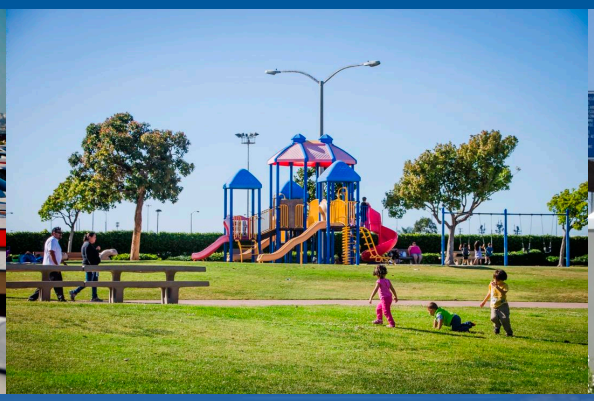
Final Environmental Impact Report

National City Bayfront Projects & Plan Amendments

UPD# EIR-2018-232; SCH# 2018121054







VOLUME 5 of 6



September 2022

PORT of SAN DIEGO
Environment

DRAFT ENVIRONMENTAL IMPACT REPORT
for the
National City Bayfront Projects & Plan Amendments

UPD # EIR-2018-232
State Clearinghouse (SCH) #2018121054

Volume 5~~IV~~ of 6~~V~~

Appendix K

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September 202~~1~~

Appendix K

Transportation Impact Analysis (TIA)

Transportation Impact Analysis

National City Bayfront Projects

Draft Report

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EXECUTIVE SUMMARY

The purpose of this Transportation Impact Analysis (TIA) is to identify and document potential transportation impacts related to the implementation of the National City Bayfront Projects (Proposed Project), as well as to recommend mitigation measures, as necessary, for any identified transportation related impacts associated with the Proposed Project.

ES.1 Study Purpose and Project Description

The San Diego Unified Port District (District), the City of National City (City), GB Capital Holdings, LLC (GB Capital), and Pasha Automotive Services (Pasha), as co-applicants and project proponents, are each proposing various components which constitute the National City Bayfront Projects. Each component of the Proposed Project is outlined below:

DEVELOPMENT PROJECTS

- *Bayshore Bikeway Component* - Construction and operation of Segment 5 of the Bayshore Bikeway. Segment 5 of the Bayshore Bikeway would provide a bicycle facility along McKinley Avenue, the southern border of the City Program parcels, Marina Way, and the former railroad right-of-way. The bikeway would covert McKinley Way to a one-way southbound roadway to accommodate the proposed bicycle facility, and also modify the East Harbor Drive/Civic Center Drive intersection to remove the southbound free right-turn movement.
- *City Program - Development* - Construction and operation of hotel, restaurant, retail, and/or a combination of tourist/visitor-serving commercial development north of Bay Marina Drive. The two City-owned blocks that are currently vacant and between I-5 and Harrison Avenue could be developed with hotel, restaurant, retail, and/so some combination of tourist/visitor serving commercial uses. For purposes of this analysis, a potential development scenario associated with the City Program would be a hotel with 150 rooms, along with 15,500 square feet of restaurant space, and 12,000 square feet of retail space.
- *GB Capital Component* - Construction and operation of up to four hotels, a recreational vehicle (RV) park, modular cabins, dry boat storage, and an expanded marina. The following quantities of each use that are anticipated to generate traffic are:
    - Construct up to 463 hotel rooms with approximately 16,500 square feet of retail space.
    - Develop up to 70 sites at the proposed RV resort. 135 sites would be constructed in Phase 1 of the project; however, it may be necessary to remove up to 65 RV spaces to accommodate the hotels.
    - Develop approximately 40,000 square feet of dry boat storage, which would be capable of storing up to 210 boats.

- Develop up to 60 modular cabins, which would serve as independent accommodations with kitchenettes, bathrooms, and sleeping quarters
- Construct and operate a 10,000 square foot of administration/recreation building
- Construct marina facilities (e.g. moorings, docks, etc.) to accommodate up-to 95 boats
- Remove the reduced use restrictions of the National City Aquatic Center to provide for more flexibility and allow visitors to arrive using their vehicles, instead of via bus only as specified in the current Coastal Development Permit (CDP). This component is already included in the base model assumptions, so vehicle trips associated with the removal of the CDP is not included to avoid double counting of the National City Aquatic Center.

In addition, this component would implement a new road realignment for Marina Way, public access/view corridors, and bicycle and pedestrian paths.

- *Pasha Road Closures Component* - Closure of Tidelands Avenue between Bay Marina Drive and West 32nd Street as well as West 28th Street between Tidelands Avenue and Quay Avenue and re-designation of the area to Marine-Related Industrial in the District's PMP. This improvement would not generate new traffic into the study area, but would alter traffic patterns and the closures would redistribute traffic onto parallel roadways in the study area.
- *Pasha Rail Improvement Component* - Construction and operation of a rail connector track and storage track. This improvement would not generate new traffic or alter traffic patterns in the study area.

DISTRICT PUBLIC WORKS

- *Marina Balanced Land Use Plan (Balanced Plan)* covers an approximate 60.9 acre that proposes the following transportation improvements:
  - Marina Way Realignment will reconfigure from its existing alignment to form a curve that rounds the west when traveling toward the Balanced Plan area. This improvement does not affect the roadway operations analysis.
  - Add a connector rail track to provide an additional point of connection between the existing rail yard along the west side of Marina Way and the east side of the National Distribution Center, north of the Balanced Plan area, to the existing rail line north of the existing West 32nd Street and west of Tidelands Avenue. This improvement would not generate new traffic or alter traffic patterns in the study area.
  - Close West 32nd Street east of Tidelands Avenue to allow for the realignment of Marina Way. This improvement does not affect the roadway operations analysis.

- Close the southern half of the existing Goesno Place south of West 32nd Street to vehicular traffic and relocate the northern portion of the road to the east. This improvement does not affect the roadway operations analysis.
- Shift the southern terminus of Tidelands Avenue to the east to accommodate a reconfigured historical first point of rest. This improvement does not affect the roadway operations analysis.
- Pepper Park Expansion would increase by over 2.54 acres, from approximately 5.22 acres to 7.76 acres. An optional feature to the Pepper Park is the relocation of the historic Granger Hall to Pepper Park.

CLOSURE & PARTIAL CLOSURE OF BAY MARINA DRIVE

- *Closure of Bay Marina Drive* –Potentially close or narrow Bay Marina Drive west of Marina Way through vehicular traffic. This project component is intended to help reduce the number of trucks traveling through the Bay Marina Drive/Mile of Cars and I-5 freeway ramps.

ES.2 Project Trip Generation and Study Area

The three trip generators of the project are the City Program, GP Capital components and the Pepper Park Expansion. Trip generation estimates for these projects were developed using trip generation rates outlined in the *SANDAG Not so Brief Guide to Vehicular Traffic Generation Rates* (April 2002); however, based on the anticipated operations of the boat storage under the GB Capital, a modified trip rate was used for the marina. According to the project applicant, the boat storage would operate primarily as storage with infrequent and inconsistent use, hence, a modified rate from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition) was used for the marina land use.

The City Program project would generate a total of 4,160 daily weekday trips, with 274 occurring in the AM peak hour (145 inbound, 129 outbound) and 327 occurring in the PM peak hour (175 inbound, 152 outbound). The GB Capital project would generate a total of 5,335 daily weekday trips, with 259 occurring in the AM peak hour (114 inbound, 145 outbound) and 407 occurring in the PM peak hour (305 inbound, 102. outbound). These two projects combined results in the Development Projects generating a total of 9,495 daily weekday trips, with 533 occurring in the AM peak hour (259 inbound, 274 outbound) and 734 occurring in the PM peak hour (480 inbound, 254 outbound). The District Public Works (Pepper Park Expansion) component would generate a total of 127 daily weekday trips, with 17 occurring in the AM peak hour (9 inbound, 8 outbound) and 12 occurring in the PM peak hour (6 inbound, 6 outbound). Furthermore, the Total Bayfront project would generate a total of 9,622 daily weekday trips, with 550 occurring in the AM peak hour (268 inbound, 282 outbound) and 746 occurring in the PM peak hour (486 inbound, 260 outbound).

Additionally, several project components such as the closures of Tidelands Avenue and Bay Marina Drive, as well as the conversion of McKinley Avenue to a southbound only roadway, would change travel patterns in the study area. These roadway changes would cause a redistribution in traffic by shifting traffic that currently use those roadways to nearby parallel facilities.

ES.3 Project Impacts and Mitigation Measures

The operations analysis was conducted for each project component separately under Existing Conditions, and then coupled together under the future year scenarios. The associated traffic related impacts, for each component of the project, and appropriate mitigation measures to reduce the identified traffic related impacts to less than significant were conducted for each of the scenarios described below. The following analysis scenarios are required to identify the direct impacts associated with each project component, and to determine their fair-share responsibilities for cumulative related impacts:

- Existing Conditions Analysis
- Existing Plus Development Projects
- Existing Plus District Public Works Projects
- Existing Plus Total Bayfront Plan
- Existing Plus the Closure of Bay Marina Drive
- Existing Plus the Partial Closure of Bay Marina Drive
- Existing Plus Total Bayfront Plan with Closure of Bay Marina Drive
- Existing Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive
- Near-Term Base Conditions
- Near-Term Plus Total Bayfront Plan
- Near-Term Plus Total Bayfront Plan with Closure of Bay Marina Drive
- Near-Term Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive
- Future Year Base Conditions
- Future Year Plus Total Bayfront Plan
- Future Year Plus Total Bayfront Plan with Closure of Bay Marina Drive
- Future Year Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive

Table ES.1 shows the project impacts and mitigations for all the study facilities and under what scenario those facilities are impacted.

Table ES.1 Impacted Study Facilities and Proposed Mitigations – Existing Plus Project Conditions

Study Facility			Existing Plus Project Scenarios							Mitigation	Feasible?	Responsibility Split	Direct Impact Mitigated?
			Ex + DP	Ex + DPW	Ex + TB	Ex + CI of BM	Ex + Part CI of BM	Ex + TB w/ CI of BM	Ex + TB w/ Part CI of BM				
ROADWAY SEGMENTS													
Tidelands Avenue	West 19th Street to Bay Marina Drive							✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Cleveland Avenue to I-5 SB Ramps		✓		✓		✓		✓	Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
INTERSECTIONS													
1	Cleveland Avenue & Civic Center Drive					✓		✓		Add a separate westbound left-turn and install a traffic signal	NO	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive					✓		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive		✓		✓				✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE													
I-5	I-15 and Division Street	NB	✓		✓			✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementation of this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓		✓			✓	✓				
	Division Street and 8th Street	NB	✓		✓			✓	✓				
	Division Street and 8th Street	NB	✓		✓			✓	✓				
	8th Street and Civic Center Drive	NB	✓		✓			✓	✓				
		SB	✓		✓			✓	✓				

✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works

TB = Total Bayfront
CI of BM = Closure of Bay Marina
Part CI of BM = Partial Closure of Bay Marina

TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Source: Chen Ryan Associates; October 2019

Table ES.2 Impacted Study Facilities and Proposed Mitigations – Near-Term Year 2030 Plus Project Conditions

Study Facility		Near-Term Year 2030 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
		NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM				
ROADWAY SEGMENTS								
Tidelands Avenue	Harbor Drive to West 19th Street		✓		Widen roadway and reclassify as a 4-Lane Collector	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	West 19th Street to Bay Marina Drive		✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Tidelands Avenue to Marina Way			✓	Reclassify roadway to a 2-Lane Collector with Center-Left-Turn Lane	YES	Project Fair Share: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, this improvement could be done within the existing right-of-way. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
	Cleveland Avenue to I-5 SB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
INTERSECTIONS								
1	Cleveland Avenue & Civic Center Drive		✓		Add a separate westbound left-turn and install a traffic signal	NO	Fair Share: 82.2% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	YES	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
7	Cleveland Avenue & West 19th Street	✓	✓	✓	Restripe the eastbound left/through to an exclusive left-turn lane, and restripe the eastbound right-turn lane to a through/right	YES	Fair Share: 45.5% Responsibility Split: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. This improvement can be achieved within the existing right-or-way and would reduce the impact to less-than-significant conditions. However, since this intersection is under the City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive	✓	✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	Direct Impact: 100% Responsibility Split: 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*

Table ES.2 Impacted Study Facilities and Proposed Mitigations – Near-Term Year 2030 Plus Project Conditions

Study Facility			Near-Term Year 2030 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
			NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM				
14	I-5 Northbound Ramps & Bay Marina Drive		✓		✓	Restripe the northbound left/through/right lane to a northbound left/through lane, and add widen the ramp to construct a second northbound right-turn lane	NO	Direct Impact: 100% Responsibility Split: 62% Development Projects (City Program) 35% Development Projects (GB Capital) 3% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, while there is adequate right-of-way to add a second northbound right-turn lane, constructing this improvement would require substantial relocation of existing utility lines and large electrical power towers. Therefore, due to the close proximity of the ramp to the existing utility lines, the construction of this improvement is considered infeasible. Therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE									
I-5	I-15 and Division Street	NB	✓	✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	Fair Share: 25.2% Responsibility Split: 24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementing this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓	✓	✓				
	Division Street and 8th Street	NB	✓	✓	✓				
	Division Street and 8th Street	SB	✓	✓	✓				
	8th Street and Civic Center Drive	NB	✓	✓	✓				
		SB	✓	✓	✓				
	Civic Center Drive and Bay Marina Drive	SB	✓	✓	✓				

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Table ES.3 Impacted Study Facilities and Proposed Mitigations – Future Year 2050 Plus Project Conditions

Study Facility		Future Year 2050 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
		Fut + TB	Fut + TB w/ CI of BM	Fut + TB w/ Part CI of BM				
ROADWAY SEGMENTS								
Tidelands Avenue	Harbor Drive to West 19th Street		✓		Widen roadway and reclassify as a 4-Lane Collector	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	West 19th Street to Bay Marina Drive		✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Cleveland Avenue	West 23rd Street to Bay Marina Drive	✓		✓	Reclassify roadway to a 4-Lane Collector	NO	Direct Impact: 100% Project Responsibility: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Tidelands Avenue to Marina Way			✓	Reclassify roadway to a 2-Lane Collector with Center-Left-Turn Lane	YES	Project Fair Share: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, this improvement could be done within the existing right-of-way. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
	Cleveland Avenue to I-5 SB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	I-5 SB Ramps to I-5 NB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way (such as widening below the I-5 overpass bridge) would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
INTERSECTIONS								
1	Cleveland Avenue & Civic Center Drive		✓		Add a separate westbound left-turn and install a traffic signal	NO	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	NO	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve the overall intersection delay; however, the delay would still be higher than pre-project conditions, so the improvement would only partially mitigate the impact. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*

Table ES.3 Impacted Study Facilities and Proposed Mitigations – Future Year 2050 Plus Project Conditions

Study Facility			Future Year 2050 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
			Fut + TB	Fut + TB w/ CI of BM	Fut + TB w/ Part CI of BM				
7	Cleveland Avenue & West 19th Street		✓	✓	✓	Restripe the eastbound left/through to an exclusive left-turn lane, and restripe the eastbound right-turn lane to a through/right	YES	Fair Share: 45.5% Project Responsibility: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. This improvement can be achieved within the existing right-or-way and would reduce the impact to less-than-significant conditions. However, since this intersection is under the City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
10	Tidelands Avenue & Bay Marina Drive				✓	Add a separate westbound right-turn lane	YES	Project Fair Share: 50.5% Project Responsibility: 100% Closure of Bay Marina Drive	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
11	Marina Way & Bay Marina Drive				✓	Add a second westbound left-turn lane	YES	Project Fair Share: 51% Project Responsibility: 70% Closure of Bay Marina Drive 28% Development Projects (GB Capital) 1% Development Projects (City Program) 1% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Since the Partial Closure of Bay Marina Drive would be reducing the through lanes to one lane in each direction, that would leave adequate right-of-way to construct this improvement. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive		✓	✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
14	I-5 Northbound Ramps & Bay Marina Drive		✓		✓	Restripe the northbound left/through/right lane to a northbound left/through lane, and add widen the ramp to construct a second northbound right-turn lane	NO	Direct Impact: 100% Responsibility Split: 62% Development Projects (City Program) 35% Development Projects (GB Capital) 3% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, while there is adequate right-of-way to add a second northbound right-turn lane, constructing this improvement would require substantial relocation of existing utility lines and large electrical power towers. Therefore, due to the close proximity of the ramp to the existing utility lines, the construction of this improvement is considered infeasible. Therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE									
I-5	I-15 and Division Street	NB	✓	✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	Fair Share: 18.4% Responsibility Split: 24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementation of this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓	✓	✓				
	Division Street and 8th Street	NB	✓	✓	✓				
	Division Street and 8th Street	SB	✓	✓	✓				
	8th Street and Civic Center Drive	NB	✓	✓	✓				
		SB	✓	✓	✓				
	Civic Center Drive and Bay Marina Drive	SB	✓	✓	✓				

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact

TB = Total Bayfront

TB w/ CI of BM = Total Bayfront with Closure of Bay Marina

TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Granger Hall Alternative

An optional feature to the Pepper Park Expansion (which is part of the "District Public Works" project component) is the relocation of the historic Granger Hall to Pepper Park. If Granger Hall were to be relocated, it could be used as a restaurant of a special event center. For conservative purposes, a restaurant use was analyzed for a worst-case condition, with a size of 6,760 square feet.

The Granger Hall restaurant would generate an additional 1,082 daily weekday trips, with 87 trips occurring in the AM peak hour (44 inbound, 43 outbound), and 87 trips occurring in the PM peak hour (52 inbound, 35 outbound). With the relocation of Granger Hall, the Total Bayfront project would generate a total of 11,084 daily weekday trips, with 649 occurring in the AM peak hour (314 inbound, 335 outbound) and 860 occurring in the PM peak hour (554 inbound, 306 outbound).

The Proposed Project with the Granger Hall alternative would result in the same impacts as identified above, but would also cause a significant impact at the following two (2) additional facilities:

Roadway Segment:

- Marina Way between Bay Marina Drive and West 32nd Street

Freeway Segment:

- I-5 Southbound between Division Street and 8th Street

Active Transportation and Transit

Potential impacts related to pedestrian, bicycle and transit circulation would be considered significant if the Proposed Project would substantially increase hazards due to a design feature, or would conflict with the adopted policies, plans, or programs supporting alternative transportation, as outlined in Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*. Based on an initial review of the project site plan and field visit, the Proposed Project would not conflict with any existing or proposed pedestrian, bicycle, or transit facilities. The driveways for the development projects would not conflict with current sidewalks or bike facilities, and the project components that are altering the roadway network (i.e. Pasha Road Closures, Pasha Rail Improvement, Marina Way Realignment, and Bay Marina Drive Closure) would still provide access for pedestrian and bicyclists. Therefore, no impacts related to pedestrian, bicycle, or transit facilities are expected to occur with the Proposed Project.

Furthermore, the project proposes to improve bicycle facilities by implementing Segment 5 of the Bayshore Bikeway that would provide a separated bicycle facility on McKinley Avenue and Marina Way. Segment 5 of the Bayshore Bikeway would create a safer environment for bicyclists and provide connection to the regional bikeway system.

Parking

The Total Bayfront parking supply requirement includes parking demand from the Development Projects and the District Public Works projects. **Table ES.4** summarizes the total net new parking spaces required of the Proposed Project. As shown, the Total Bayfront project would require between 855 and 1,619 new parking spaces in the study area.

Table ES.4 Total Bayfront Parking Supply Requirement

Project Component	Parking Supply Requirements
City Program*	**0 / 764**
GB Capital	**817**
Pepper Park Expansion	**38**
TOTAL NET NEW PARKING SUPPLY	**855 / 1,619**

Source: Chen Ryan Associates; October 2019

Notes:
*National City Municipal Code provides a minimum and maximum parking rate for mixed-use commercial. Both are shown as "Minimum Parking Supply / Maximum Parking Supply"

Though the Tidelands Avenue Closure would result in a net decrease in parking supply of 216 on-street spaces, Pasha is planning to increase their employee parking at Lot Q by 590 spaces. Therefore, the parking demand on Tidelands Avenue would no longer exist as Pasha would provide the appropriate number of spaces to accommodate their employees.

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1.0 Introduction

1.1 Purpose of the Report

The purpose of this Transportation Impact Analysis (TIA) is to identify and document potential transportation impacts related to the implementation of the National City Bayfront Projects (Proposed Project), as well as to recommend mitigation measures, as necessary, for any identified transportation related impacts associated with the Proposed Project.

1.2 Proposed Project

The San Diego Unified Port District (District), the City of National City (City), GB Capital Holdings, LLC (GB Capital), and Pasha Automotive Services (Pasha), are co-applicants and project proponents in a Master Planning effort, which includes series of development and public infrastructure projects to be located within or adjacent to the National City Marine Terminal (NCMT). The regional location of the proposed project is displayed in **Figure 1-1**.

The Proposed Project area is generally considered underutilized, particularly when proximity to the waterfront is taken into consideration. Discussions between the District, City, and stakeholders have highlighted a desire to create more recreation and visitor-serving commercial space in the project area in an effort to draw more visitors to the waterfront while maintaining the productivity of the maritime industrial areas at and adjacent to the NCMT. To achieve these goals the following development and public infrastructure components were included into the Proposed Project Master Plan.

