	0	8	0	27	392

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	192	20	0	96	136	0	4	0	0	0	0	4	0	96	0	548
Heavy Trucks	0	0	0		0	4	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/21/2019 3:38 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

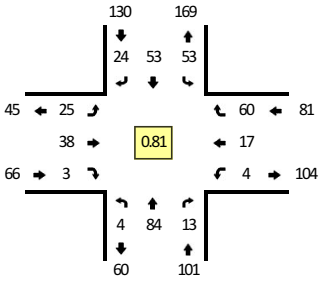
Type of peak hour being reported: Intersection Peak

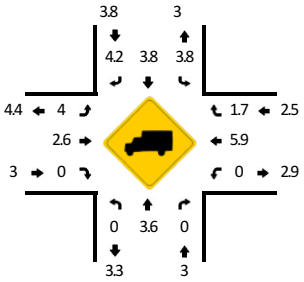
Method for determining peak hour: Total Entering Volume

LOCATION: First Ave -- Spruce St E
CITY/STATE: Pacific, WA

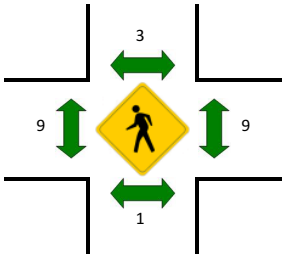
QC JOB #: 15085002
DATE: Wed, Oct 16 2019

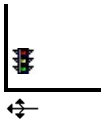
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

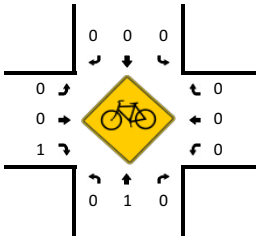


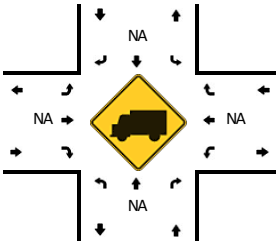


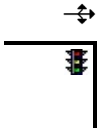
Quality Counts
DATA THAT DRIVES COMMUNITIES

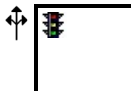


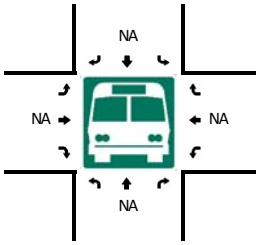












5-Min Count Period Beginning At	First Ave (Northbound)				First Ave (Southbound)				Spruce St E (Eastbound)				Spruce St E (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	5	1	0	5	2	2	0	2	2	1	0	0	0	4	0	25	
4:05 PM	1	8	0	0	5	4	3	0	0	8	2	0	0	1	3	0	35	
4:10 PM	0	6	2	0	1	5	2	0	3	1	1	0	1	1	3	0	26	
4:15 PM	0	8	1	0	4	4	1	0	4	1	0	0	1	0	6	0	30	
4:20 PM	0	10	1	0	6	2	1	0	0	2	1	0	1	3	6	0	33	
4:25 PM	1	8	1	0	3	5	2	0	1	6	0	0	0	1	5	0	33	
4:30 PM	0	16	0	0	6	5	2	0	2	6	1	0	0	1	7	0	46	
4:35 PM	0	5	2	0	4	4	1	0	8	1	0	0	0	2	10	0	37	
4:40 PM	0	6	0	0	4	3	3	0	1	1	0	0	0	0	1	0	19	
4:45 PM	0	5	0	0	10	5	2	0	0	1	0	0	1	1	2	0	27	
4:50 PM	1	4	1	0	1	4	2	0	4	1	0	0	0	3	4	0	25	
4:55 PM	1	6	2	0	4	9	2	0	2	4	0	0	0	0	5	0	35	371
5:00 PM	0	3	2	0	2	5	4	0	2	1	0	0	1	1	4	0	25	371
5:05 PM	0	11	2	0	4	2	1	0	1	6	1	0	0	2	6	0	36	372
5:10 PM	1	5	1	0	5	3	2	0	3	5	0	0	0	2	3	0	30	376
5:15 PM	0	5	1	0	4	6	2	0	1	4	0	0	1	1	7	0	32	378
5:20 PM	0	4	1	0	5	2	2	0	3	2	0	0	1	0	8	0	28	373
5:25 PM	0	5	0	0	3	7	2	0	1	0	0	0	0	1	6	0	25	365
5:30 PM	2	4	0	0	2	2	1	0	4	2	1	0	0	0	3	0	21	340
5:35 PM	0	4	0	0	2	2	1	0	2	1	1	0	0	1	4	0	18	321
5:40 PM	0	3	1	0	3	4	2	0	1	0	0	0	0	2	7	0	23	325
5:45 PM	0	1	0	0	5	2	0	0	0	1	0	0	0	1	4	0	14	312
5:50 PM	0	4	2	0	4	2	1	0	0	0	0	0	0	2	2	0	17	304
5:55 PM	0	2	1	0	2	5	1	0	6	1	0	0	0	0	2	0	20	289

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	116	12	0	52	56	20	0	44	52	4	0	0	16	88	0	464
Heavy Trucks	0	4	0		4	0	0		0	4	0		0	0	4		16
Pedestrians		0				4				32				16			52
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/21/2019 3:38 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

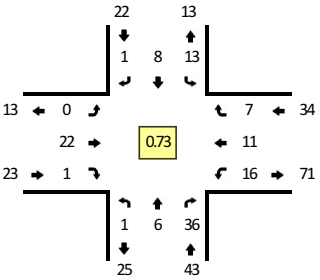
Type of peak hour being reported: Intersection Peak

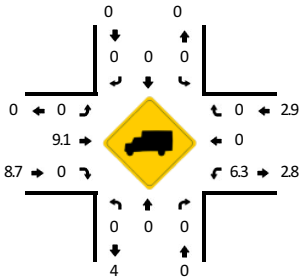
Method for determining peak hour: Total Entering Volume

LOCATION: 2nd Ave SW -- N Head Rd
CITY/STATE: Pacific, WA

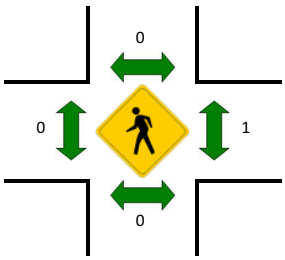
QC JOB #: 15085003
DATE: Wed, Oct 16 2019

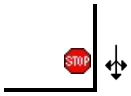
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

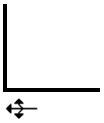


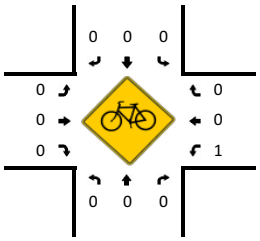


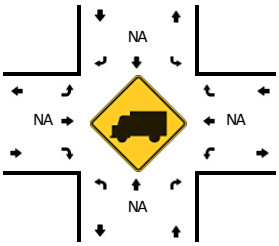
Quality Counts
DATA THAT DRIVES COMMUNITIES