DEVELOPMENT PROJECTS

- *Bayshore Bikeway Component* - Construction and operation of Segment 5 of the Bayshore Bikeway. Segment 5 of the Bayshore Bikeway would provide a bicycle facility along McKinley Avenue, the southern border of the City Program parcels, Marina Way, and the former railroad right-of-way. The bikeway would covert McKinley Way to a one-way southbound roadway to accommodate the proposed bicycle facility, and also modify the East Harbor Drive/Civic Center Drive intersection to remove the southbound free right-turn movement.
- *City Program - Development* - Construction and operation of hotel, restaurant, retail, and/or a combination of tourist/visitor-serving commercial development north of Bay Marina Drive. The two City-owned blocks that are currently vacant and between I-5 and Harrison Avenue could be developed with hotel, restaurant, retail, and/so some combination of tourist/visitor serving commercial uses. For purposes of this analysis, a potential development scenario associated with the City Program would be a hotel with 150 rooms, along with 15,500 square feet of restaurant space, and 12,000 square feet of retail space.

- *GB Capital Component* - Construction and operation of up to four hotels, a recreational vehicle (RV) park, modular cabins, dry boat storage, and an expanded marina. The following quantities of each use that are anticipated to generate traffic are:
    - Construct up to 463 hotel rooms with approximately 16,500 square feet of retail space.
    - Develop up to 70 sites at the proposed RV resort. 135 sites would be constructed in Phase 1 of the project; however, it may be necessary to remove up to 65 RV spaces to accommodate the hotels.
    - Develop approximately 40,000 square feet of dry boat storage, which would be capable of storing up to 210 boats.
    - Develop up to 60 modular cabins, which would serve as independent accommodations with kitchenettes, bathrooms, and sleeping quarters
    - Construct and operate a 10,000 square foot of administration/recreation building
    - Construct marina facilities (e.g. moorings, docks, etc.) to accommodate up-to 95 boats
    - Remove the reduced use restrictions of the National City Aquatic Center to provide for more flexibility and allow visitors to arrive using their vehicles, instead of via bus only as specified in the current Coastal Development Permit (CDP). This component is already included in the base model assumptions, so vehicle trips associated with the removal of the CDP is not included to avoid double counting of the National City Aquatic Center.

  In addition, this component would implement a new road realignment for Marina Way, public access/view corridors, and bicycle and pedestrian paths.

- *Pasha Road Closures Component* - Closure of Tidelands Avenue between Bay Marina Drive and West 32nd Street as well as West 28th Street between Tidelands Avenue and Quay Avenue and re-designation of the area to Marine-Related Industrial in the District's PMP.
- *Pasha Rail Improvement Component* - Construction and operation of a rail connector track and storage track. This improvement would not generate new traffic or alter traffic patterns in the study area.

DISTRICT PUBLIC WORKS

- *Marina Balanced Land Use Plan (Balanced Plan)* covers an approximate 60.9 acre that proposes the following transportation improvements:
    - Marina Way Realignment will reconfigure from its existing alignment to form a curve that rounds the west when traveling toward the Balanced Plan area. This improvement does not affect the roadway operations analysis.
    - Add a connector rail track to provide an additional point of connection between the existing rail yard along the west side of Marina Way and the east side of the National Distribution Center, north of the Balanced Plan area, to the existing rail line north of the existing West 32nd Street and west of Tidelands Avenue. This

improvement would not generate new traffic or alter traffic patterns in the study area.

- Close West 32nd Street east of Tidelands Avenue to allow for the realignment of Marina Way. This improvement does not affect the roadway operations analysis.
- Close the southern half of the existing Goesno Place south of West 32nd Street to vehicular traffic and relocate the northern portion of the road to the east. This improvement does not affect the roadway operations analysis.
- Shift the southern terminus of Tidelands Avenue to the east to accommodate a reconfigured historical first point of rest. This improvement does not affect the roadway operations analysis.
- Pepper Park Expansion would increase by over 2.54 acres, from approximately 5.22 acres to 7.76 acres. An optional feature to the Pepper Park Expansion is the relocation of the historic Granger Hall to Pepper Park.

CLOSURE & PARTIAL CLOSURE OF BAY MARINA DRIVE

- *Closure of Bay Marina Drive* –Potentially close or narrow Bay Marina Drive between Quay Avenue and Marina Way. This project component is intended to help reduce the number of trucks traveling through the Bay Marina Drive/Mile of Cars and I-5 freeway ramps.

1.3 Analysis Scenarios

The operations analysis was conducted for each project component separately under Existing Conditions, and then coupled together under future year conditions. The associated traffic related impacts, for each component of the project, and appropriate mitigation measures to reduce the identified traffic related impacts to less than significant were conducted for each of the scenarios described below. The following analysis scenarios are required to identify the direct impacts associated with each project component, and to determine their fair-share responsibilities for cumulative related impacts:

Existing Conditions Analysis **-** Analyze and document the Existing traffic conditions within the project study area. This condition provides an existing baseline in which direct project related impacts can be determined by.

Existing Plus Development Projects – The scenario assumes existing conditions with the development of Segment 5 of the Bayshore Bikeway, the closure of Tidelands Avenue, and the implementation of the City Program and GB Capital developments (collectively "Development Projects"). The direct impacts associated with these projects were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were determined for each responsible party. The purpose of this scenario is to identify the direct impacts associated with the projects that are not included in the District's Public Works improvements.

Existing Plus District Public Works Projects - The scenario assumes existing conditions with the proposed expansion of Pepper Park as well as the Marina Way Roadway Realignment (collectively "District Public Works Projects"). The direct impacts associated with these projects were identified, as well as associated mitigation measures. The purpose of this scenario was to identify the direct impacts associated with the District's Public Works Projects.

Existing Plus Total Bayfront Plan – This scenario assumes the implementation of both the proposed development projects, as well as the District's Public Works projects (collectively "Total Bayfront Plan"). The direct impacts associated with the total Bayfront Plan will be identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were determined for each responsible party. The purpose of this scenario was to identify the total direct impacts associated with proposed project as a whole.

Existing Plus the Closure of Bay Marina Drive – This scenario assumes that Bay Marina Drive, west of Marina Way, would be closed to vehicular traffic. The purpose of this scenario was to identify the direct impacts associated with the proposed closure, as well as recommend corresponding mitigation measures.

Existing Plus the Partial Closure of Bay Marina Drive – This scenario assumes that Bay Marina Drive, west of Marina Way, would be closed to traffic entering the National City Marine Terminal. The purpose of this scenario was to identify the direct impacts associated with the proposed partial closure, as well as recommend corresponding mitigation measures.

Existing Plus Total Bayfront Plan with Closure of Bay Marina Drive – This scenario assumes the implementation of both the proposed development projects, the District's Public Works projects, and the full closure of Bay Marina Drive. The direct impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were determined for each responsible party. The purpose of this scenario was to identify the total direct impacts associated with proposed project as a whole, with the full closure of Bay Marina Drive.

Existing Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive – This scenario assumes the implementation of the proposed development projects, the District's Public Works projects, and the partial closure of Bay Marina Drive. The direct impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts will also be determined for each responsible party. The purpose of this scenario was to identify the total direct impacts associated with proposed project as a whole, with the partial closure of Bay Marina Drive.

Near-Term Base Conditions – This scenario assumes Year 2030 conditions and includes background cumulative traffic associated with the PMPU. The purpose of this scenario is

to develop a near-term cumulative baseline in which Near-Term Cumulative impacts can be identified by. Near-Term Base conditions represents the projects opening year.

Near-Term Plus Total Bayfront Plan – This scenario assumes the implementation of the proposed development projects and the District's Public Works projects under near-term conditions. The near-term cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were also determined for each responsible party. The purpose of this scenario was to identify the total near-term cumulative impacts associated with proposed project as a whole, under project opening year conditions.

Near-Term Plus Total Bayfront Plan with Closure of Bay Marina Drive – This scenario assumes the implementation of the proposed development projects, the District's Public Works projects, and the full closure of Bay Marina Drive under near-term conditions. The near-term cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were also determined for each responsible party. The purpose of this scenario was to identify the total cumulative impacts associated with proposed project as a whole, with the full closure of Bay Marina Drive, under project opening year conditions.

Near-Term Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive – This scenario assumes the implementation of the proposed development projects, the District's Public Works projects, and the partial closure of Bay Marina Drive under near-term conditions. The near-term cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were also determined for each responsible party. The purpose of this scenario is to identify the total cumulative impacts associated with proposed project as a whole with the partial closure of Bay Marina Drive, under project opening year conditions.

Future Year Base Conditions - Background traffic volumes for the longer-term conditions were based on the City of National City General Plan as well as the SANDAG Series 13 Year 2050 Transportation Forecast Model. The purpose of this scenario was to develop a Future Year cumulative baseline in which Future Year Cumulative impacts can be identified by.

Future Year Plus Total Bayfront Plan – This scenario assumes the implementation of the proposed development projects and the District's Public Works projects under Future Year conditions. The Future Year cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were also determined for each responsible party. The purpose of this scenario was to identify the total Future Year cumulative impacts associated with proposed project as a whole, under project future year conditions.

Future Year Plus Total Bayfront Plan with Closure of Bay Marina Drive – This scenario assumes the implementation of the proposed development projects, the District's Public Works projects, and the full closure of Bay Marina Drive under Future Year conditions. The

Future Year cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts were also determined for each responsible party. The purpose of this scenario is to identify the total cumulative impacts associated with proposed project as a whole with the full closure of Bay Marina Drive, under project future year conditions.

Future Year Plus Total Bayfront Plan with Partial Closure of Bay Marina Drive – This scenario assumes the implementation of the proposed development projects, the District's Public Works projects, and the partial closure of Bay Marina Drive under Future Year conditions. The Future Year cumulative impacts associated with this scenario were identified, as well as associated mitigation measures. A fair share allocation of the responsibility of these impacts will also be determined for each responsible party. The purpose of this scenario is to identify the total cumulative impacts associated with proposed project as a whole with the partial closure of Bay Marina Drive, under project future year conditions.

Figure 1-2 displays the location of each of project components.

1.4 Report Organization

Following this Introduction chapter, this report is organized into the following chapters:

2.0 Analysis Methodology – This chapter describes the methodologies and standards utilized to analyze roadway and intersection traffic conditions.

3.0 Project Description – This chapter describes the Proposed Project including project traffic generation, trip distribution patterns, project trip assignments, and the reassignment of existing travel patterns.

4.0 Existing Conditions – This chapter describes the existing traffic operations both with and without each of the project components, which has been specified in the previous section. Mitigation measures, if necessary, for project-related impacts are also identified.

5.0 Near-Term Year 2030 Traffic Conditions – This chapter describes Near-Term developments anticipated to generate additional study area trips by Year 2030, the opening year of the project. Analysis results are provided for the Year 2030 Base and Year 2030 Plus Project conditions, along with the recommended mitigation measures (if necessary).

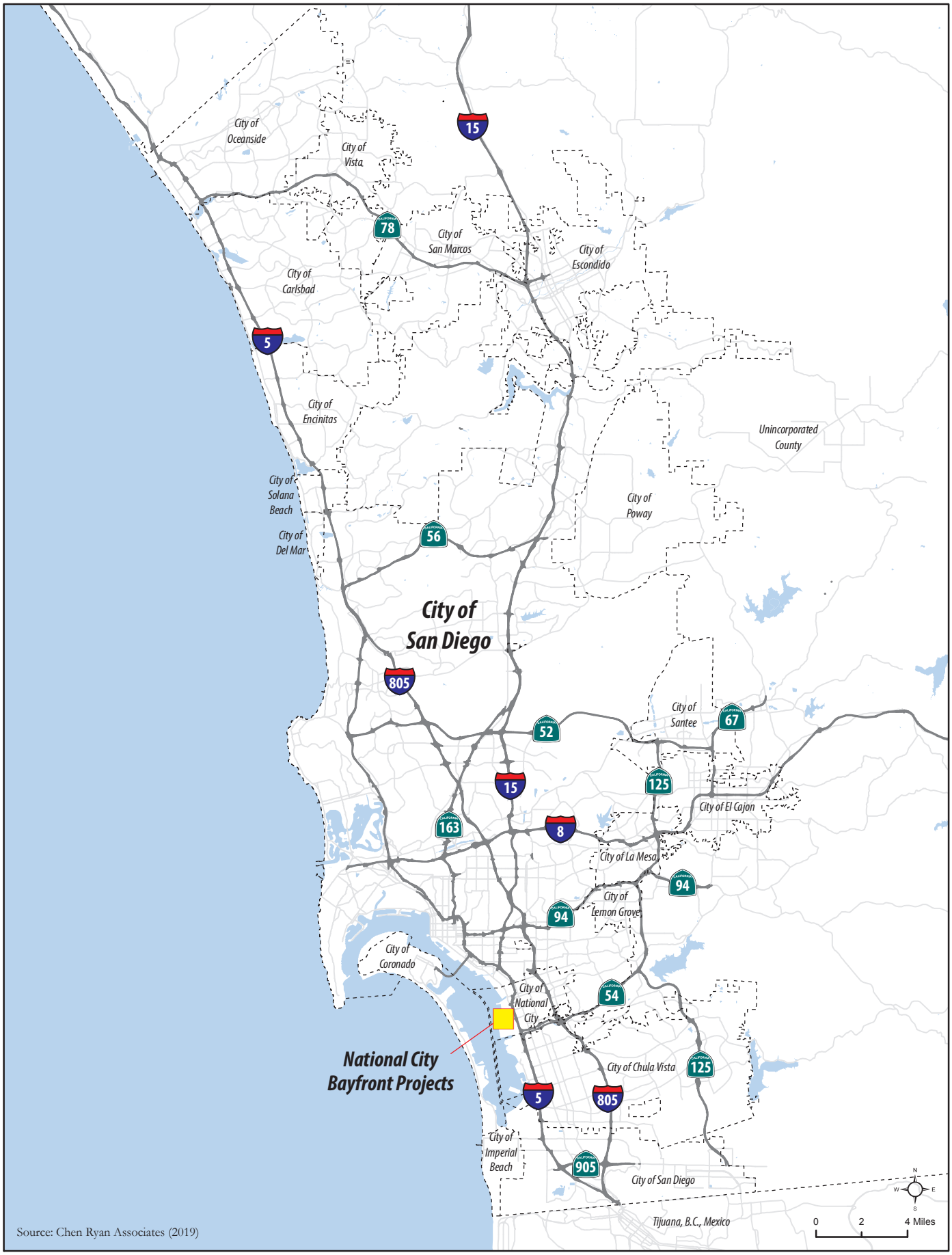
6.0 Future Year 2050 Traffic Conditions – This chapter describes projected long-range traffic conditions both with and without project traffic. Mitigation measures for project-related impacts are identified for Future Year 2050 Plus Project conditions, as appropriate.

7.0 Granger Hall Alternative – This chapter describes the Pepper Park alternative with the relocation of Granger Hall under existing, Near-Term and Future year conditions

without and with project traffic. Impacts and associated mitigation measures are identified, if necessary.

8.0 Active Transportation and Transportation Demand Management – This chapter focuses on alternative modes of travel to and from the project (walking, bicycling and transit), and also discusses potential Transportation Demand Management strategies to reduce vehicle travel to the project site.

9.0 Parking – This chapter addresses access to the project site, and discusses the required parking within the project site.



Source: Chen Ryan Associates (2019)

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Figure 1-1
Project Regional Location

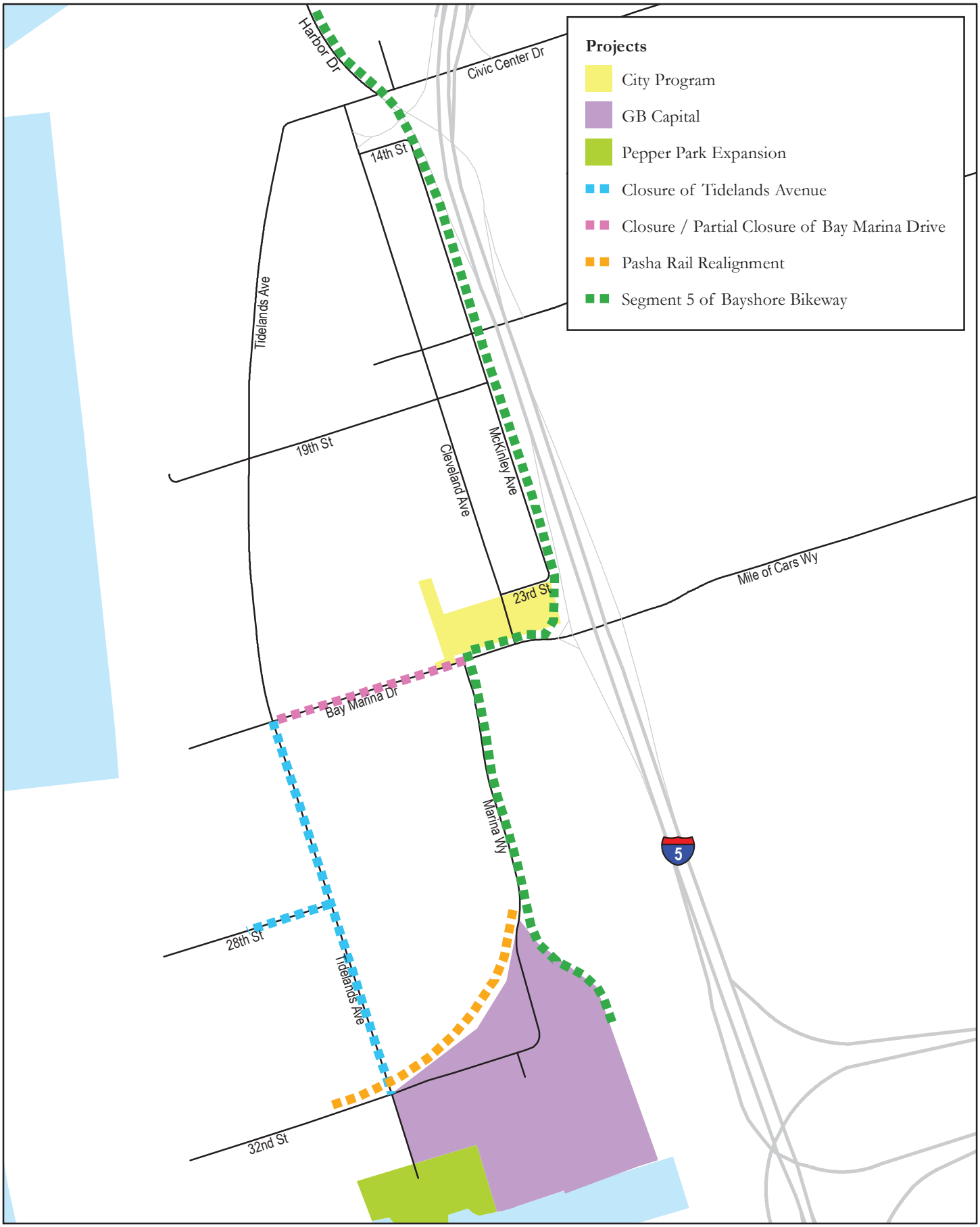

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Figure 1-2
Project Location

2.0 Analysis Methodology

This TIA was performed in accordance with the requirements of the SANTEC/ITE *Guidelines for Traffic Impact Studies within the San Diego Region, March 2000*, and the California Environmental Quality Act (CEQA) project review process. Detailed information on freeway, roadway and intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 Level of Service Definition

Level of Service (LOS) is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations.

Table 2.1 Level of Service (LOS) Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: Highway Capacity Manual 2010

2.2 Roadway Segment LOS Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.2** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report.

Table 2.2 National City Roadway Classifications and LOS Standards

Roadway Classification	LOS A	LOS B	LOS C	LOS D	LOS E
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	**< 45,000**	< 50,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	**< 35,000**	< 40,000
Secondary Arterial / Collector (4-lane w/ center lane)	< 10,000	< 14,000	< 20,000	**< 25,000**	< 30,000
Collector (4-lane w/o center lane)	< 7,000	< 10,000	< 13,000	**< 15,000**	< 20,000
Collector (2-lane w/ continuous left-turn lane)	< 5,000	< 7,000	< 10,000	**< 13,000**	< 15,000
Collector (2-lane)	< 4,000	< 5,500	< 7,500	**< 9,000**	< 10,000

Source: City of National City Circulation Element, 2011

Note:
Bold numbers indicate the ADT thresholds for acceptable LOS.

These standards are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway facility varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for circulation element roadway segments.

2.3 Peak Hour Intersection LOS Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis, including both signalized and unsignalized intersections. The following assumptions were utilized in conducting all intersection LOS analyses:

- *Pedestrian Calls per Hour:* 10 calls per hour for each pedestrian movement was assumed.
- *Signal Timing:* Based on existing signal timing plans (as of May 2017), provided in **Appendix A.**
- *Peak Hour Factor*: Based on existing peak hour count data for existing conditions and future conditions.

Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedures as outlined in the *Highway Capacity Manual (HCM) 2010*. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in **Table 2.3**. The computerized analysis of intersection operations was performed utilizing the *Synchro 10* traffic analysis software.

Table 2.3 Signalized Intersection LOS Criteria

Average Stopped Delay Per Vehicle (seconds)	LOS Characteristics
<10.0	*LOS A* describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	*LOS B* describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	*LOS C* describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	*LOS F* describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 2010

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections, were analyzed using the HCM 2010 (Sections 19 & 20) unsignalized intersection analysis methodology. The *Synchro 10* Traffic Analysis software supports this methodology and was utilized to produce LOS results. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 2.4** summarizes the LOS criteria for unsignalized intersections. The City of National City considers LOS D or better during the AM and PM peak hours to be acceptable for intersection LOS.

Table 2.4 Unsignalized Intersection LOS Criteria

Average Control Delay (sec/veh)	LOS
≤10	A
>10 and ≤15	B
>15 and ≤25	C
>25 and ≤35	D
>35 and ≤50	E
>50	F

Source: Highway Capacity Manual 2010

2.4 Freeway LOS Standards and Thresholds

Freeway LOS analysis is based upon procedures developed by Caltrans. The procedure for calculating freeway LOS involves estimating a peak hour volume to capacity (V/C) ratio. Peak hour volumes are estimated from the application of design hour ("K"), directional ("D") and truck ("T") factors to Average Daily Traffic (ADT) volumes. The base capacities for Interstate 5 were assumed to be 2,350 passenger-car per hour per main lane (pc/h/ln) and 1,410 pc/h/ln (60% of the main lane capacity) for auxiliary lane, respectively.

The resulting V/C ratio is then compared to acceptable ranges of V/C values corresponding to the various levels of service for each facility classification, as shown in **Table 2.6**. The corresponding LOS represents an approximation of existing or anticipated future freeway operating conditions in the peak direction of travel during the peak hour. LOS D or better is used in this study as the threshold for acceptable freeway operations.

Table 2.6 Freeway Segment LOS Definitions

LOS	V/C	Congestion/Delay	Traffic Description
Used for freeways, expressways and conventional highways			
"A"	<0.30	None	Free flow.
"B"	0.30-0.50	None	Free to stable flow, light to moderate volumes.
"C"	0.50-0.71	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
"D"	0.71-0.89	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.89-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.

Source: Caltrans Guide for the Preparation of Traffic Impact Studies; December 2002

2.5 Determination of Significant Impacts

The *SANTEC/ITE Guidelines for Traffic Impact Studies within the San Diego Region, March 2000*, defines project impact thresholds by facility type. These thresholds are generally based upon an acceptable increase in the Volume / Capacity (V/C) ratio for roadway and freeway segments, and upon increases in vehicle delays for intersections and ramps.

In the City of National City, LOS D is considered acceptable for roadway and intersection operations. A project is considered to have a significant impact if it degrades the operations of a roadway or intersection from an acceptable LOS (D or better) to an unacceptable LOS (E or F), or if it adds additional delay to a facility already operating at an unacceptable level. **Table 2.7** summarizes the impact significant thresholds as identified within the SANTEC/ITE guidelines beyond which mitigation measures are required.

Table 2.7 Measure of Significant Project Traffic Impacts

LOS with Project	Allowable Change Due to Impact					
	Freeways		Roadway Segments		Intersections	Ramp Metering
E & F (or ramp meter delays above 15 min.)	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec)	Delay (min.)
	0.01	1	0.02	1	2	2

Source: SANTEC/ITE Guidelines for Traffic Impact Studies in the San Diego Region

3.0 Proposed Project

This section describes the Proposed Project, including the Proposed Project features and their associated trip generation, trip distribution, trip assignment and redistribution of existing travel patterns.

3.1 Project Description

The Proposed Project includes several components that will increase traffic within the study area and alter the roadway configuration, resulting in a redistribution of traffic volumes. The description of each project improvement is described below:

DEVELOPMENT PROJECTS

- *Bayshore Bikeway Component* - Construction and operation of Segment 5 of the Bayshore Bikeway. Segment 5 of the Bayshore Bikeway would provide a bicycle facility along McKinley Avenue, the southern border of the City Program parcels, Marina Way, and the former railroad right-of-way. The bikeway would covert McKinley Way to a one-way southbound roadway to accommodate the proposed bicycle facility, and also modify the East Harbor Drive/Civic Center Drive intersection to remove the southbound free right-turn movement. **Appendix B** includes the 30% design plans for Segment 5 of the Bayshore Bikeway.
- *City Program - Development* - Construction and operation of hotel, restaurant, retail, and/or a combination of tourist/visitor-serving commercial development north of Bay Marina Drive. The two City-owned blocks that are currently vacant and between I-5 and Harrison Avenue could be developed with hotel, restaurant, retail, and/so some combination of tourist/visitor serving commercial uses. For purposes of this analysis, a potential development scenario associated with the City Program would be a hotel with 150 rooms, along with 15,500 square feet of restaurant space, and 12,000 square feet of retail space.
- *GB Capital Component* - Construction and operation of up to four hotels, a recreational vehicle (RV) park, modular cabins, dry boat storage, and an expanded marina. The following quantities of each use that are anticipated to generate traffic are:
    - Construct up to 463 hotel rooms with approximately 16,500 square feet of retail space.
    - Develop up to 70 sites at the proposed RV resort. 135 sites would be constructed in Phase 1 of the project; however, it may be necessary to remove up to 65 RV spaces to accommodate the hotels.
    - Develop approximately 40,000 square feet of dry boat storage, which would be capable of storing up to 210 boats.
    - Develop up to 60 modular cabins, which would serve as independent accommodations with kitchenettes, bathrooms, and sleeping quarters
    - Construct and operate a 10,000 square foot of administration/recreation building

- Construct marina facilities (e.g. moorings, docks, etc.) to accommodate up-to 95 boats
- Remove the reduced use restrictions of the National City Aquatic Center to provide for more flexibility and allow visitors to arrive using their vehicles, instead of via bus only as specified in the current Coastal Development Permit (CDP). This component is already included in the base model assumptions, so vehicle trips associated with the removal of the CDP is not included to avoid double counting of the National City Aquatic Center.

In addition, this component would implement a new road realignment for Marina Way, public access/view corridors, and bicycle and pedestrian paths.

- *Pasha Road Closures Component* - Closure of Tidelands Avenue between Bay Marina Drive and West 32nd Street as well as West 28th Street between Tidelands Avenue and Quay Avenue and re-designation of the area to Marine-Related Industrial in the District's PMP. This improvement would not generate new traffic into the study area, but would alter traffic patterns and the closures would redistribute traffic onto parallel roadways in the study area.
- *Pasha Rail Improvement Component* - Construction and operation of a rail connector track and storage track. This improvement would not generate new traffic or alter traffic patterns in the study area.

DISTRICT PUBLIC WORKS

- *Marina Balanced Land Use Plan (Balanced Plan)* covers an approximate 60.9 acre that proposes the following transportation improvements:
  - Marina Way Realignment will reconfigure from its existing alignment to form a curve that rounds the west when traveling toward the Balanced Plan area. This improvement does not affect the roadway operations analysis.
  - Add a connector rail track to provide an additional point of connection between the existing rail yard along the west side of Marina Way and the east side of the National Distribution Center, north of the Balanced Plan area, to the existing rail line north of the existing West 32nd Street and west of Tidelands Avenue. This improvement would not generate new traffic or alter traffic patterns in the study area.
  - Close West 32nd Street east of Tidelands Avenue to allow for the realignment of Marina Way. This improvement does not affect the roadway operations analysis.
  - Close the southern half of the existing Goesno Place south of West 32nd Street to vehicular traffic and relocate the northern portion of the road to the east. This improvement does not affect the roadway operations analysis.
  - Shift the southern terminus of Tidelands Avenue to the east to accommodate a reconfigured historical first point of rest. This improvement does not affect the roadway operations analysis.

- Pepper Park Expansion would increase by over 2.54 acres, from approximately 5.22 acres to 7.76 acres.

CLOSURE & PARTIAL CLOSURE OF BAY MARINA DRIVE

- *Closure of Bay Marina Drive* –Potentially close or narrow Bay Marina Drive between Quay Avenue and Marina Way. This project component is intended to help reduce the number of trucks traveling through the Bay Marina Drive/Mile of Cars and I-5 freeway ramps.

Figure 1-2 shows the components of the National City Bayfront Projects.

3.2 Project Trip Generation, Distribution, and Assignment

Project Trip Generation

The three trip generators of the project are the two Development Projects – City Program and GP Capital components and the District Public Works, which includes the Pepper Park Expansion. Trip generation estimates for these projects were developed using trip generation rates outlined in the *SANDAG Not so Brief Guide to Vehicular Traffic Generation Rates* (April 2002); however, based on the anticipated operations of the boat storage under the GB Capital component, a modified trip rate was used for the marina. According to the project applicant, the boat storage would operate primarily as storage with infrequent and inconsistent use, hence, a modified rate from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition) was used for the marina land use. **Table 3.1** displays daily, as well as AM and PM Peak hour trip generations for the Total Bayfront project.

Table 3.1 Total Bayfront Trip Generation

Project	Land Use	Units	Trip Rate	ADT	AM Peak Hour				PM Peak Hour			
					%	Trips	In	Out	%	Trips	In	Out
Development Projects												
City Program	High Turnover Restaurant	15.5 ksf	160 / ksf	2,480	8%	199	100	99	8%	199	119	80
	Resort Hotel[1]	150 rooms	8 / room	1,200	5%	60	36	24	7%	84	34	50
	Specialty Retail	12 ksf	40 / ksf	480	3%	15	9	6	9%	44	22	22
	TOTAL			**4,160**		**274**	**145**	**129**		**327**	**175**	**152**
GB Capital[4]	Resort Hotel[1]	463 rooms	8 / room	3,704	5%	186	74	112	7%	261	208	53
	Recreational Vehicle (RV)[2]	70 sites	4 / site	280	4%	12	4	8	7%	23	16	7
	Specialty Retail	16.5 ksf	40 / ksf	660	3%	20	8	12	9%	60	48	12
	Modules	60 sites	4 / site	240	4%	10	6	4	8%	20	16	4
	Dry Boat Storage[3]	210 boat storage	1.48 / boat storage	311	3%	10	3	7	7%	22	13	9
	Office	10 ksf	14 / ksf	140	15%	21	19	2	15%	21	4	17

Table 3.1 Total Bayfront Trip Generation

Project	Land Use	Units	Trip Rate	ADT	AM Peak Hour				PM Peak Hour			
					%	Trips	In	Out	%	Trips	In	Out
GB Capital[4]	Marina	95 berths	4 / berth	380	3%	12	4	8	7%	27	16	11
	TOTAL			**5,715**		**271**	**118**	**153**		**434**	**321**	**113**
DEVELOPMENT PROJECTS NET TOTAL				**9,875**		**545**	**263**	**282**		**761**	**496**	**265**
District Public Works												
Pepper Park Expansion	City Parks	2.54 / acres	50 / acre	127	13%	17	9	8	9%	12	6	6
DISTRICT PUBLIC WORKS NET TOTAL				**127**		**17**	**9**	**8**		**12**	**6**	**6**
TOTAL BAYFRONT NET NEW TRIPS				**10,002**		**562**	**270**	**292**		**773**	**502**	**271**

Source: Chen Ryan Associates, October 2019

Notes:
KSF = Thousand Square Feet
[1]Resort Hotel cater to tourist and the vacation industry, often providing a wide variety of recreational facilities rather than the conventional business meeting spaces. Resort hotels are normally located in suburban or outlying locations.
[2]Campground trip rate used for Recreational Vehicles
[3]Dry boat storage is based on 50% of ITE's Trip Generation Manual "Marina" trip rate. A reduced rate was applied since the boat storage would not be generating regular trips as would a Marina.
[4]The changes to the Aquatic Center would remove the restrictions of reduced travel to the site. This is already included in the base traffic volumes, and therefore, is not included in the net new traffic estimates.

As shown in the table, the Development Projects would generate a total of 9,875 daily weekday trips, with 545 occurring in the AM peak hour (261 inbound, 284 outbound) and 761 occurring in the PM peak hour (496 inbound, 265 outbound). The District Public Works component would generate a total of 127 daily weekday trips, with 17 occurring in the AM peak hour (9 inbound, 8 outbound) and 12 occurring in the PM peak hour (6 inbound, 6 outbound). Furthermore, the Total Bayfront project would generate a total of 10,002 daily weekday trips, with 562 occurring in the AM peak hour (270 inbound, 292 outbound) and 773 occurring in the PM peak hour (502 inbound, 271 outbound).

Project Trip Distribution

The assumed project trip distribution the Development Projects and Districts of Public Works were based on the SANDAG Series 13 Travel Demand Model that includes land use from the North Harbor Drive and Port Master Plan Update (PMPU) studies. **Figure 3-1** displays the trip distribution patterns associated with the Development Projects (i.e. City Program and GB Capital) and District of Public Works (i.e. Pepper Park Expansion) projects.

Project Trip Assignment

Based upon the assumed project trip distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figure 3-2**.

3.3 Changes to Travel Patterns

As previously noted, the proposed project plans to close Tidelands Avenue between Bay Marina Drive and West 32nd Street, as well as potentially Bay Marina Drive West of Marina Way. Additionally, Segment 5 of the Bayshore Bikeway would convert McKinley Avenue to a one-way

southbound roadway. These roadway closures and conversions would cause a shift in the existing travel patterns on the NCMT. **Figure 3-3** displays the redistribution of traffic associated with the closures of Tidelands Avenue and Bay Marina Roadway closures, and the conversion of McKinley Avenue.

Tidelands Avenue

The closure of Tidelands Avenue would result in existing through traffic currently using Tidelands Avenue between Bay Marina Drive and West 32nd Street to redistribute to parallel facilities, such as Marina Way.

Bay Marina Drive

The potential closure, or partial closure of Bay Marina Drive would redistribute traffic to nearby roadways, such as Cleveland Avenue or Marina Way, and/or reduce traffic using the Bay Marina Drive/Mile of Cars and I-5 interchange; that traffic would be redistributed to the Civic Center Drive interchange.

To estimate the change in existing travel patterns with the closures of both Tidelands Avenue and Bay Marina Drive, a Select Link analysis was conducted using the SANDAG Series 13 Travel Demand Model. This analysis revealed the trip assignments of vehicles traveling on those two roadways, which was used to reassign to adjacent roadways with the closure(s).

McKinley Avenue

The conversion of McKinley Avenue to southbound travel only would redistribute the northbound traffic to parallel facilities like Cleveland Avenue.

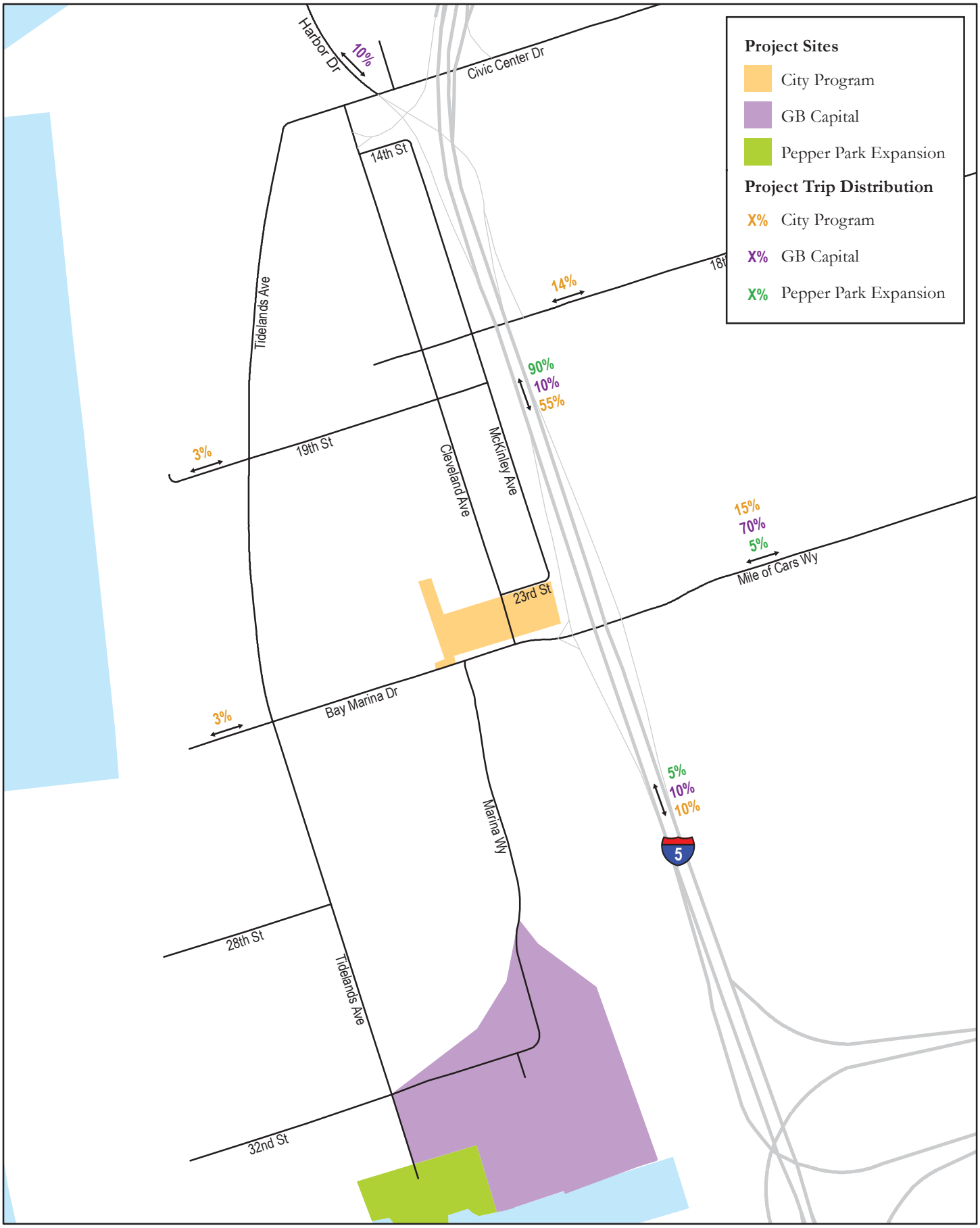

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Figure 3-1
Project Trip Distribution

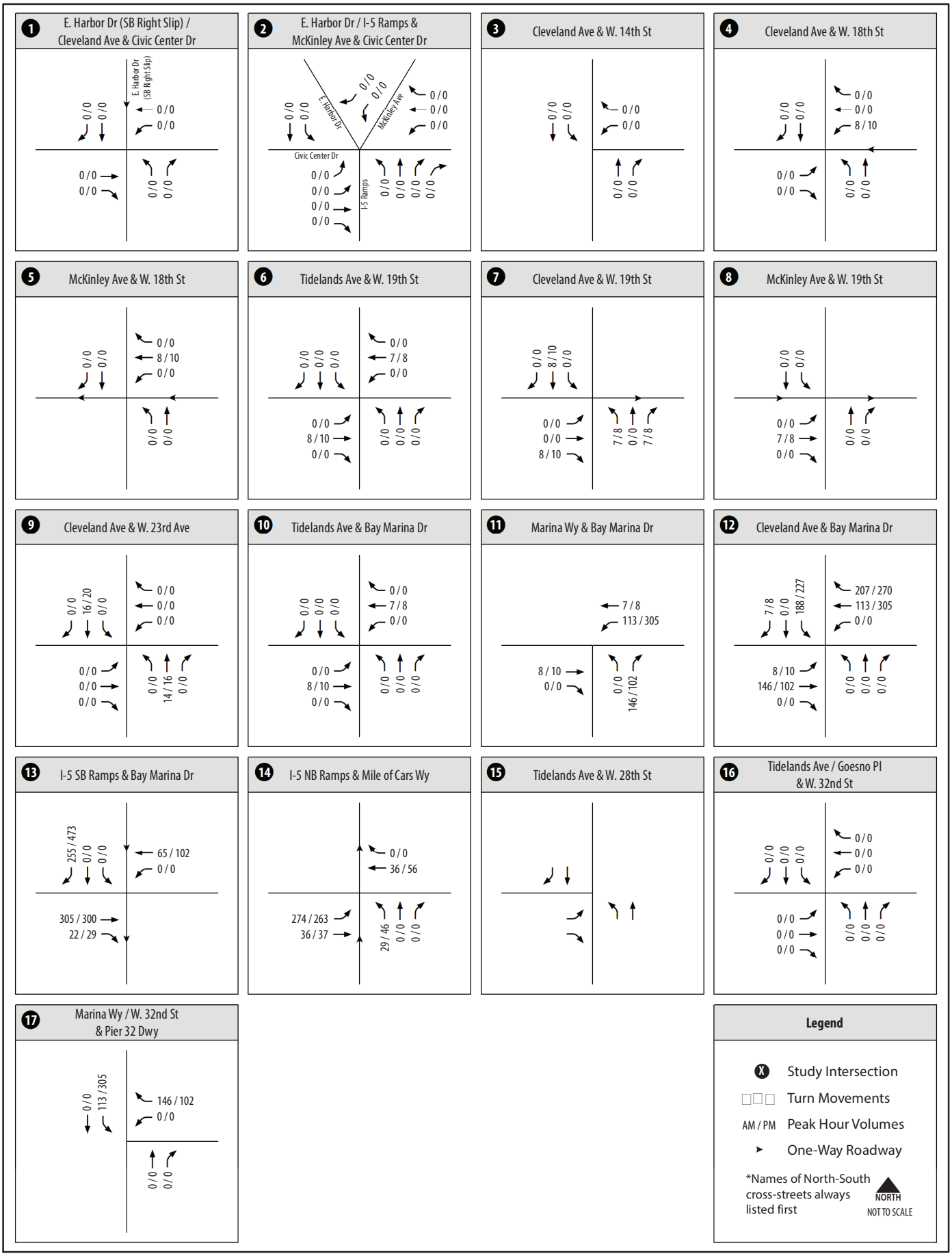

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Figure 3-2
Intersection AM/PM Peak Hour Traffic Volumes
Development Projects Trip Assignment