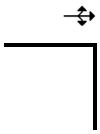


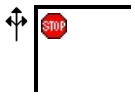


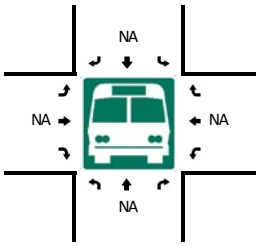












5-Min Count Period Beginning At	2nd Ave SW (Northbound)				2nd Ave SW (Southbound)				N Head Rd (Eastbound)				N Head Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	1	0	2	0	0	0	0	2	0	0	0	0	2	0	8	
4:05 PM	0	0	5	0	3	0	0	0	0	0	0	0	1	2	0	0	11	
4:10 PM	0	0	3	0	0	1	0	0	0	1	0	0	1	1	0	1	8	
4:15 PM	0	0	4	0	1	0	0	0	0	0	0	0	0	1	0	0	6	
4:20 PM	0	0	3	0	0	0	0	0	0	0	0	0	2	2	0	0	7	
4:25 PM	0	4	7	0	0	0	0	0	0	1	0	0	1	0	2	0	15	
4:30 PM	0	1	3	0	1	1	0	0	0	5	0	0	0	2	0	0	13	
4:35 PM	0	0	3	0	3	1	1	0	0	3	0	0	1	1	1	0	14	
4:40 PM	0	0	0	0	0	1	0	0	0	1	0	0	3	1	0	0	6	
4:45 PM	0	0	0	0	1	1	0	0	0	1	1	0	1	0	0	0	5	
4:50 PM	1	0	3	0	0	1	0	0	0	1	0	0	2	2	2	0	12	
4:55 PM	0	0	3	0	1	1	0	0	0	2	0	0	1	1	0	0	9	114
5:00 PM	0	0	3	0	0	0	0	0	0	2	0	0	0	2	0	0	7	113
5:05 PM	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	6	108
5:10 PM	0	1	5	0	2	1	0	0	0	2	0	0	3	1	2	0	17	117
5:15 PM	0	0	3	0	0	1	0	0	0	3	0	0	2	1	0	0	10	121
5:20 PM	0	0	3	0	2	0	0	0	0	1	0	0	2	0	0	0	8	122
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3	110
5:30 PM	0	0	2	0	2	0	0	0	0	2	0	0	1	0	0	0	7	104
5:35 PM	0	0	2	0	0	0	0	0	0	2	0	0	0	1	0	0	5	95
5:40 PM	0	0	0	0	0	0	1	0	0	0	0	0	2	3	0	0	6	95
5:45 PM	2	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	6	96
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	85
5:55 PM	1	1	6	0	0	0	0	0	0	0	0	0	0	1	0	0	9	85

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	20	52	0	16	8	4	0	0	36	0	0	8	12	12	0	168
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/21/2019 3:38 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

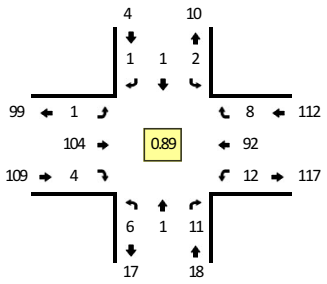
Type of peak hour being reported: Intersection Peak

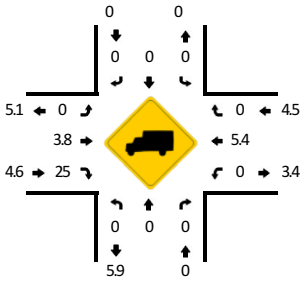
Method for determining peak hour: Total Entering Volume

LOCATION: Eliizabeth Ave SE -- Spruce St E
CITY/STATE: Pacific, WA

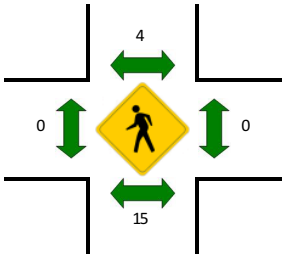
QC JOB #: 15085004
DATE: Wed, Oct 16 2019

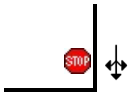
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:20 PM -- 4:35 PM

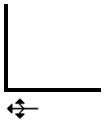


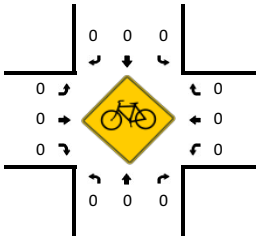


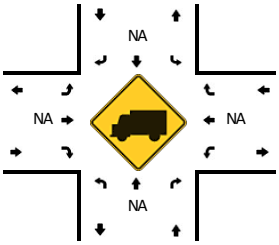
Quality Counts
DATA THAT DRIVES COMMUNITIES