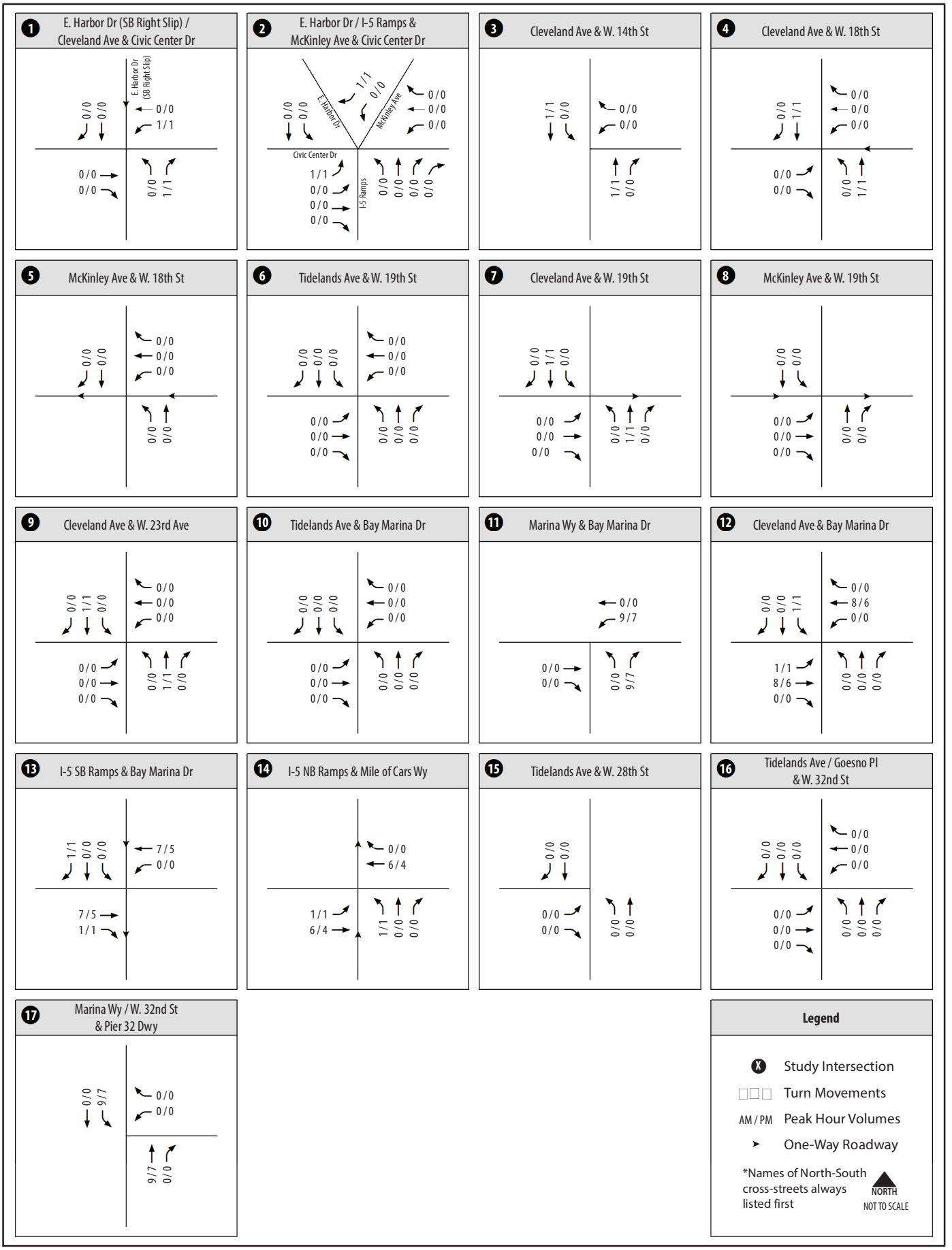

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Figure 3-2
Intersection AM/PM Peak Hour Traffic Volumes
District Public Works Trip Assignment

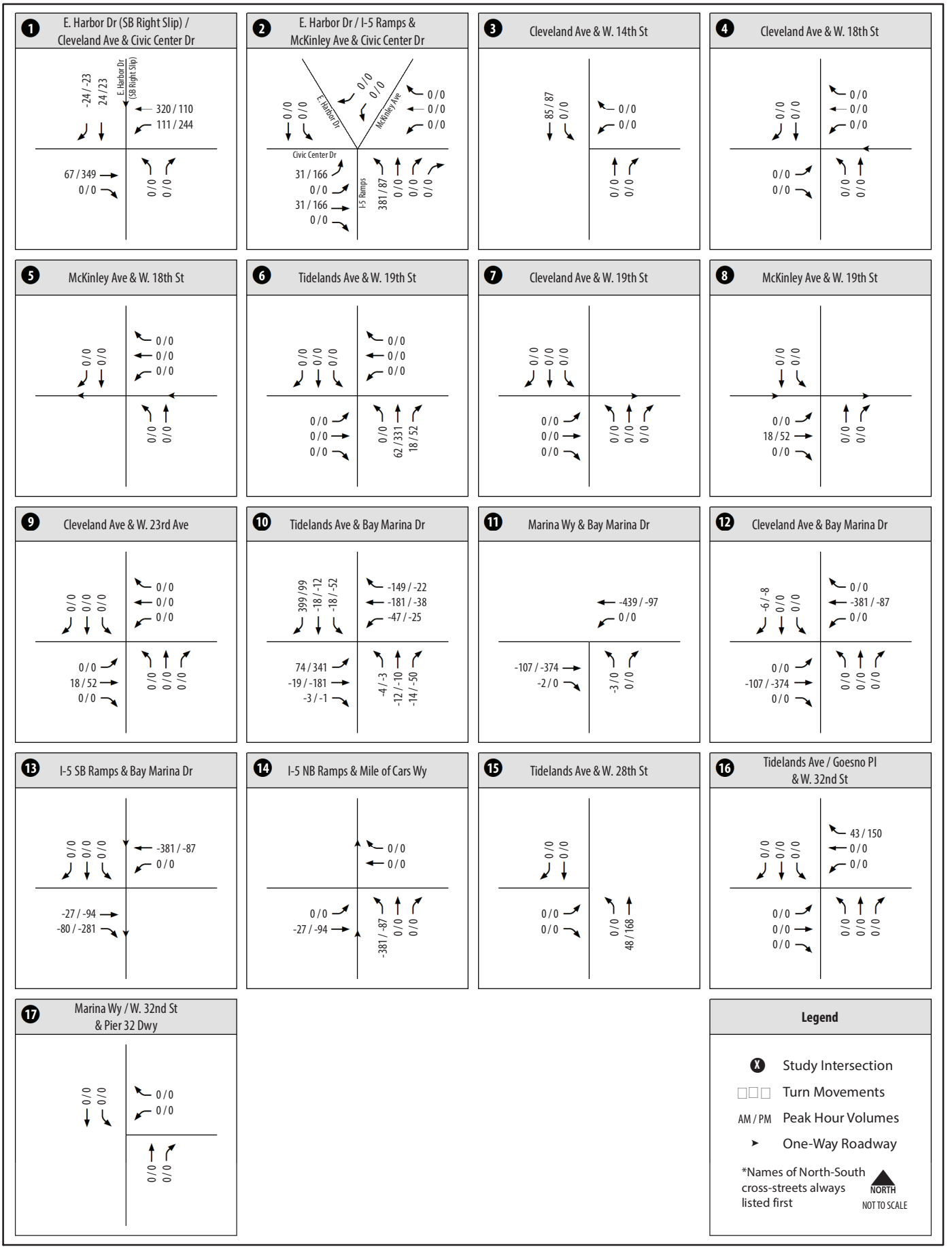

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Figure 3-3
Intersection AM/PM Peak Hour Traffic Volumes
Changes in Travel Patterns - Bay Marina Drive Closure

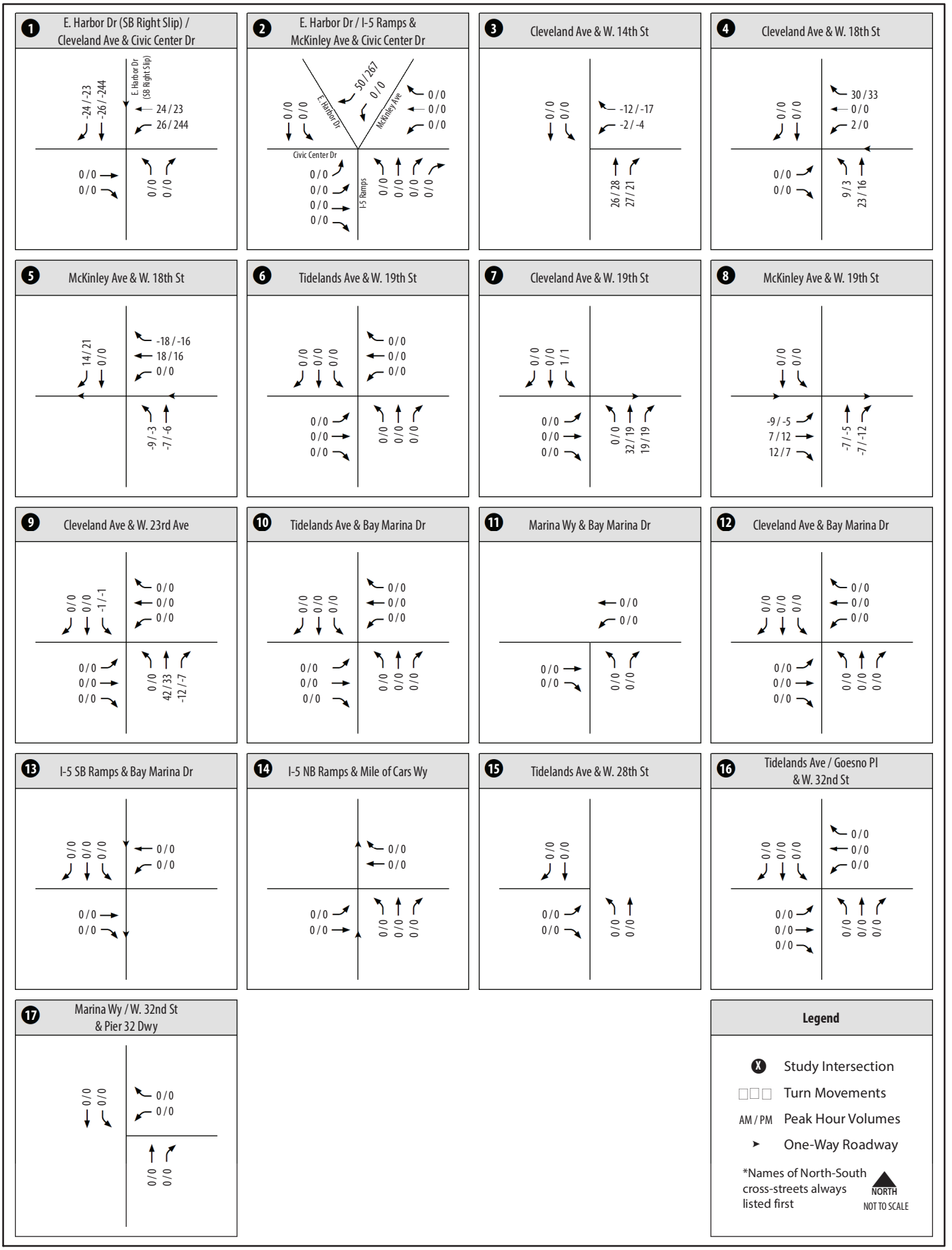

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Figure 3-3
Intersection AM/PM Peak Hour Traffic Volumes
Changes in Travel Patterns - McKinley Avenue Conversion

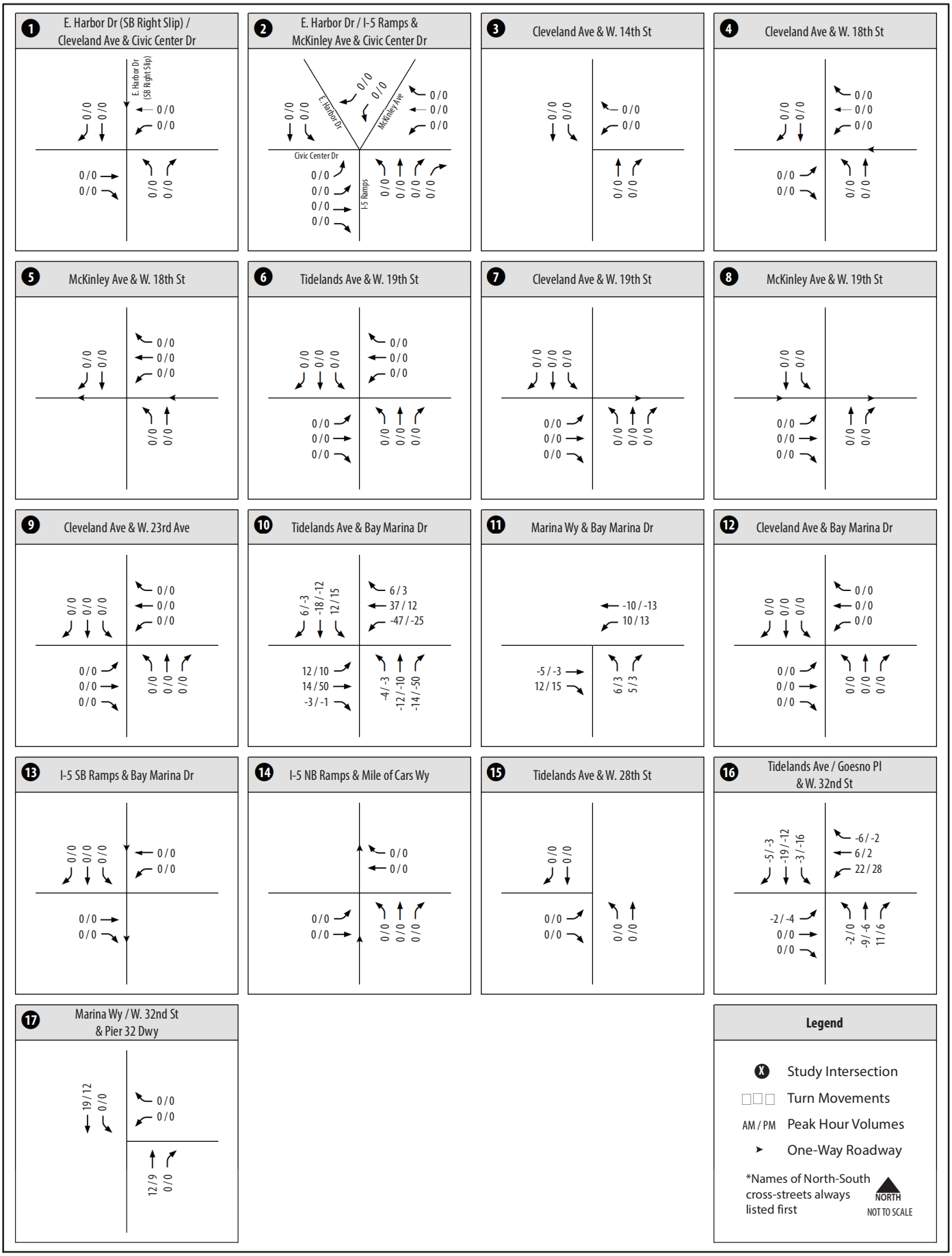

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Figure 3-3
Intersection AM/PM Peak Hour Traffic Volumes
Changes to Travel Patterns - Tidelands Avenue Closure

3.4 Project Study Area

This TIA was performed in accordance with the requirements of the *SANTEC/ITE Guidelines for Traffic Impact Studies within the San Diego Region, March 2000* requirements. The SANTEC/ITE guidelines require that the defined study area include all freeway segments, roadway segments, and intersections where the Proposed Project would add 50 or more peak hour trips in either direction, as well as any metered freeway ramps where the project would add 20 or more peak hour trips.

Study Roadway Segments

Based on the project trip assignment and redistribution of existing traffic (See Figures 3-2 and 3-3), the following key study area roadway segments were analyzed:

Tidelands Avenue between:

- Harbor Drive & West 19th Street
- 19th Street & Bay Marina Drive
- Bay Marina Drive & 32nd Street

McKinley Avenue between:

- West 14th Street & West 18th Street
- West 18th Street & West 19th Street
- West 19th Street & Cleveland Avenue

Cleveland Avenue between:

- Civic Center Drive & West 14th Street
- West 14th Street & West 18th Street
- West 18th Street & West 19th Street
- West 19th Street & West 23rd Street
- West 23rd Street and Bay Marina Drive

Bay Marina Drive between:

- Quay Avenue & Tidelands Avenue
- Tidelands Avenue & Marina Way
- Marina Way & Cleveland Avenue
- Cleveland Avenue & I-5 SB Ramps
- I-5 SB Ramps & I-5 NB Ramps

West 18th Street between:

- Cleveland Avenue & McKinley Avenue

West 19th Street between:

- Tidelands Avenue & Cleveland Avenue
- Cleveland Avenue & McKinley Avenue

Marina Way between:

- Bay Marina Drive & West 32nd Street

West 32nd Street between:

- Tidelands Avenue & Marina Way

Study Intersections

Based on the project trip assignment and redistribution of existing traffic (See Figures 3-2 and 3-3), the following 17 key study area intersections were analyzed:

1. Civic Center Drive / Cleveland Avenue
2. Civic Center Drive / East Harbor Drive / I-5 Ramps
3. Cleveland Avenue / 14th Street
4. Cleveland Avenue / 18th Street
5. McKinley Avenue / 18th Street
6. Tidelands Avenue / 19th Street
7. Cleveland Avenue/ 19th Street
8. McKinley Avenue / 19th Street
9. Cleveland Avenue / McKinley Avenue
10. Tidelands Avenue / Bay Marina Drive
11. Bay Marina Drive/ Marina Way
12. Cleveland Avenue / Bay Marina Drive
13. Bay Marina Drive / I-5 Southbound Ramps
14. Bay Marina Drive / I-5 Northbound Ramps
15. Tidelands Avenue / West 28th Street
16. West 32nd Street / Bay Marina Drive
17. Pier 32 Marina Driveway / Marina Way

Study Freeway Facilities

The Proposed Project is anticipated to contribute more than 50 peak hour trips on Interstate 5 (I-5) in either direction; therefore, freeway impact analyses, as specified in the SANTEC/ITE Guidelines, were conducted along the following freeway mainline segments:

- I-5, between I-15 and Division Street
- I-5, between Division Street and 8th Street
- I-5, between 8th Street and Civic Center Drive
- I-5, between Civic Center Drive and Bay Marina Drive
- I-5, between Bay Marina Drive and SR-54 Junction
- I-5, between SR-54 Junction and E Street

There are currently no ramp meters within the project study area.

Figure 3-4 displays the project study area. All key study facilities are located within the San Diego Unified Port District and the City of National City.



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Figure 3-4
Project Study Area

4.0 Existing Conditions

This section provides an analysis of the current traffic conditions both with and without the Proposed Project. The scenarios analyzed in this section include:

- Existing Conditions
- Existing Plus Development Projects
- Existing Plus District Public Works
- Existing Plus Total Bayfront
- Existing Plus Closure of Bay Marina Drive
- Existing Plus Partial Closure of Bay Marina Drive
- Existing Plus Total Bayfront with the Closure of Bay Marina Drive
- Existing Plus Total Bayfront with the Partial Closure of Bay Marina Drive

4.1 Existing Roadway Network

Four locally significant roadways traverse the study area. Each of the key roadways included in the study area are discussed below.

North-South Facilities

Interstate 5 (I-5) is a north-south freeway immediately east of the study area. This freeway provides regional access to the NCMT. Access from I-5 to the study area is taken from the Bay Marina Drive/Mile of Cars interchange, and the Civic Center Drive/Harbor Driver interchange to the north.

Cleveland Avenue is a two-lane roadway that connects Civic Center Drive in the north to Bay Marina Drive to the south. It has a center-left-turn-lane and provides access to multiple industrial uses and small business. Parallel parking is provided on both sides of the roadway and the posted speed limit is 35 mile per hour (mph). Sidewalks are provided on both sides of the roadway. There are currently no bike or transit facilities along Cleveland Avenue.

Tidelands Avenue is a four-lane undivided roadway with a posted speed limit of 35 mph. The roadway has a paved width of 62 feet. Parking is allowed on both sides of the roadway. Tidelands Avenue between Civic Center Drive and West 32nd Street provides Class II bicycle lanes on both sides of the roadway; towards the northern end of Tidelands Avenue near Civic Center Drive, a two-way Class IV cycle track exists on the west side of the road. Within the project study area, pedestrian facilities (sidewalks) are provided on both sides of the roadway. There are currently no transit facilities along Tidelands Avenue within the project study area.

Marina Way is a two-lane north-south roadway that connects Bay Marina Drive to the north to West 32nd Street to the south. It is generally an undivided roadway, but widens on the southern segment adjacent to Lot J, where it widens to a two-lane roadway with a center-turn lane and provides parallel parking on both sides of the roadway. A wide sidewalk currently exists on the

eastside of the roadway, but not on the westside. There are currently no bike or transit facilities along Marina Way.

McKinley Avenue is a two-lane north south roadway that connects 14th Street to the north to West 23rd Street to the south. It is an undivided roadway that provides parking on both sides of the road. It has a posted speed limit of 25 mph, and currently does not include any bike or transit facilities along the roadway.

East-West Facilities

Bay Marina Drive is a four-lane roadway from Terminal Avenue in the west to Marina Way in the east, where it then widens to five lanes to the I-5 Southbound ramps. This roadway is generally undivided with short pockets of segments with painted or raised medians. Bay Marina Drive has a posted speed limit of 30 mph and has a paved width of 62 feet. Parking is not allowed on either side of the roadway between Haffley Avenue and I-5; however, parking is allowed on both sides of the roadway west of Haffley Avenue. Within the project study area, pedestrian facilities (sidewalks) are provided on both sides of the roadway but bicycle facilities are non-existent. There are currently no transit facilities along Bay Marina Drive within the project study area.

Civic Center Drive is an undivided two-lane roadway that connects Tidelands Avenue on the west to National City Boulevard in the east. It has a posted speed limit of 30 mph and on-street parallel parking is provided on both sides of the street. Within the study area, portions of sidewalks exist between Tidelands Avenue and East Harbor Drive.

28th Street – Within the project study area, 28th Street is an undivided two-lane roadway with a posted speed limit of 35 mph. The roadway has a paved width of 45 feet. Parking is permitted on both sides of the roadway. West of Quay Avenue, 28th Street has sidewalk facilities on both sides of the roadway; however, between Quay Avenue and Tidelands Avenue, no sidewalk facilities are present. There are currently no bicycle or transit facilities along 28th Street within the project study area.

The existing roadway and intersection geometrics are shown in **Figure 4-1**.

4.2 Existing Intersection and Roadway Volumes

Figure 4-2 shows both the existing ADT volumes for study area roadway segments and the AM/PM peak hour traffic volumes for the key study area intersections. The roadway segment and study area intersection traffic counts were conducted in May and September 2017. Count worksheets are provided in **Appendix A**.

4.3 Existing LOS Analysis

Level of service analyses under Existing conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway results are discussed separately below.

Roadway Segment Analysis

Table 4.1 displays the LOS analysis results for key study area roadway segments under Existing conditions.

Table 4.1 Roadway Segment LOS Results - Existing Conditions

Roadway Segment	Segment	Functional Classification	Threshold (LOS E)	ADT	V/C	LOS
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,683	0.168	A
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	593	0.059	A
	West 18th Street to West 19th Street	2-Lane Collector	10,000	633	0.063	A
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	471	0.047	A
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,822	0.321	A
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,724	0.315	A
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,323	0.355	B
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,075	0.338	B
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	5,708	0.381	B
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	7,573	0.379	B
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	8,472	0.282	A
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	14,833	0.494	C
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	21,354	0.534	C
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,148	0.115	A
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	3,937	0.197	A
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,218	0.111	A
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,390	0.139	A
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	650	0.043	A

Source: NDS, Chen Ryan Associates; October 2019

Notes:
CLTL = Center-Left-Turn-Lane
V/C = Volume to Capacity Ratio.

As shown in the table, all key study roadway segments currently operate at LOS C or better.

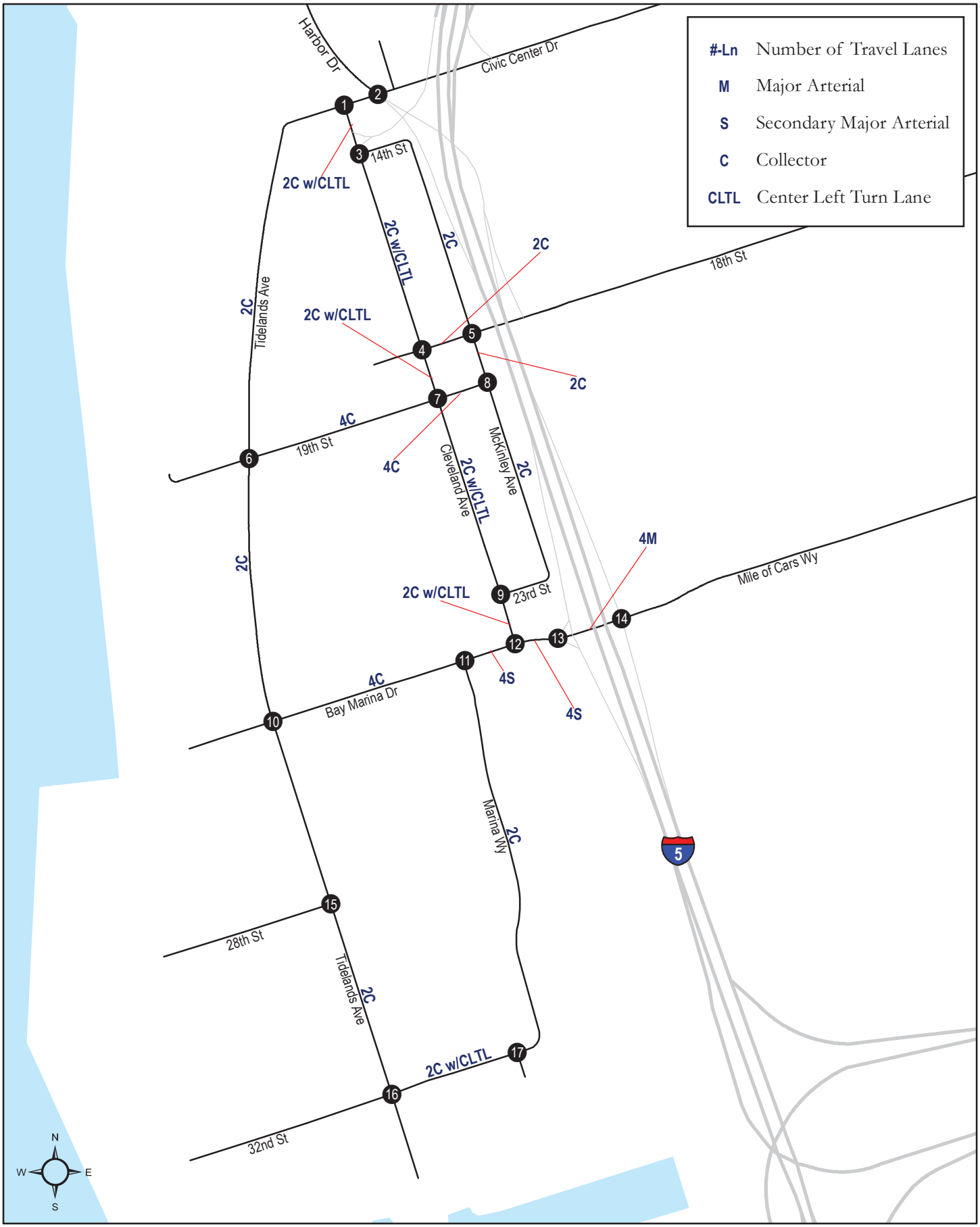

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Figure 4-1
Roadway Geometrics - Existing Conditions

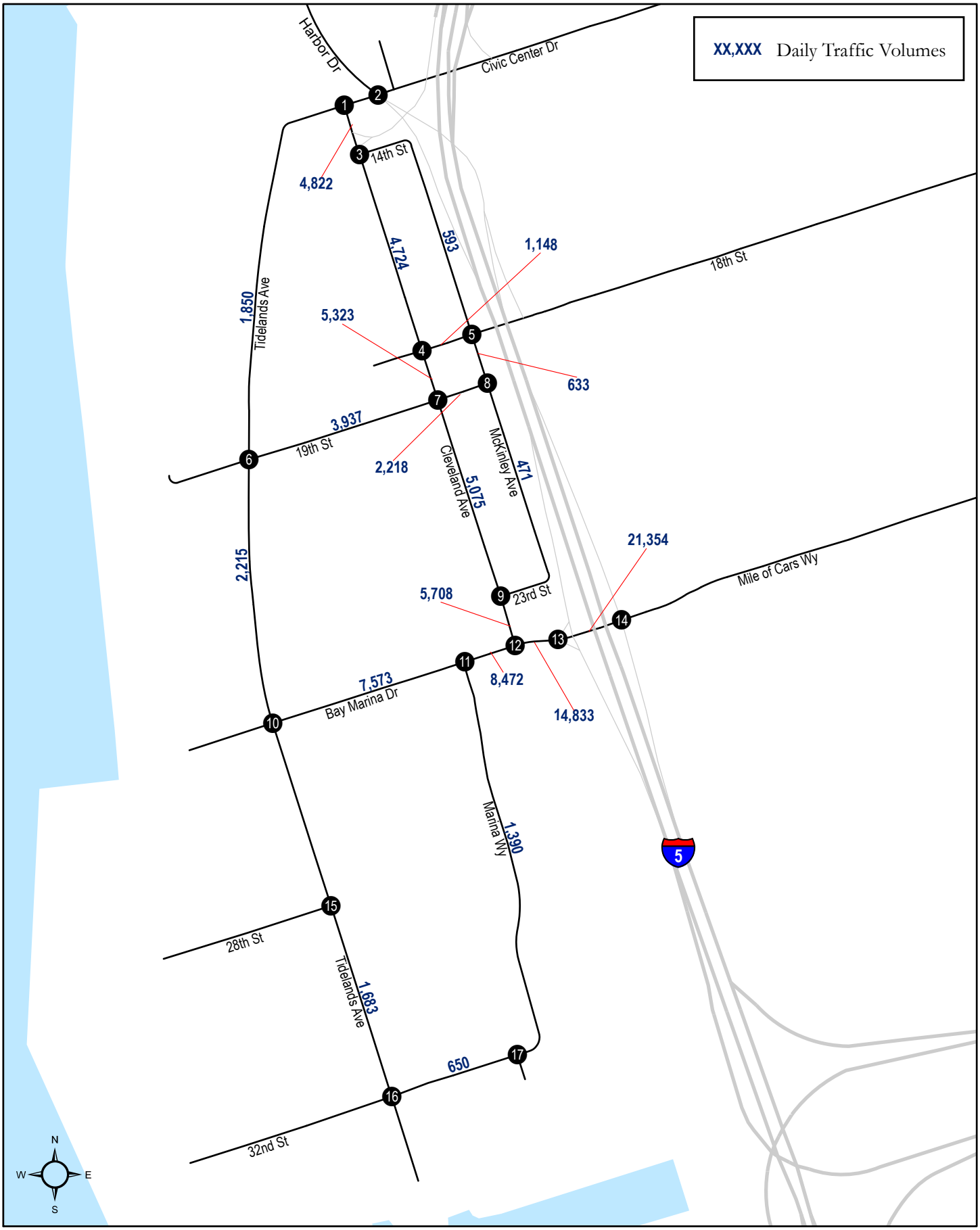

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Figure 4-2
Traffic Volumes - Existing Conditions

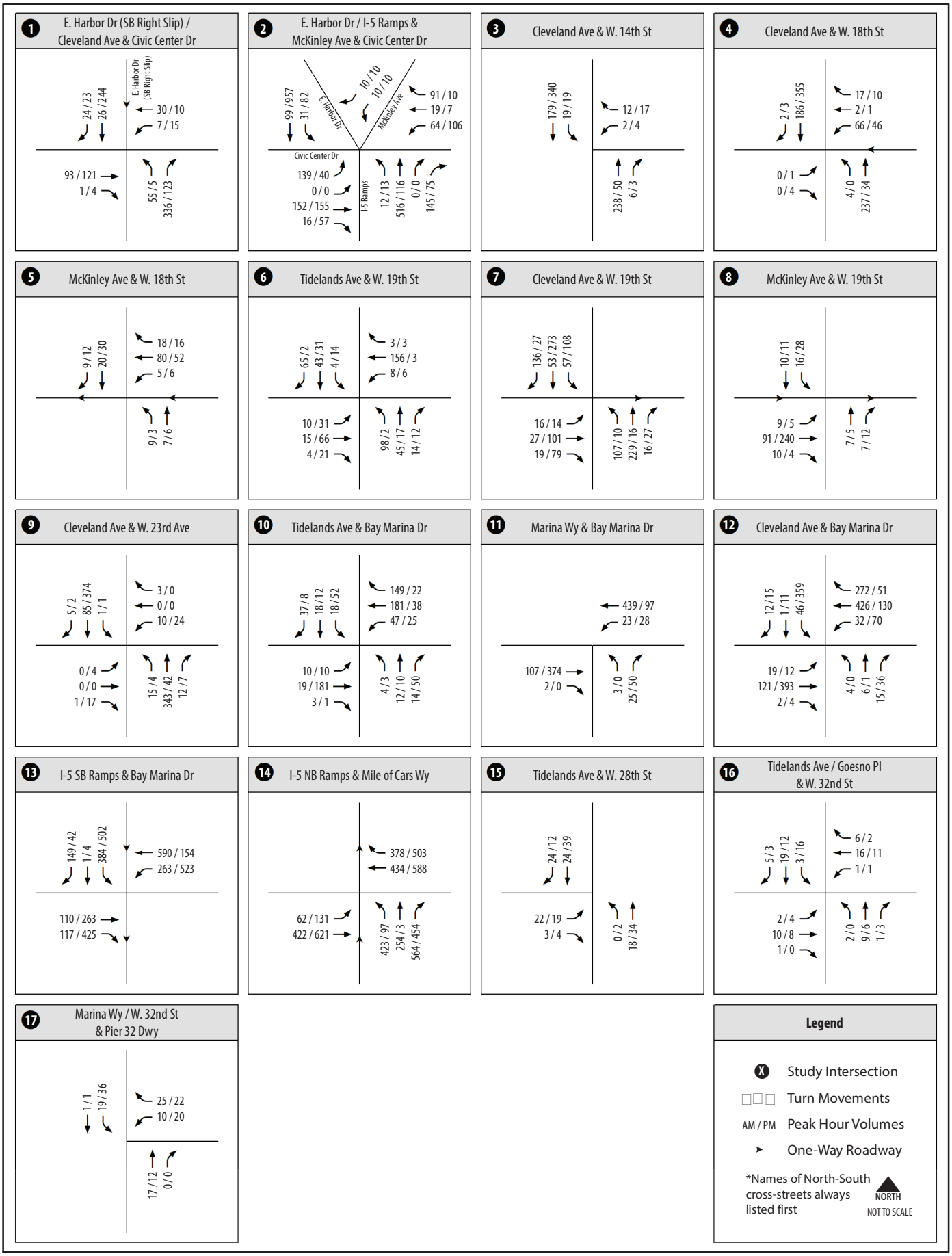

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Figure 4-2
Traffic Volumes - Existing Conditions

Intersection Analysis

Table 4.2 displays intersection LOS and average vehicle delay results for the key study area intersections under Existing conditions. LOS calculation worksheets for Existing Conditions are provided in **Appendix C**.

Table 4.2 Peak Hour Intersection LOS Results - Existing Conditions

#	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Cleveland Avenue & Civic Center Drive	SSSC	12.0	B	16.2	C
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	Signal	34.9	C	37.1	D
3	Cleveland Avenue & W 14th Street	SSSC	11.3	B	10.6	B
4	Cleveland Avenue & West 18th Street	SSSC	13.1	B	12.4	B
5	McKinley Avenue & West 18th Street	AWSC	9.7	A	9.7	A
6	Tidelands Avenue & West 19th Street	Signal	7.7	A	7.0	A
7	Cleveland Avenue & West 19th Street	SSSC	19.7	C	20.8	C
8	McKinley Avenue & West 19th Street	AWSC	9.7	A	10.8	B
9	Cleveland Avenue & McKinley Avenue	SSSC	13.8	B	14.0	B
10	Tidelands Avenue & Bay Marina Drive	Signal	7.2	A	7.4	A
11	Marina Way & Bay Marina Drive	Signal	4.1	A	7.3	A
12	Cleveland Avenue & Bay Marina Drive	Signal	11.2	B	14.8	B
13	I-5 SB Ramps & Bay Marina Drive	Signal	24.7	C	31.2	C
14	I-5 NB Off-Ramps & Bay Marina Drive	Signal	28.6	C	16.6	B
15	Tidelands Avenue & West 28th Street	SSSC	9.5	A	9.6	A
16	Tidelands Avenue & West 32nd Street	AWSC	7.6	A	7.7	A
17	West 32nd St & Marina Way	SSSC	8.6	A	7.4	A

Source: Chen Ryan Associates; March 2019

Notes:
AWSC indicates all way stop controlled intersection.
SSSC indicates side street stop-controlled intersection, the delay shown is the worst delay experienced by any of the approaches.

As shown, all key study area intersections currently operate at LOS D or better.

Freeway Segment LOS

Table 4.3 displays the LOS analysis results for the key study freeway segments. Year 2017, which is the latest data available, freeway volume information was obtained from Caltrans' *2017 Traffic Volumes on California State Highways* and are included in **Appendix D.**

Table 4.3 Freeway Segment LOS – Existing Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	LOS
I-5	I-15 & Division St	212,000	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,428	0.94	**E**
			SB	5M	11,750	60.9%	7.9%	5.0%	10,737	0.91	**E**
	Division St & 8th St	196,000	NB	4M	9400	78.0%	6.6%	5.0%	10,528	1.12	**F**
			SB	5M	11750	60.9%	7.9%	5.0%	9,937	0.85	D
	8th Street & Civic Center Dr	189,000	NB	4M	9,400	70.1%	6.2%	5.0%	8,628	0.92	**E**
			SB	5M	10,810	59.6%	7.8%	5.0%	9,337	0.86	D
	Civic Center Dr & Bay Marina Dr	190,000	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,728	0.66	C
			SB	5M	11,750	59.6%	7.8%	5.0%	9,337	0.79	D
	Bay Marina Dr & SR-54	190,000	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,763	0.67	C
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,345	0.71	D
	SR-54 & E St	132,000	NB	5M	11,750	70.1%	6.2%	5.0%	6,063	0.52	C
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	C

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
M = Mainline. A = Auxiliary Lane.
[a] Traffic volumes provided by Caltrans (2017).
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %,

As shown, all key study freeway segments currently operate at acceptable LOS D or better, with the exception of the following four (4) segments:

- I-5 between I-15 and Division Street – LOS E in the NB direction.
- I-5 between I-15 and Division Street – LOS E in the SB direction.
- I-5 between Division Street and 8th Street – LOS F in the NB direction.
- I-5 between 8th Street and Civic Center Drive – LOS E in the NB direction

4.4 Existing Plus Project Conditions

This section provides an analysis of existing traffic conditions with the addition of the Proposed Project. As noted in Section 3.1, the project includes multiple components, both land developments and infrastructure changes, that would increase or alter traffic in the study area. To understand and isolate the direct impacts associated with each project component, the following seven (7) Existing Plus Project scenarios were studied:

- Existing Plus Development Projects
- Existing Plus District Public Works
- Existing Plus Total Bayfront
- Existing Plus Closure of Bay Marina Drive
- Existing Plus Partial Closure of Bay Marina Drive
- Existing Plus Total Bayfront with the Closure of Bay Marina Drive
- Existing Plus Total Bayfront with the Partial Closure of Bay Marina Drive

4.5 Existing Plus Development Projects

Figure 4-3 displays the anticipated roadway and intersection geometrics for the Existing Plus Development Project scenario. Existing Plus Development Projects traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective project trip assignment volumes (displayed in Figure 3-2) and the respective projected trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for Existing Plus Development Project scenario are displayed in **Figure 4-4**.