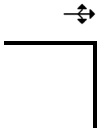


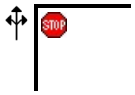


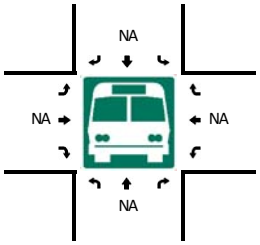












5-Min Count Period Beginning At	Eliizabeth Ave SE (Northbound)				Eliizabeth Ave SE (Southbound)				Spruce St E (Eastbound)				Spruce St E (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	2	0	1	0	0	0	0	12	0	0	0	7	0	0	23	
4:05 PM	0	0	2	0	0	0	0	0	0	5	0	0	2	5	0	0	14	
4:10 PM	0	0	2	0	0	0	0	0	0	9	0	0	0	9	3	0	23	
4:15 PM	0	0	2	0	1	0	0	0	0	6	0	0	1	9	2	0	21	
4:20 PM	0	0	2	0	0	0	0	0	0	9	0	0	0	11	0	0	22	
4:25 PM	0	0	0	0	0	0	1	0	0	10	1	0	0	5	0	0	17	
4:30 PM	2	0	0	0	0	0	0	0	1	13	1	0	1	10	1	0	29	
4:35 PM	0	0	3	0	0	0	0	0	0	8	0	0	1	9	0	0	21	
4:40 PM	0	0	0	0	0	0	0	0	0	4	0	0	2	1	0	0	7	
4:45 PM	0	1	1	0	0	0	0	0	0	13	2	0	0	9	0	0	26	
4:50 PM	0	0	0	0	0	0	0	0	0	2	0	0	4	12	0	0	18	
4:55 PM	1	0	0	0	0	0	0	0	0	11	0	0	1	5	1	0	19	240
5:00 PM	1	0	0	0	1	0	0	0	0	9	0	0	2	3	0	0	16	233
5:05 PM	2	0	1	0	0	1	0	0	0	10	0	0	0	9	1	0	24	243
5:10 PM	0	1	0	0	0	0	0	0	0	13	1	0	2	6	0	0	23	243
5:15 PM	1	0	0	0	0	0	0	0	0	6	0	0	2	7	0	0	16	238
5:20 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	1	0	16	232
5:25 PM	0	2	0	0	0	0	0	0	1	6	0	0	0	8	0	0	17	232
5:30 PM	0	0	2	0	0	1	0	0	0	6	0	0	1	7	0	0	17	220
5:35 PM	0	0	0	0	0	0	1	0	0	3	0	0	2	3	1	0	10	209
5:40 PM	1	0	2	0	0	0	1	0	0	4	0	0	1	9	1	0	19	221
5:45 PM	0	0	1	0	0	0	0	0	1	5	1	0	2	3	0	0	13	208
5:50 PM	0	0	0	0	0	1	0	0	0	11	0	0	3	2	0	0	17	207
5:55 PM	0	1	0	0	0	0	0	0	0	5	0	0	0	1	0	0	7	195

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	0	8	0	0	0	4	0	4	128	8	0	4	104	4	0	272
Heavy Trucks	0	0	0		0	0	0		0	4	4		0	12	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 10/21/2019 3:38 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix C: Existing HCM Reports

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	55	190	17	76	125
Future Vol, veh/h	7	55	190	17	76	125
Conflicting Peds, #/hr	18	18	0	18	18	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	2	0	4	4
Mvmt Flow	8	64	221	20	88	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	588	267	0	0	259	0
Stage 1	249	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.4	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	475	772	-	-	1294	-
Stage 1	797	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	425	746	-	-	1272	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	687	1272	-
HCM Lane V/C Ratio	-	-	0.105	0.069	-
HCM Control Delay (s)	-	-	10.9	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.2	-

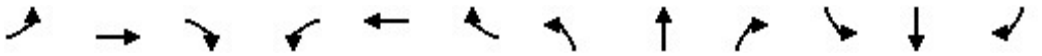
Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	22	1	16	11	7	1	6	36	13	8	1
Future Vol, veh/h	0	22	1	16	11	7	1	6	36	13	8	1
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	0	9	0	6	0	0	0	0	0	0	0	0
Mvmt Flow	0	30	1	22	15	10	1	8	49	18	11	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	26	0	0	32	0	0	102	102	33	125	97	21
Stage 1	-	-	-	-	-	-	32	32	-	65	65	-
Stage 2	-	-	-	-	-	-	70	70	-	60	32	-
Critical Hdwy	4.1	-	-	4.16	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.254	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1601	-	-	1555	-	-	884	792	1046	854	797	1062
Stage 1	-	-	-	-	-	-	990	872	-	951	845	-
Stage 2	-	-	-	-	-	-	945	841	-	957	872	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1599	-	-	1554	-	-	864	779	1044	797	784	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-	864	779	-	797	784	-
Stage 1	-	-	-	-	-	-	989	871	-	950	832	-
Stage 2	-	-	-	-	-	-	918	828	-	902	871	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.5	8.9	9.7
HCM LOS			A	A

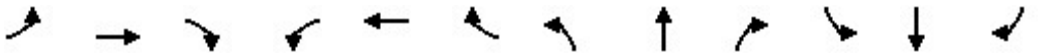
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	992	1599	-	-	1554	-	-	801
HCM Lane V/C Ratio	0.059	-	-	-	0.014	-	-	0.038
HCM Control Delay (s)	8.9	0	-	-	7.3	0	-	9.7
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	38	3	4	17	60	13	84	4	53	53	24
Future Volume (veh/h)	25	38	3	4	17	60	13	84	4	53	53	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.99	0.99		0.96	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	31	47	4	5	21	74	16	104	5	65	65	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	6	6	6	4	4	4	4	4	4
Cap, veh/h	374	187	14	223	63	209	265	498	22	419	269	93
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	526	1044	81	55	354	1164	114	1587	71	427	857	296
Grp Volume(v), veh/h	82	0	0	100	0	0	125	0	0	160	0	0
Grp Sat Flow(s),veh/h/ln	1651	0	0	1573	0	0	1773	0	0	1580	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	1.0	0.0	0.0	0.9	0.0	0.0	1.2	0.0	0.0
Prop In Lane	0.38		0.05	0.05		0.74	0.13		0.04	0.41		0.19
Lane Grp Cap(c), veh/h	576	0	0	495	0	0	785	0	0	781	0	0
V/C Ratio(X)	0.14	0.00	0.00	0.20	0.00	0.00	0.16	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	1887	0	0	1800	0	0	1992	0	0	1828	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.3	0.0	0.0	6.4	0.0	0.0	4.5	0.0	0.0	4.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	0.0	0.0	6.6	0.0	0.0	4.6	0.0	0.0	4.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		82			100			125			160	
Approach Delay, s/veh		6.4			6.6			4.6			4.7	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.1		7.7		10.1		7.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		2.9		2.7		3.2		3.0				
Green Ext Time (p_c), s		0.5		0.3		0.7		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			5.4									
HCM 6th LOS			A									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	38	3	4	17	60	13	84	4	53	53	24
Future Volume (veh/h)	25	38	3	4	17	60	13	84	4	53	53	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.97	0.99		0.99	0.99		0.96	0.99		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1856	1856	1856	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	31	47	4	5	21	74	16	104	5	65	65	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	6	6	6	4	4	4	4	4	4
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	374	187	14	223	63	209	265	498	22	419	269	93
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.31	0.31	0.31	0.31	0.31	0.31
Unsig. Movement Delay												
Ln Grp Delay, s/veh	6.4	0.0	0.0	6.6	0.0	0.0	4.6	0.0	0.0	4.7	0.0	0.0
Ln Grp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		82			100			125			160	
Approach Delay, s/veh		6.4			6.6			4.6			4.7	
Approach LOS		A			A			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		8.0		8.0		8.0
Phs Duration (G+Y+Rc), s		10.1		7.7		10.1		7.7
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.3		5.4		5.4		5.5
Max Q Clear (g_c+I1), s		2.9		2.7		3.2		3.0
Green Ext Time (g_e), s		0.5		0.3		0.7		0.4
Prob of Phs Call (p_c)		1.00		0.60		1.00		0.60
Prob of Max Out (p_x)		0.00		0.00		0.01		0.00