Table 4.4 displays the LOS analysis results for key roadway segments under the Existing Plus Development Projects scenario. According to the results in Table 4.4, the addition of project trips associated with the Development Projects would cause a total of one (1) significant impact to the following study roadway:

- Bay Marina Drive between Cleveland Avenue the I-5 Southbound Ramps – LOS E

Table 4.5 displays the LOS analysis results for the study intersections under the Existing Plus Development Projects scenario. LOS calculation worksheets for Existing Plus Development Projects are provided in **Appendix E.** According to the results in Table 4.5, the addition of project trips associated with the Development Projects would cause a total of one (1) significant impact to the following intersection:

- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour

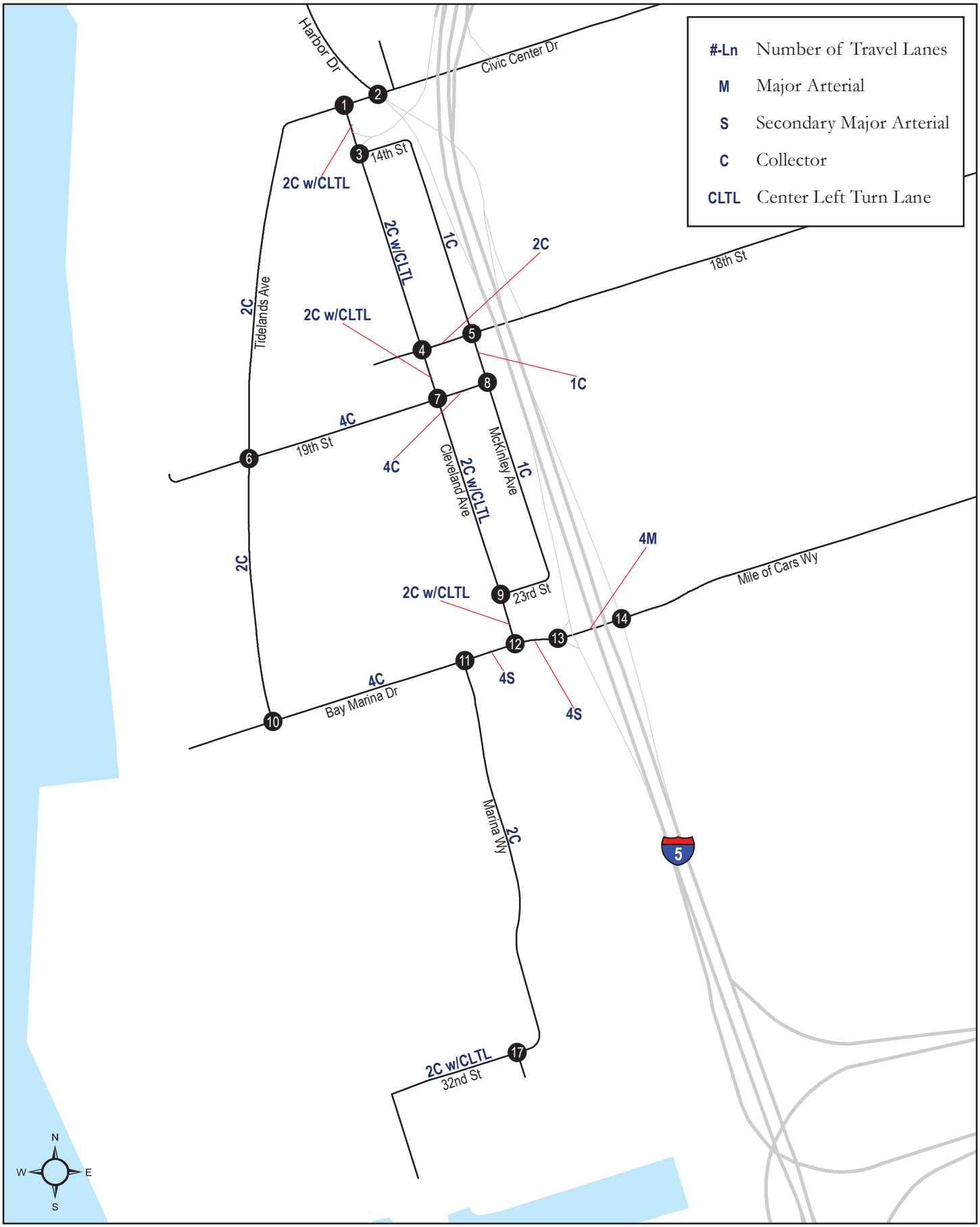

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Figure 4-3
Roadway Geometrics -
Development Projects Conditions

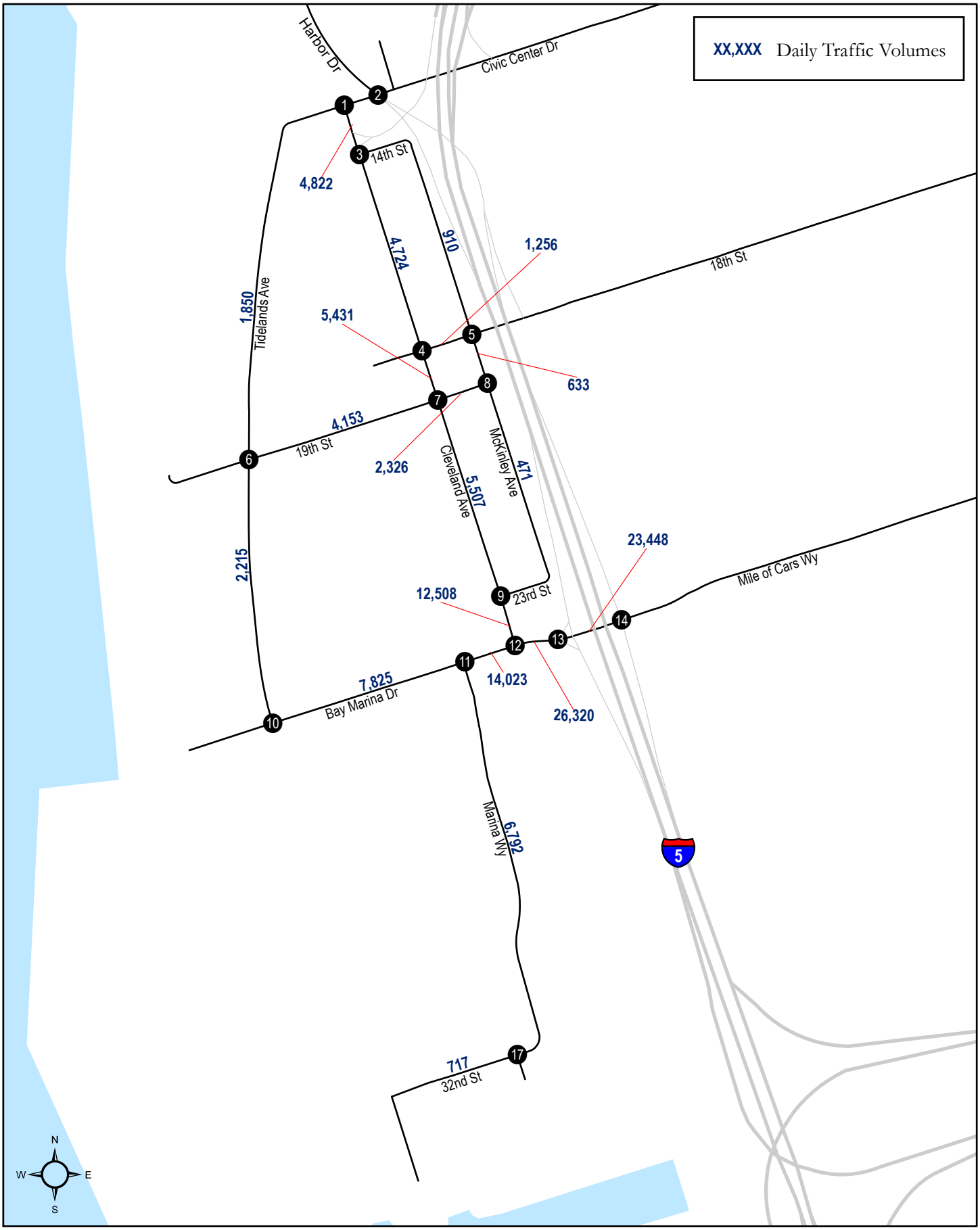

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Figure 4-4
Traffic Volumes -
Existing Plus Development Project Conditions

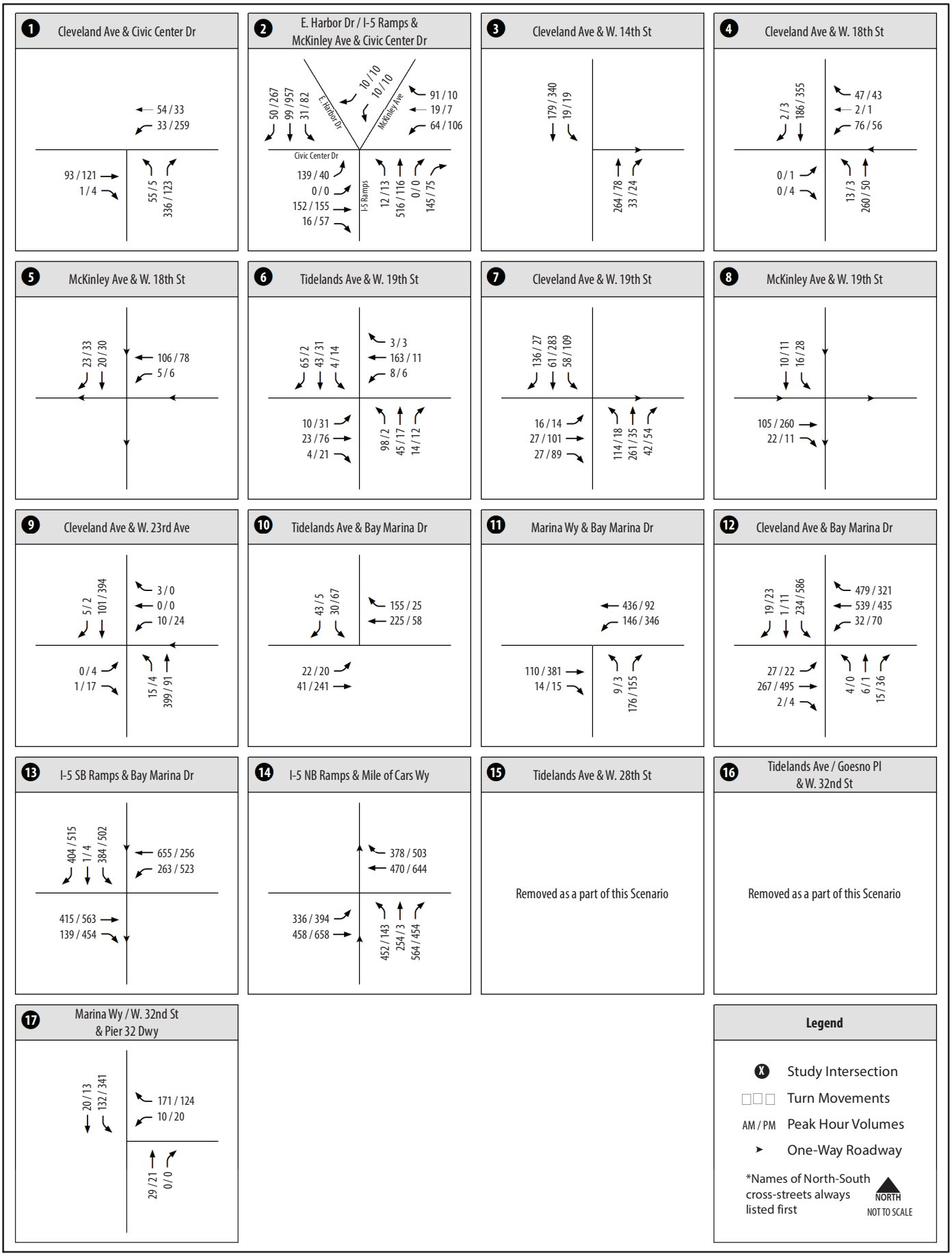

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Figure 4-4
Traffic Volumes -
Existing Plus Development Projects Conditions

Table 4.4 Roadway Segment LOS Results - Existing Plus Development Projects Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Development Projects			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850 / .185 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215 / .222 / A	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	910	0.182	A	593 / .059 / A	0.123	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	633	0.127	A	633 / .063 / A	0.063	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	471	0.094	A	471 / .047 / A	0.047	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,822	0.321	A	4,822 / .321 / A	0.000	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,724	0.315	A	4,724 / .315 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,431	0.362	B	5,323 / .355 / B	0.007	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,507	0.367	B	5,075 / .338 / B	0.029	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,508	0.834	D	5,708 / .381 / B	0.453	N
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	7,825	0.391	B	7,573 / .379 / B	0.013	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	14,023	0.467	C	8,472 / .282 / A	0.185	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	26,320	0.877	**E**	14,833 / .494 / C	0.383	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	23,448	0.586	C	21,354 / .534 / C	0.052	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,256	0.126	A	1,148 / .115 / A	0.011	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,153	0.208	A	3,937 / .197 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,326	0.116	A	2,218 / .111 / A	0.005	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,792	0.679	C	1,390 / .139 / A	0.540	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	717	0.048	A	650 / .043 / A	0.004	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) only roadway.

Table 4.5 Peak Hour Intersection LOS Results - Existing Plus Development Projects Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	12.0	B	25.5	D	12/16.2	B/C	0.0/9.3	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	34.4	C	35.0	C	34.9/37.1	C/D	-0.5/-2.1	N
3	Cleveland Avenue & W 14th Street	11.0	B	10.6	B	11.3/10.6	B/B	-0.3/0.0	N
4	Cleveland Avenue & West 18th Street	14.0	B	12.7	B	13.1/12.4	B/B	0.9/0.3	N
5	McKinley Avenue & West 18th Street	7.8	A	7.7	A	9.7/9.7	A/A	-1.9/-2.0	N
6	Tidelands Avenue & West 19th Street	7.8	A	7.0	A	7.7/7	A/A	0.1/0.0	N
7	Cleveland Avenue & West 19th Street	22.0	C	23.9	C	19.7/20.8	C/C	2.3/3.1	N
8	McKinley Avenue & West 19th Street	7.9	A	9.1	A	9.7/10.8	A/B	-1.8/-1.7	N
9	Cleveland Avenue & McKinley Avenue	13.3	B	13.6	B	13.8/14	B/B	-0.5/-0.4	N
10	Tidelands Avenue & Bay Marina Drive	6.7	A	6.4	A	7.2/7.4	A/A	-0.5/-1	N
11	Marina Way & Bay Marina Drive**	12.6	B	19.9	B	4.1/7.3	A/A	8.5/12.6	N
12	Cleveland Avenue & Bay Marina Drive	40.6	D	38.6	D	11.2/14.8	B/B	29.4/23.8	N
13	I-5 SB Ramps & Bay Marina Drive	27.7	C	57.8	**E**	24.7/31.2	C/C	3.0/26.6	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	49.4	D	23.7	C	28.6/16.6	C/B	20.8/7.1	N
15	Tidelands Avenue & West 28th Street*	Intersection Removed				9.5/9.6	A/A	-9.5/-9.6	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				7.6/7.7	A/A	-7.6/-7.7	N
17	West 32nd St & Marina Way	13.6	B	9.7	A	9.1/9.9	A/A	4.5/-0.2	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F

*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.

**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 4.6 displays the key study freeway mainline LOS under the Existing Plus Development Projects scenario. According to the results in Table 4.6, the addition of project trips associated with the Development Projects would cause a total of five (5) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Degrades to LOS E conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS E conditions

Table 4.6 Freeway Segment LOS - Existing Plus Development Projects Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	219,200	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,828	0.97	0.03	**E**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	11,137	0.95	0.04	**E**	**Y**
	Division Street and 8th Street	203,200	NB	4M	9400	78.0%	6.6%	5.0%	10,928	1.16	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	10,237	0.87	0.02	D	N
	8th Street and Civic Center Drive	196,200	NB	4M	9,400	70.1%	6.2%	5.0%	9,028	0.96	0.04	**E**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	9,637	0.89	0.03	**E**	**Y**
	Civic Center Drive and Bay Marina Drive	196,860	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,028	0.69	0.03	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,737	0.83	0.04	D	N
	Bay Marina Drive and SR-54 Junction	191,630	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,863	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,445	0.72	0.01	D	N
	SR-54 Junction and E Street	132,840	NB	5M	11,750	70.1%	6.2%	5.0%	6,163	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.6 Existing Plus District Public Works

Figure 4-5 displays the anticipated roadway and intersection geometrics for the Existing Plus District Public Works scenario. Existing Plus District Public Works Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective project trip assignment volumes (displayed in Figure 3-2) and the respective projected trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for Existing Plus District Public Works Project scenario are displayed in **Figure 4-6**.

Table 4.7 displays the LOS analysis results for key roadway segments under the Existing Plus District Public Works Project scenario. According to the results in Table 4.7, the addition of project trips associated with the District Public Works project would not cause a significant impact to any of the study roadways. All roadways are anticipated to operate at LOS D or better under Existing Plus District Public Works conditions.

Table 4.8 displays the LOS analysis results the study intersections under the Existing Plus District Public Works scenario. LOS calculation worksheets for Existing Plus District Public Works are provided in **Appendix E**. According to the results in Table 4.8, the addition of project trips associated with the District Public Works project would not cause a significant impact to any of the study intersections. All study intersections are anticipated to operate at LOS D or better under Existing Plus District Public Works conditions.

Table 4.9 displays the key study freeway mainline LOS under the Existing Plus District Public Works scenario. According to the results in Table 4.9, the addition of project trips associated with the District Public Works would not cause a significant impact to any of the study freeway mainline segments.

Although there are freeway segments that are projected to operate at LOS E or F, the addition of the District Public Works traffic does not cause an increase in the segment's v/c ratio of higher than 0.01. Therefore, based on the significance criteria presented in section 2.5, this freeway segment is not considered to be significantly impacted by the District Public Works project.

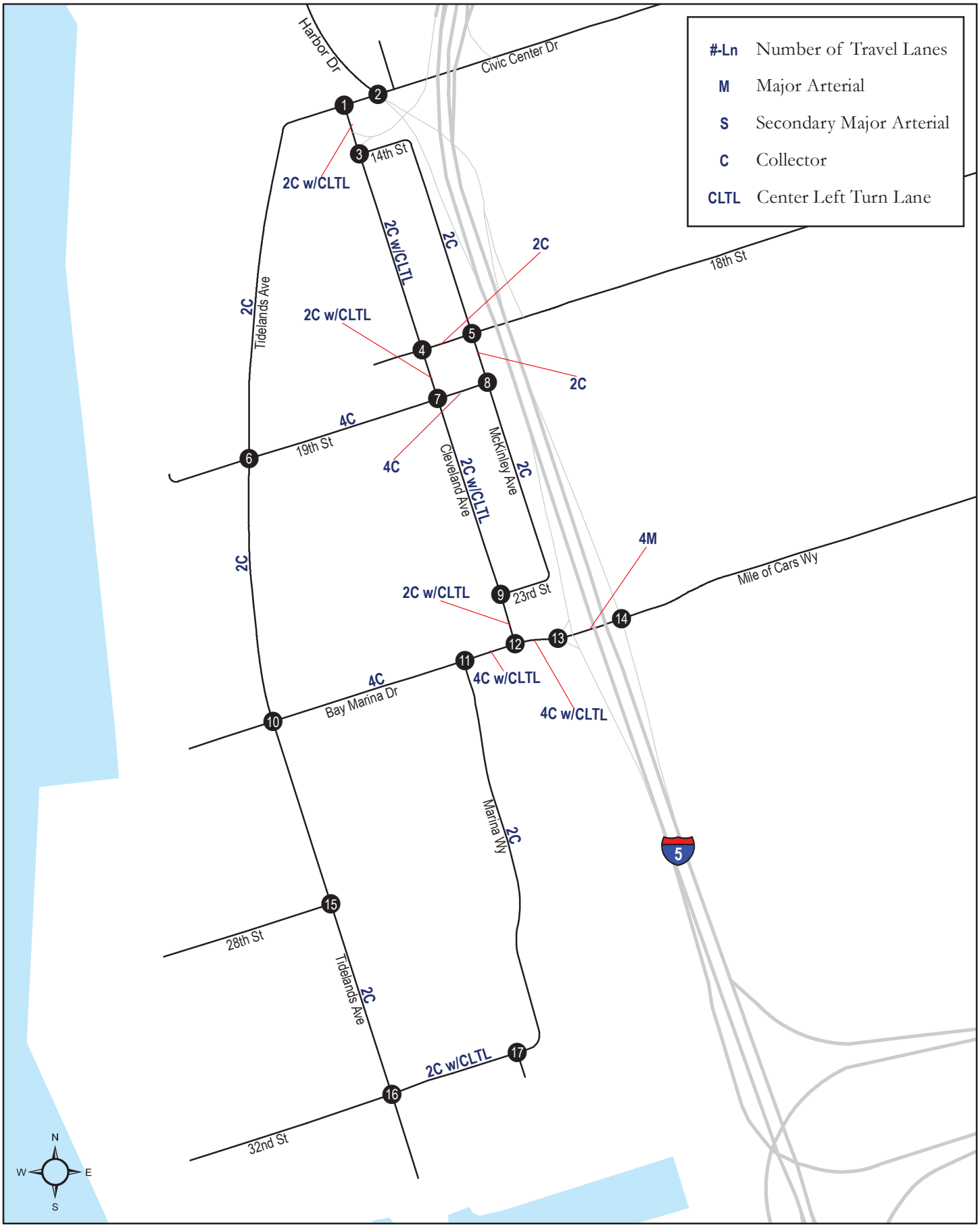

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Figure 4-5
Roadway Geometrics -
District Public Works Conditions

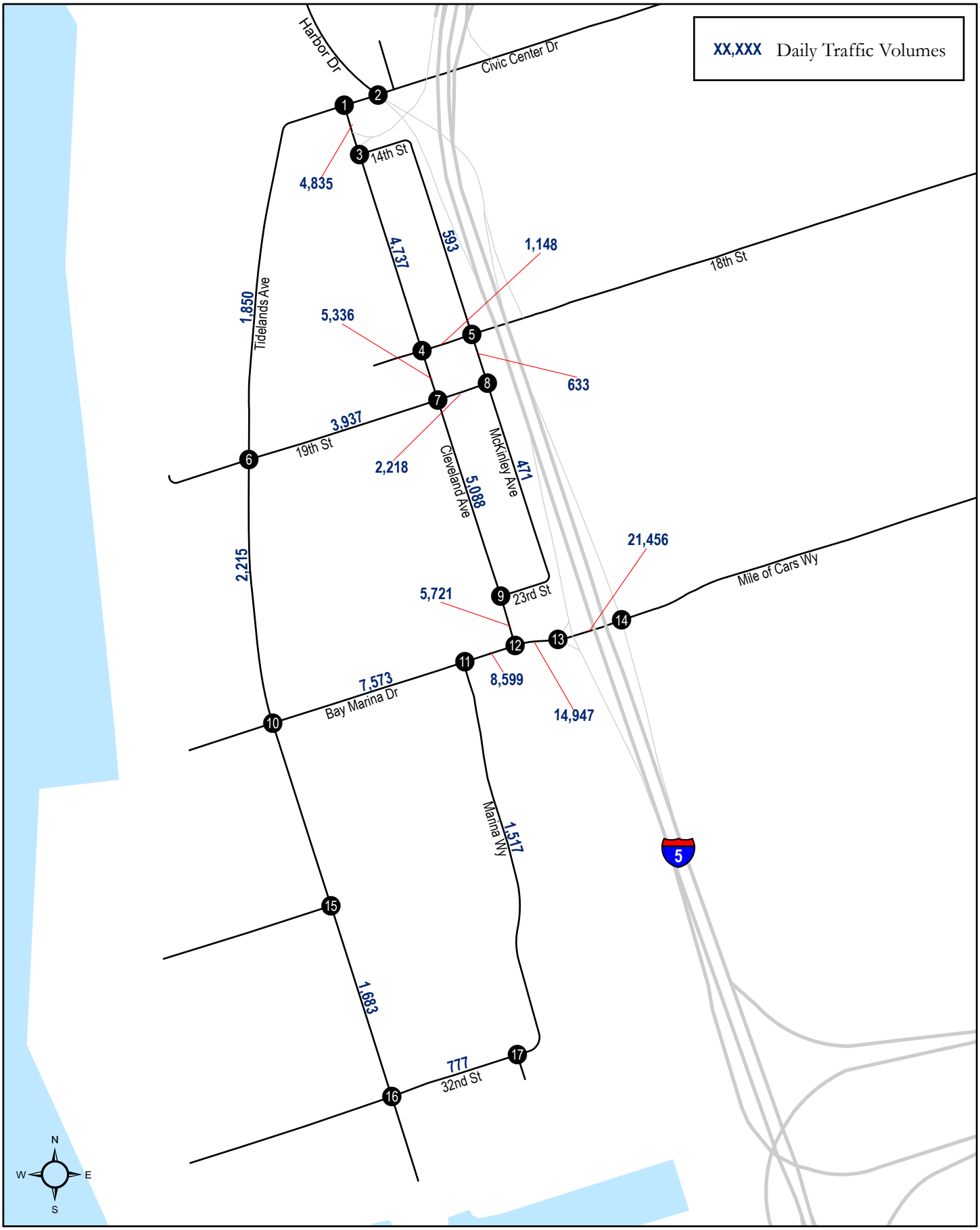

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Figure 4-6
Traffic Volumes -
Existing Plus District Public Works Conditions