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		114		526		427		55

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1587		1044		857		354

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		71		81		296		1164

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R		L+T+R		L+T+R		L+T+R

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	125	0	82	0	160	0	100
Grp Sat Flow (s), veh/h/ln	0	1773	0	1651	0	1580	0	1573
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.9	0.0	0.7	0.0	1.2	0.0	1.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1307	0	1313	0	1290	0	1366
Shared LT Sat Flow (s_sh), veh/h/ln	0	1826	0	1817	0	1795	0	1806
Perm LT Eff Green (g_p), s	0.0	5.6	0.0	3.2	0.0	5.6	0.0	3.2
Perm LT Serve Time (g_u), s	0.0	4.4	0.0	2.2	0.0	4.7	0.0	2.5
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	2.7	0.0	0.4	0.0	1.7	0.0	0.9
Serve Time pre Blk (g_fs), s	0.0	0.9	0.0	0.4	0.0	1.2	0.0	0.9
Prop LT Inside Lane (P_L)	0.00	0.13	0.00	0.38	0.00	0.41	0.00	0.05
Lane Grp Cap (c), veh/h	0	785	0	576	0	781	0	495
V/C Ratio (X)	0.00	0.16	0.00	0.14	0.00	0.20	0.00	0.20
Avail Cap (c_a), veh/h	0	1992	0	1887	0	1828	0	1800
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	4.5	0.0	6.3	0.0	4.6	0.0	6.4
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.6	0.0	6.4	0.0	4.7	0.0	6.6
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.04	0.00	0.05	0.00	0.19	0.00	0.74
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	5.4
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	104	4	12	92	8	6	1	11	2	1	1
Future Vol, veh/h	1	104	4	12	92	8	6	1	11	2	1	1
Conflicting Peds, #/hr	4	0	15	15	0	4	15	0	15	4	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	4	25	0	5	0	0	0	0	0	0	0
Mvmt Flow	1	117	4	13	103	9	7	1	12	2	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	116	0	0	136	0	0	286	278	149	281	276	127
Stage 1	-	-	-	-	-	-	136	136	-	138	138	-
Stage 2	-	-	-	-	-	-	150	142	-	143	138	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1485	-	-	1461	-	-	670	633	903	675	635	929
Stage 1	-	-	-	-	-	-	872	788	-	870	786	-
Stage 2	-	-	-	-	-	-	857	783	-	865	786	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1479	-	-	1440	-	-	644	615	877	647	617	912
Mov Cap-2 Maneuver	-	-	-	-	-	-	644	615	-	647	617	-
Stage 1	-	-	-	-	-	-	859	776	-	866	775	-
Stage 2	-	-	-	-	-	-	834	772	-	839	774	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	9.8	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	766	1479	-	-	1440	-	-	689
HCM Lane V/C Ratio	0.026	0.001	-	-	0.009	-	-	0.007
HCM Control Delay (s)	9.8	7.4	0	-	7.5	0	-	10.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Appendix D: Future HCM Reports and Queueing Analysis

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	68	234	21	94	154
Future Vol, veh/h	9	68	234	21	94	154
Conflicting Peds, #/hr	18	18	0	18	18	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	2	0	4	4
Mvmt Flow	10	79	272	24	109	179

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	717	320	0	0	314	0
Stage 1	302	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.4	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	399	721	-	-	1235	-
Stage 1	755	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	347	696	-	-	1214	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	594	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	3.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	623	1214	-
HCM Lane V/C Ratio	-	-	0.144	0.09	-
HCM Control Delay (s)	-	-	11.7	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.3	-

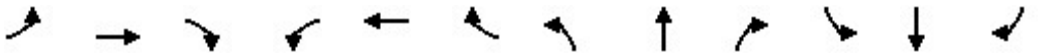
Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	27	1	20	14	9	1	7	44	16	10	1
Future Vol, veh/h	0	27	1	20	14	9	1	7	44	16	10	1
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	0	9	0	6	0	0	0	0	0	0	0	0
Mvmt Flow	0	37	1	27	19	12	1	10	60	22	14	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	39	0	0	126	125	40	154	119	26
Stage 1	-	-	-	-	-	-	39	39	-	80	80	-
Stage 2	-	-	-	-	-	-	87	86	-	74	39	-
Critical Hdwy	4.1	-	-	4.16	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.254	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1593	-	-	1545	-	-	852	769	1037	817	775	1056
Stage 1	-	-	-	-	-	-	981	866	-	934	832	-
Stage 2	-	-	-	-	-	-	926	827	-	940	866	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1591	-	-	1544	-	-	827	754	1035	750	760	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	827	754	-	750	760	-
Stage 1	-	-	-	-	-	-	980	865	-	933	816	-
Stage 2	-	-	-	-	-	-	893	811	-	875	865	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.4	9	10
HCM LOS			A	B

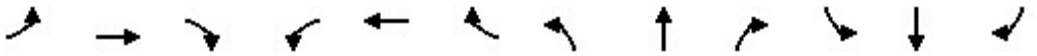
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	981	1591	-	-	1544	-	-	762
HCM Lane V/C Ratio	0.073	-	-	-	0.018	-	-	0.049
HCM Control Delay (s)	9	0	-	-	7.4	0	-	10
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	31	47	4	5	21	74	5	103	16	65	65	30
Future Volume (veh/h)	31	47	4	5	21	74	5	103	16	65	65	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.99	0.99		0.96	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	38	58	5	6	26	91	6	127	20	80	80	37
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	6	6	6	4	4	4	4	4	4
Cap, veh/h	370	213	16	217	72	231	215	464	71	415	250	89
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	494	1075	82	49	360	1164	31	1511	232	444	815	291
Grp Volume(v), veh/h	101	0	0	123	0	0	153	0	0	197	0	0
Grp Sat Flow(s),veh/h/ln	1651	0	0	1574	0	0	1774	0	0	1550	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	1.2	0.0	0.0	1.2	0.0	0.0	1.6	0.0	0.0
Prop In Lane	0.38		0.05	0.05		0.74	0.04		0.13	0.41		0.19
Lane Grp Cap(c), veh/h	600	0	0	520	0	0	750	0	0	754	0	0
V/C Ratio(X)	0.17	0.00	0.00	0.24	0.00	0.00	0.20	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	1833	0	0	1756	0	0	1948	0	0	1758	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	6.3	0.0	0.0	4.8	0.0	0.0	4.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.3	0.0	0.0	6.6	0.0	0.0	4.9	0.0	0.0	5.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		101			123			153			197	
Approach Delay, s/veh		6.3			6.6			4.9			5.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.1		8.1		10.1		8.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		3.2		2.9		3.6		3.2				
Green Ext Time (p_c), s		0.6		0.4		0.9		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			5.6									
HCM 6th LOS			A									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	47	4	5	21	74	5	103	16	65	65	30
Future Volume (veh/h)	31	47	4	5	21	74	5	103	16	65	65	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.97	0.99		0.99	0.99		0.96	0.99		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1856	1856	1856	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	38	58	5	6	26	91	6	127	20	80	80	37
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	6	6	6	4	4	4	4	4	4
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	370	213	16	217	72	231	215	464	71	415	250	89
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.31	0.31	0.31	0.31	0.31	0.31
Unsig. Movement Delay												
Ln Grp Delay, s/veh	6.3	0.0	0.0	6.6	0.0	0.0	4.9	0.0	0.0	5.1	0.0	0.0
Ln Grp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		101			123			153			197	
Approach Delay, s/veh		6.3			6.6			4.9			5.1	
Approach LOS		A			A			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		8.0		8.0		8.0
Phs Duration (G+Y+Rc), s		10.1		8.1		10.1		8.1
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.3		5.4		5.5		5.5
Max Q Clear (g_c+I1), s		3.2		2.9		3.6		3.2
Green Ext Time (g_e), s		0.6		0.4		0.9		0.5
Prob of Phs Call (p_c)		1.00		0.68		1.00		0.68
Prob of Max Out (p_x)		0.00		0.00		0.02		0.00