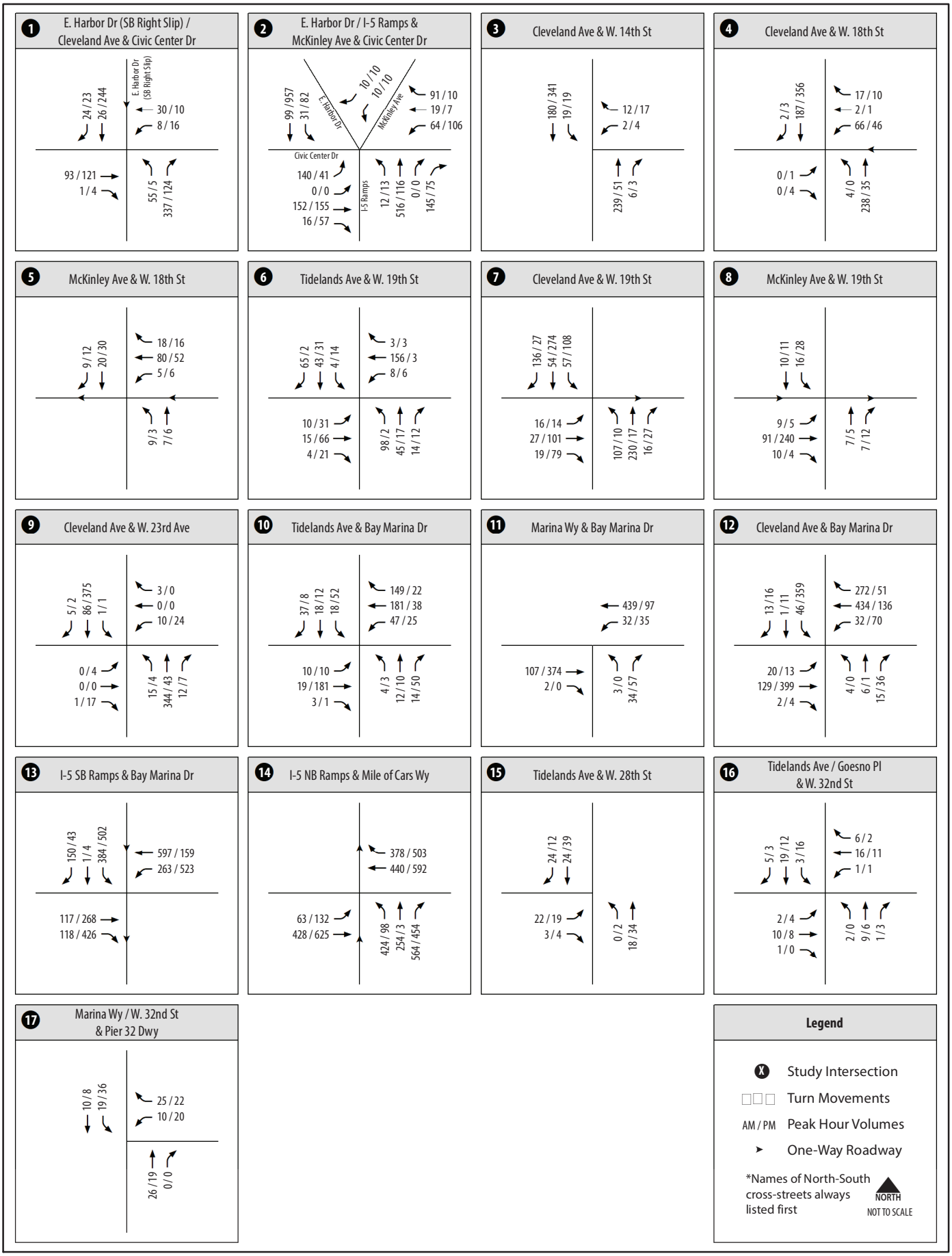

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Figure 4-6
Traffic Volumes -
Existing Plus District Public Works Conditions

Table 4.7 Roadway Segment LOS Results - Existing Plus District Public Works Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + District Public Works			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850 / .185 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215 / .222 / A	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,683	0.168	A	1,683 / .168 / A	0.000	N
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	593	0.059	A	593 / .059 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector	10,000	633	0.063	A	633 / .063 / A	0.000	N
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	471	0.047	A	471 / .047 / A	0.000	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,835	0.322	A	4,822 / .321 / A	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,737	0.316	A	4,724 / .315 / A	0.001	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,336	0.356	B	5,323 / .355 / B	0.001	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,088	0.339	B	5,075 / .338 / B	0.001	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	5,721	0.381	B	5,708 / .381 / B	0.001	N
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	7,573	0.379	B	7,573 / .379 / B	0.000	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	8,599	0.287	A	8,472 / .282 / A	0.004	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	14,947	0.498	C	14,833 / .494 / C	0.004	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	21,456	0.536	C	21,354 / .534 / C	0.003	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,148	0.115	A	1,148 / .115 / A	0.000	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	3,937	0.197	A	3,937 / .197 / A	0.000	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,218	0.111	A	2,218 / .111 / A	0.000	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,517	0.152	A	1,390 / .139 / A	0.013	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	777	0.052	A	650 / .043 / A	0.008	N

Source: Chen Ryan Associates; October 2019

Notes:
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant

Table 4.8 Peak Hour Intersection LOS Results - Existing Plus District Public Works Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	12.0	B	16.3	C	12/16.2	B/C	0.0/0.1	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	35.0	C	37.1	D	34.9/37.1	C/D	0.1/0.0	N
3	Cleveland Avenue & W 14th Street	11.3	B	10.6	B	11.3/10.6	B/B	0.0/0.0	N
4	Cleveland Avenue & West 18th Street	13.1	B	12.4	B	13.1/12.4	B/B	0.0/0.0	N
5	McKinley Avenue & West 18th Street	9.7	A	9.7	A	9.7/9.7	A/A	0.0/0.0	N
6	Tidelands Avenue & West 19th Street	7.7	A	7.0	A	7.7/7	A/A	0.0/0.0	N
7	Cleveland Avenue & West 19th Street	19.8	C	20.9	C	19.7/20.8	C/C	0.1/0.1	N
8	McKinley Avenue & West 19th Street	9.7	A	10.8	B	9.7/10.8	A/B	0.0/0.0	N
9	Cleveland Avenue & McKinley Avenue	13.8	B	14.0	B	13.8/14	B/B	0.0/0.0	N
10	Tidelands Avenue & Bay Marina Drive	7.2	A	7.4	A	7.2/7.4	A/A	0.0/0.0	N
11	Marina Way & Bay Marina Drive**	4.6	A	7.8	A	4.1/7.3	A/A	0.5/0.5	N
12	Cleveland Avenue & Bay Marina Drive	11.2	B	14.8	B	11.2/14.8	B/B	0.0/0.0	N
13	I-5 SB Ramps & Bay Marina Drive	24.7	C	31.2	C	24.7/31.2	C/C	0.0/0.0	N
14	I-5 NB Off-Ramps & Bay Marina Drive	28.6	C	16.7	B	28.6/16.6	C/B	0/0.1	N
15	Tidelands Avenue & West 28th Street	9.5	A	9.6	A	9.5/9.6	A/A	0.0/0.0	N
16	Tidelands Avenue & West 32nd Street*	7.6	A	7.7	A	7.6/7.7	A/A	0.0/0.0	N
17	West 32nd St & Marina Way	9.3	A	10.1	B	9.1/9.9	A/A	0.2/0.2	N

Source: Chen Ryan Associates; October 2019

Notes:
*Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 4.9 Freeway Segment LOS - Existing Plus District Public Works Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	212,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,428	0.94	0.00	**E**	N
			SB	5M	11,750	60.9%	7.9%	5.0%	10,737	0.91	0.00	**E**	N
	Division Street and 8th Street	196,110	NB	4M	9400	78.0%	6.6%	5.0%	10,528	1.12	0.00	**F**	N
			SB	5M	11750	60.9%	7.9%	5.0%	9,937	0.85	0.00	D	N
	8th Street and Civic Center Drive	189,110	NB	4M	9,400	70.1%	6.2%	5.0%	8,628	0.92	0.00	**E**	N
			SB	5M	10,810	59.6%	7.8%	5.0%	9,337	0.86	0.00	D	N
	Civic Center Drive and Bay Marina Drive	190,110	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,728	0.66	0.00	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,337	0.79	0.00	D	N
	Bay Marina Drive and SR-54 Junction	190,010	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,763	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,345	0.71	0.00	D	N
	SR-54 Junction and E Street	132,000	NB	5M	11,750	70.1%	6.2%	5.0%	6,063	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.7 Existing Plus Total Bayfront

Figure 4-7 displays the anticipated roadway and intersection geometrics for the Existing Plus Total Bayfront scenario. Existing Plus Total Bayfront traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective project trip assignment volumes (displayed in Figure 3-2) and the respective projected redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for the Existing Plus Total Bayfront scenario are displayed in **Figure 4-8**.

Table 4.10 displays the LOS analysis results for key roadway segments under the Existing Plus Total Bayfront scenario. According to the results in Table 4.10 the addition of project trips associated with the Total Bayfront project would cause a total of one (1) significant impact to the following study roadway:

- Bay Marina Drive between Cleveland Avenue the I-5 Southbound Ramps – LOS E

Table 4.11 displays the LOS analysis results the study intersections under the Existing Plus Total Bayfront scenario. LOS calculation worksheets for Existing Plus Total Bayfront are provided in **Appendix E**. According to the results in Table 4.11, the addition of project trips associated with the Total Bayfront project would cause a total of one (1) significant impact to the following intersection:

- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour

Table 4.12 displays the key study freeway mainline LOS under the Existing Plus Total Bayfront scenario. According to the results in Table 4.12, the addition of project trips associated with the Total Bayfront would cause a total of five (5) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Degrades to LOS E conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS E conditions

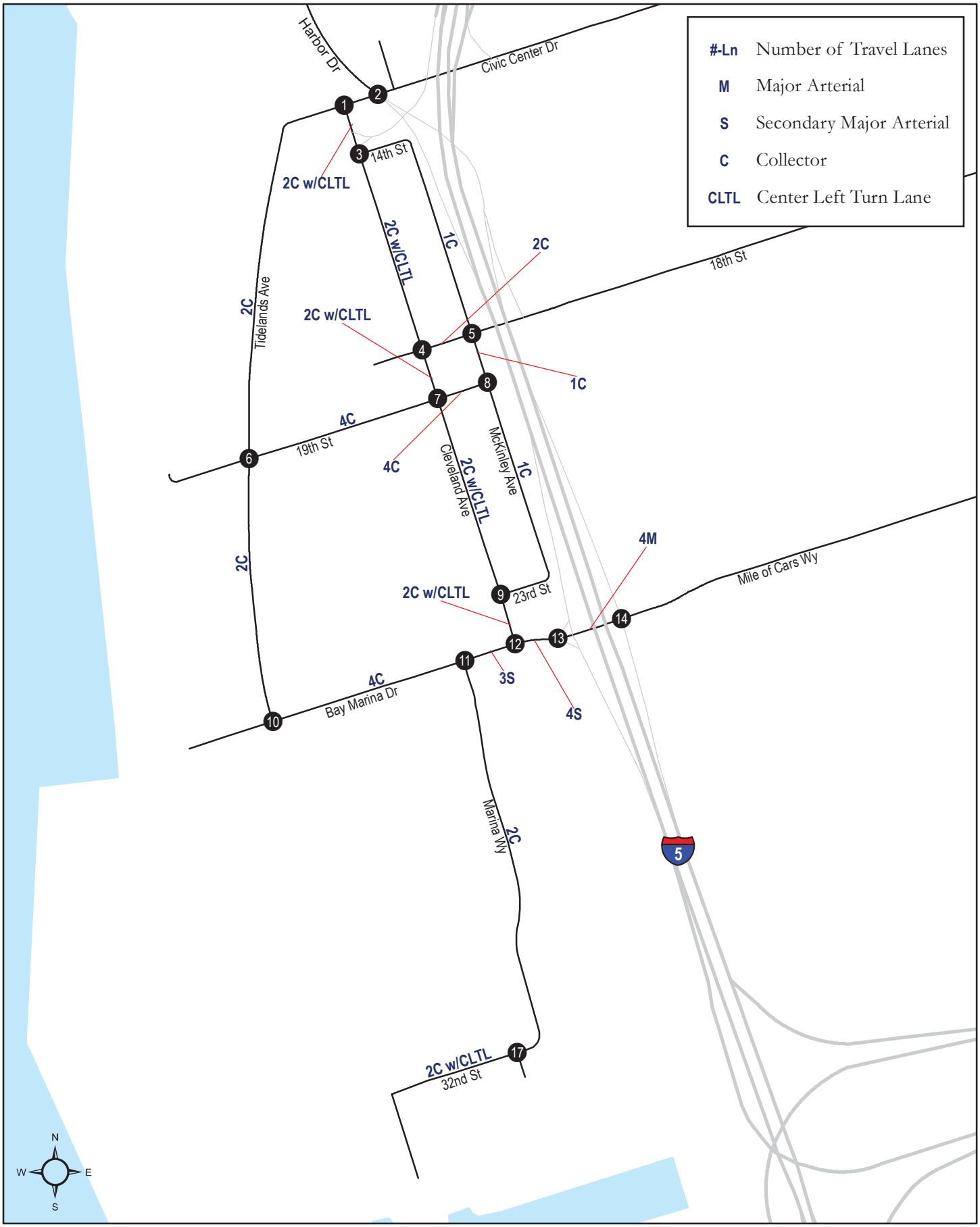

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Figure 4-7
Roadway Geometrics -
Total Bayfront Conditions

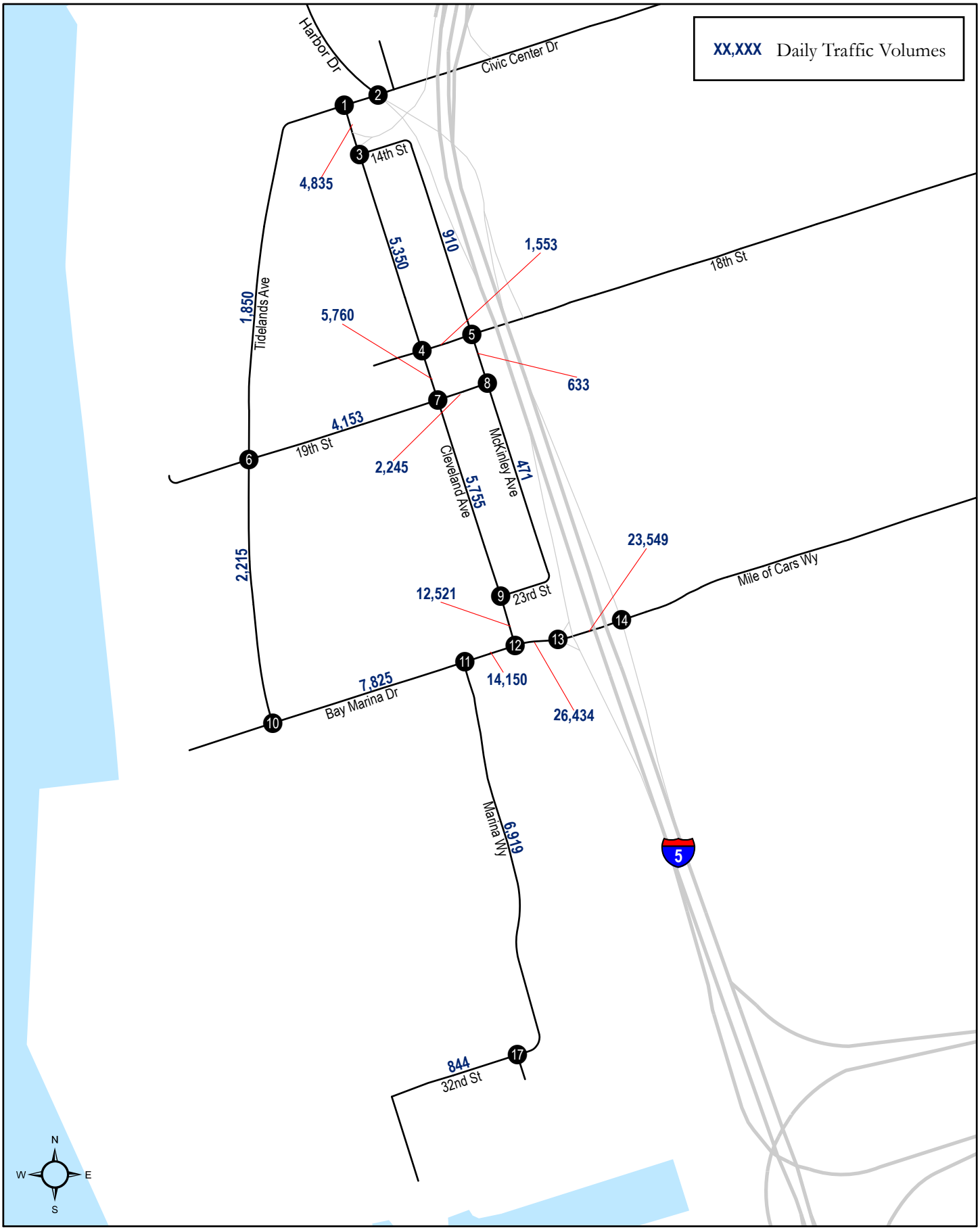

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Figure 4-8
Traffic Volumes -
Existing Plus Total Bayfront Conditions

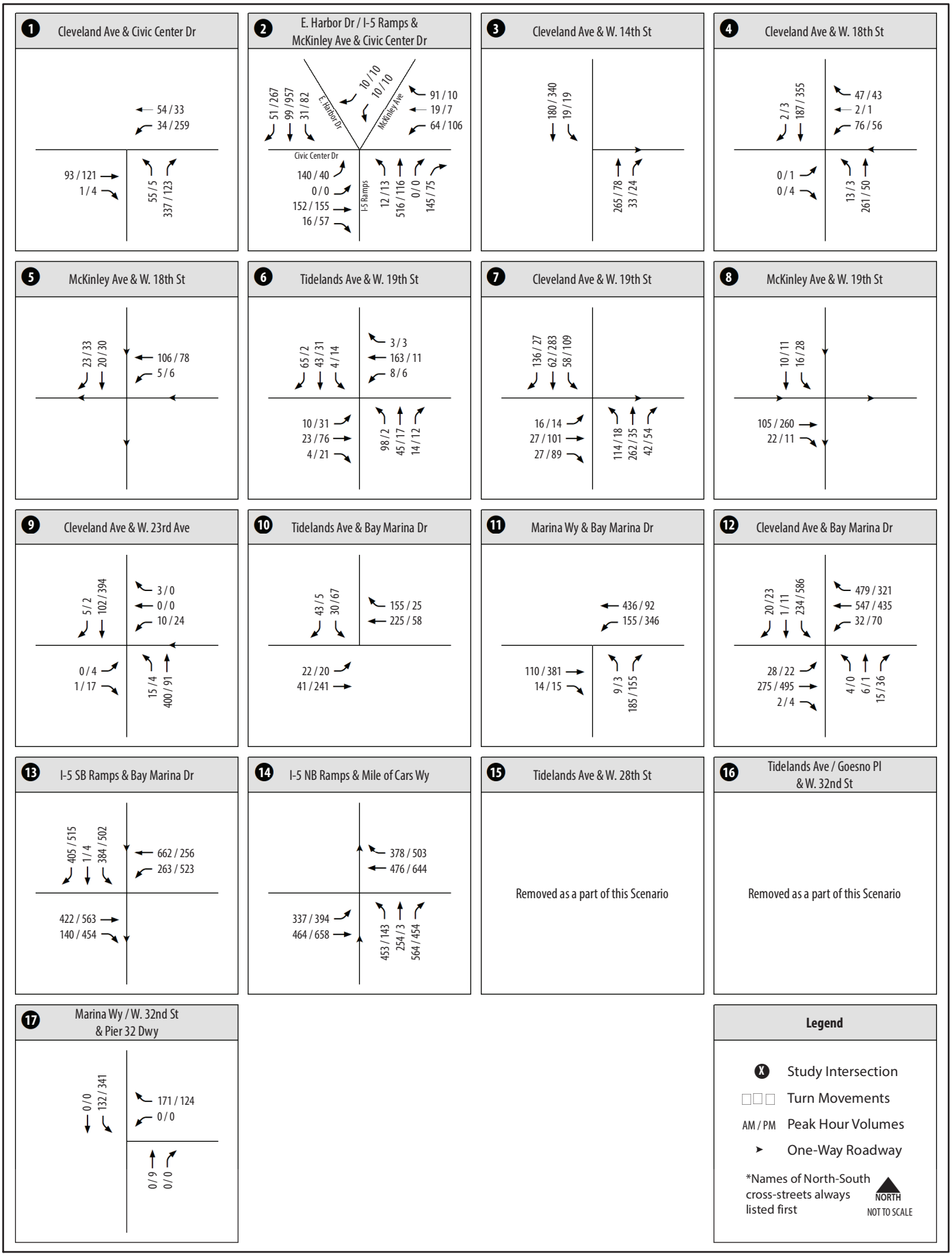

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Figure 4-8
Traffic Volumes -
Existing Plus Total Bayfront Conditions