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		31		494		444		49

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1511		1075		815		360

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		232		82		291		1164

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R		L+T+R		L+T+R		L+T+R

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	153	0	101	0	197	0	123
Grp Sat Flow (s), veh/h/ln	0	1774	0	1651	0	1550	0	1574
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	1.2	0.0	0.9	0.0	1.6	0.0	1.2
Perm LT Sat Flow (s_l), veh/h/ln	0	1281	0	1288	0	1247	0	1352
Shared LT Sat Flow (s_sh), veh/h/ln	0	1836	0	1817	0	1796	0	1806
Perm LT Eff Green (g_p), s	0.0	5.6	0.0	3.6	0.0	5.6	0.0	3.6
Perm LT Serve Time (g_u), s	0.0	4.0	0.0	2.4	0.0	4.4	0.0	2.8
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Time to First Blk (g_f), s	0.0	3.1	0.0	0.7	0.0	1.4	0.0	1.3
Serve Time pre Blk (g_fs), s	0.0	1.2	0.0	0.7	0.0	1.4	0.0	1.2
Prop LT Inside Lane (P_L)	0.00	0.04	0.00	0.38	0.00	0.41	0.00	0.05
Lane Grp Cap (c), veh/h	0	750	0	600	0	754	0	520
V/C Ratio (X)	0.00	0.20	0.00	0.17	0.00	0.26	0.00	0.24
Avail Cap (c_a), veh/h	0	1948	0	1833	0	1758	0	1756
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	4.8	0.0	6.2	0.0	4.9	0.0	6.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.9	0.0	6.3	0.0	5.1	0.0	6.6
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.2
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.13	0.00	0.05	0.00	0.19	0.00	0.74
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	128	5	15	113	10	7	1	14	2	1	1
Future Vol, veh/h	1	128	5	15	113	10	7	1	14	2	1	1
Conflicting Peds, #/hr	4	0	15	15	0	4	15	0	15	4	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	4	25	0	5	0	0	0	0	0	0	0
Mvmt Flow	1	144	6	17	127	11	8	1	16	2	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	142	0	0	165	0	0	347	340	177	344	338	152
Stage 1	-	-	-	-	-	-	164	164	-	171	171	-
Stage 2	-	-	-	-	-	-	183	176	-	173	167	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1453	-	-	1426	-	-	611	585	871	614	586	900
Stage 1	-	-	-	-	-	-	843	766	-	836	761	-
Stage 2	-	-	-	-	-	-	823	757	-	834	764	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1447	-	-	1406	-	-	586	566	846	585	567	884
Mov Cap-2 Maneuver	-	-	-	-	-	-	586	566	-	585	567	-
Stage 1	-	-	-	-	-	-	830	755	-	832	748	-
Stage 2	-	-	-	-	-	-	798	744	-	805	753	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	10.1	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	727	1447	-	-	1406	-	-	634
HCM Lane V/C Ratio	0.034	0.001	-	-	0.012	-	-	0.007
HCM Control Delay (s)	10.1	7.5	0	-	7.6	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection: 1: 1st Avenue N & School Road

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	68	36	87
Average Queue (ft)	32	4	26
95th Queue (ft)	55	21	65
Link Distance (ft)	531	199	284
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: 2nd Avenue S/Driveway & N Head Rd/Spruce Street W

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	2	26	40	44
Average Queue (ft)	0	1	26	19
95th Queue (ft)	2	13	46	45
Link Distance (ft)	519	283	737	141
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: 1st Avenue S/1st Avenue N & Spruce Street W/Spruce Street E

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	70	73	66	88
Average Queue (ft)	33	33	25	38
95th Queue (ft)	58	57	59	76
Link Distance (ft)	283	482	675	502
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Elizabeth Ave SE/Elizabeth Ave NE & Spruce Street E

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	14	35	35	33
Average Queue (ft)	0	3	16	4
95th Queue (ft)	5	19	41	21
Link Distance (ft)	232	231	235	240
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0