Table 4.10 Roadway Segment LOS Results - Existing Plus Total Bayfront Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Total Bayfront			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850 / .185 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215 / .222 / A	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	910	0.182	A	593 / .059 / A	0.123	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	633	0.127	A	633 / .063 / A	0.063	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	471	0.094	A	471 / .047 / A	0.047	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,835	0.322	A	4,822 / .321 / A	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,350	0.357	B	4,724 / .315 / A	0.042	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,760	0.384	B	5,323 / .355 / B	0.029	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,755	0.384	B	5,075 / .338 / B	0.045	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,521	0.835	D	5,708 / .381 / B	0.454	N
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	7,825	0.391	B	7,573 / .379 / B	0.013	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	14,150	0.629	C	8,472 / .282 / A	0.346	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	26,434	0.881	**E**	14,833 / .494 / C	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	23,549	0.589	C	21,354 / .534 / C	0.055	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,553	0.155	A	1,148 / .115 / A	0.040	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,153	0.208	A	3,937 / .197 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,245	0.112	A	2,218 / .111 / A	0.001	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,919	0.692	C	1,390 / .139 / A	0.553	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	844	0.056	A	650 / .043 / A	0.013	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) only roadway

Table 4.11 Peak Hour Intersection LOS Results - Existing Plus Total Bayfront Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	12.0	B	25.5	D	12/16.2	B/C	0/9.3	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	31.9	C	30.8	C	34.9/37.1	C/D	-3.0/-6.3	N
3	Cleveland Avenue & W 14th Street	11.0	B	10.6	B	11.3/10.6	B/B	-0.3/0.0	N
4	Cleveland Avenue & West 18th Street	14.0	B	12.7	B	13.1/12.4	B/B	0.9/0.3	N
5	McKinley Avenue & West 18th Street	7.8	A	7.7	A	9.7/9.7	A/A	-1.9/-2.0	N
6	Tidelands Avenue & West 19th Street	7.8	A	7.0	A	7.7/7	A/A	0.1/0.0	N
7	Cleveland Avenue & West 19th Street	22.1	C	23.9	C	19.7/20.8	C/C	2.4/3.1	N
8	McKinley Avenue & West 19th Street	7.9	A	9.1	A	9.7/10.8	A/B	-1.8/-1.7	N
9	Cleveland Avenue & McKinley Avenue	13.4	B	13.6	B	13.8/14	B/B	-0.4/-0.4	N
10	Tidelands Avenue & Bay Marina Drive	6.7	A	6.4	A	7.2/7.4	A/A	-0.5/-1.0	N
11	Marina Way & Bay Marina Drive**	11.4	B	26.3	C	4.1/7.3	A/A	7.3/19.0	N
12	Cleveland Avenue & Bay Marina Drive	19.3	B	24.4	C	11.2/14.8	B/B	8.1/9.6	N
13	I-5 SB Ramps & Bay Marina Drive	27.7	C	57.0	**E**	24.7/31.2	C/C	3.0/25.8	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	49.4	D	23.7	C	28.6/16.6	C/B	20.8/7.1	N
15	Tidelands Avenue & West 28th Street*	Intersection Removed				9.5/9.6	A/A	-9.5/-9.6	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				7.6/7.7	A/A	-7.6/-7.7	N
17	West 32nd St & Marina Way	12.6	B	10.6	B	9.1/9.9	A/A	3.5/0.7	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 4.12 Freeway Segment LOS - Existing Plus Total Bayfront Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	219,200	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,828	0.97	0.03	**E**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	11,137	0.95	0.04	**E**	**Y**
	Division Street and 8th Street	203,310	NB	4M	9400	78.0%	6.6%	5.0%	10,928	1.16	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	10,337	0.88	0.03	D	N
	8th Street and Civic Center Drive	196,310	NB	4M	9,400	70.1%	6.2%	5.0%	9,028	0.96	0.04	**E**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	9,737	0.90	0.04	**E**	**Y**
	Civic Center Drive and Bay Marina Drive	196,970	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,028	0.69	0.03	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,737	0.83	0.04	D	N
	Bay Marina Drive and SR-54 Junction	191,640	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,863	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,445	0.72	0.01	D	N
	SR-54 Junction and E Street	132,840	NB	5M	11,750	70.1%	6.2%	5.0%	6,163	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.8 Existing Plus Closure of Bay Marina Drive

Figure 4-9 displays the anticipated roadway and intersection geometrics for the Existing Plus Closure of Bay Marina Drive scenario. Existing Plus Closure of Bay Marina Drive traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for the Existing Plus Closure of Bay Marina Drive scenario are displayed in **Figure 4-10**.

Table 4.13 displays the LOS analysis results for key roadway segments under the Existing Plus Closure of Bay Marina Drive scenario. According to the results in Table 4.13, the addition of project trips associated with the Closure of Bay Marina would not cause a significant impact to any of the study roadways. All roadways are anticipated to operate at LOS D or better under Existing Plus Closure of Bay Marina Drive conditions.

Table 4.14 displays the LOS analysis results for key roadway segments under the Existing Plus Closure of Bay Marina Drive scenario. LOS calculation worksheets for Existing Plus Closure of Bay Marina are provided in **Appendix E**. According to the results in Table 4.14, the addition of project trips associated with the Closure of Bay Marina would cause a total of two (2) significant impacts to the following intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – Degrades to LOS F in the PM peak hour
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – Degrades to LOS E in the AM and PM peak hours

Table 4.15 displays the key study freeway mainline LOS under the Existing Plus Closure of Bay Marina Drive scenario. According to the results in Table 4.15, the addition of project trips associated with the Closure of Bay Marina Drive would not cause a significant impact to any of the study freeway mainline segments.

Although there are freeway segments that are projected to operate at LOS E or F, the addition of the Closure of Bay Marina Drive traffic does not cause an increase in the segment's v/c ratio of higher than 0.01. Therefore, based on the significance criteria presented in section 2.5, this freeway segment is not considered to be significantly impacted by the Closure of Bay Marina Drive.

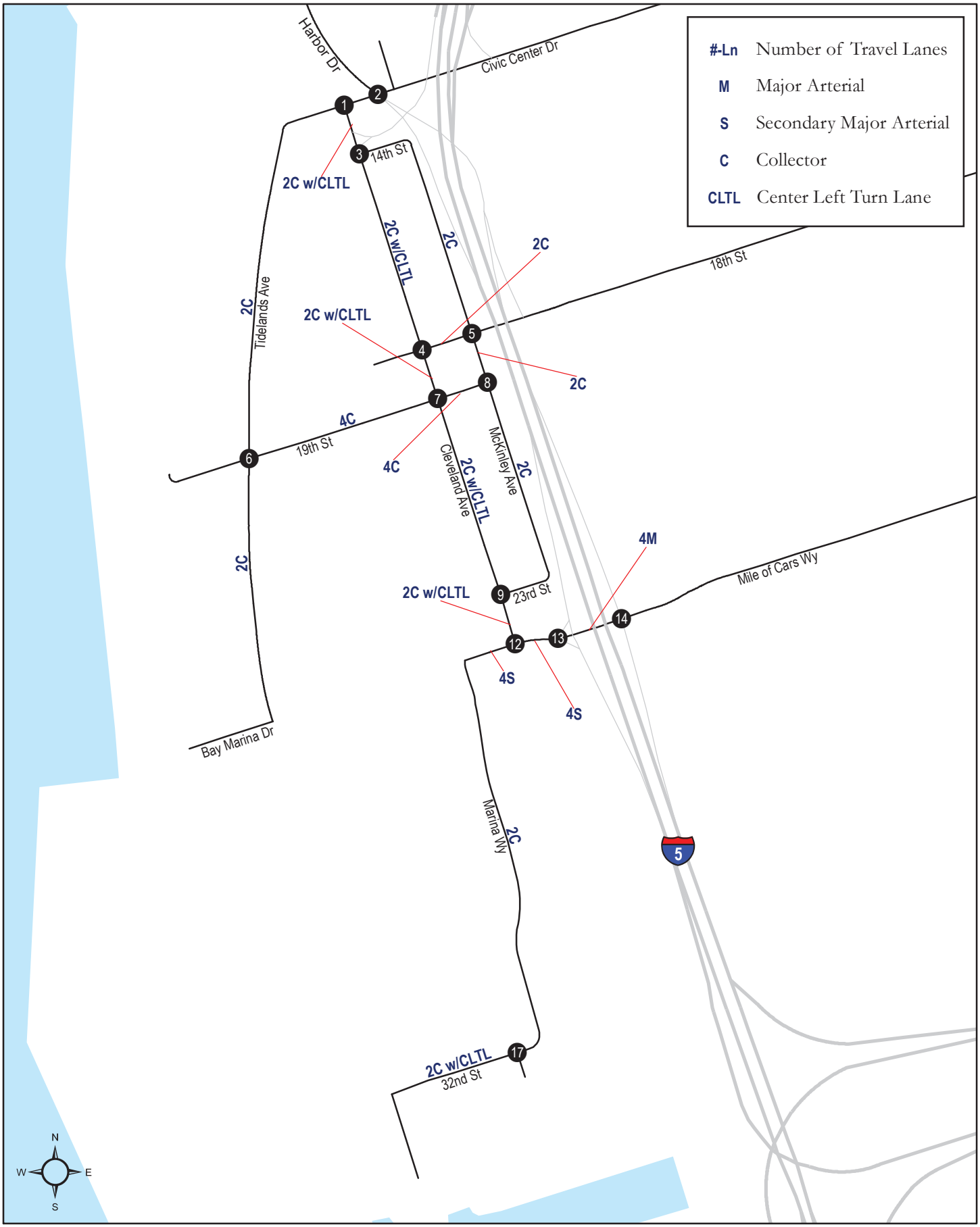

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Figure 4-9
Roadway Geometrics -
Closure of Bay Marina Drive Conditions

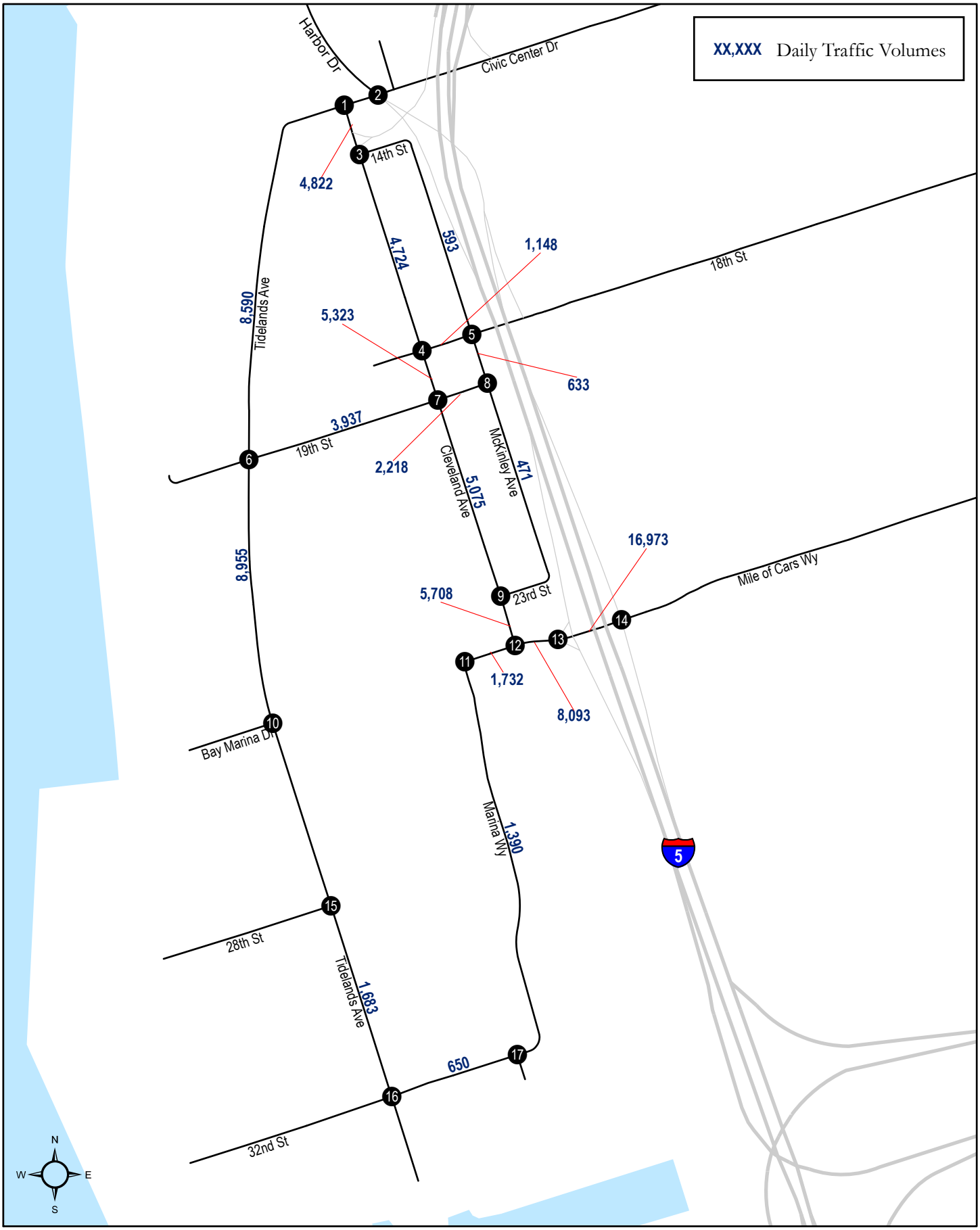

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Figure 4-10
Traffic Volumes -
Existing Plus Closure of Bay Marina Drive Conditions

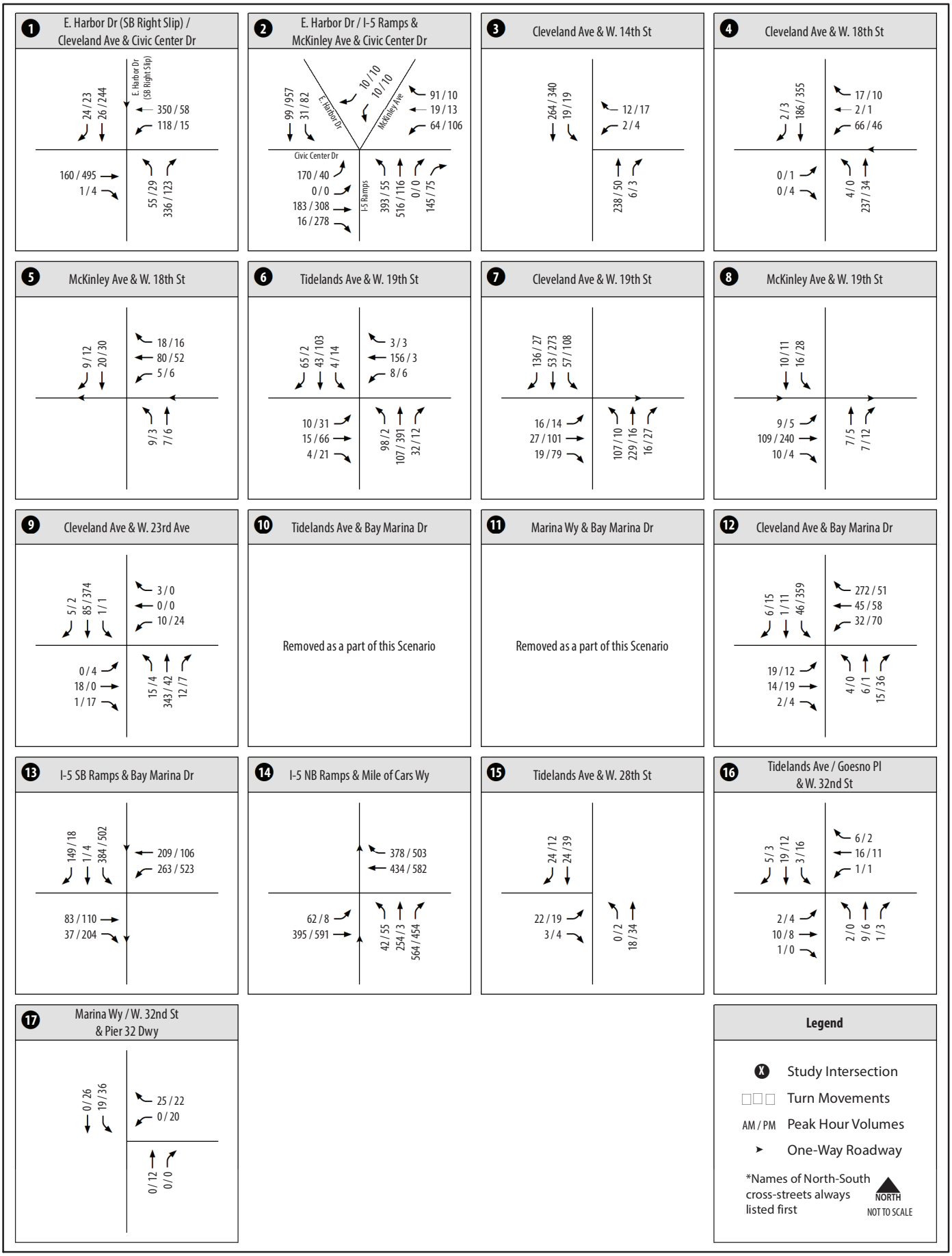

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Figure 4-10
Traffic Volumes -
Existing Plus Closure of Bay Marina Drive Conditions

Table 4.13 Roadway Segment LOS Results - Existing Plus Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Closure of Bay Marina Drive			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	8,590	0.859	D	1,850 / .185 / A	0.674	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	8,955	0.895	D	2,215 / .222 / A	0.674	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,683	0.168	A	1,683 / .168 / A	0.000	N
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	593	0.059	A	593 / .059 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector	10,000	633	0.063	A	633 / .063 / A	0.000	N
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	471	0.047	A	471 / .047 / A	0.000	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,822	0.321	A	4,822 / .321 / A	0.000	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,724	0.315	A	4,724 / .315 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,323	0.355	B	5,323 / .355 / B	0.000	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,075	0.338	B	5,075 / .338 / B	0.000	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	5,708	0.381	B	5,708 / .381 / B	0.000	N
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	Roadway Segment Closed			7,573 / .379 / B	-0.379	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	1,732	0.058	A	8,472 / .282 / A	-0.225	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	8,093	0.270	A	14,833 / .494 / C	-0.225	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	16,973	0.424	B	21,354 / .534 / C	-0.110	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,148	0.115	A	1,148 / .115 / A	0.000	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	3,937	0.197	A	3,937 / .197 / A	0.000	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,218	0.111	A	2,218 / .111 / A	0.000	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,390	0.139	A	1,390 / .139 / A	0.000	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	650	0.043	A	650 / .043 / A	0.000	N

Source: Chen Ryan Associates; October 2019

Notes:
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant

Table 4.14 Peak Hour Intersection LOS Results - Existing Plus Closure of Bay Marina Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	33.3	D	167.5	**F**	12/16.2	B/C	21.3/151.3	**Y**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	66.7	**E**	65.3	**E**	34.9/37.1	C/D	31.8/28.2	**Y**
3	Cleveland Avenue & W 14th Street	12.3	B	10.6	B	11.3/10.6	B/B	1.0/0.0	N
4	Cleveland Avenue & West 18th Street	13.1	B	12.4	B	13.1/12.4	B/B	0.0/0.0	N
5	McKinley Avenue & West 18th Street	9.7	A	9.7	A	9.7/9.7	A/A	0.0/0.0	N
6	Tidelands Avenue & West 19th Street	7.6	A	8.4	A	7.7/7	A/A	-0.1/1.4	N
7	Cleveland Avenue & West 19th Street	19.7	C	20.8	C	19.7/20.8	C/C	0.0/0.0	N
8	McKinley Avenue & West 19th Street	9.9	A	10.8	B	9.7/10.8	A/B	0.2/0.0	N
9	Cleveland Avenue & McKinley Avenue	16.0	C	14.0	B	13.8/14	B/B	2.2/0.0	N
10	Tidelands Avenue & Bay Marina Drive*	Intersection Removed				7.2/7.4	A/A	-7.2/-7.4	N
11	Marina Way & Bay Marina Drive*	Intersection Removed				4.1/7.3	A/A	-4.1/-7.3	N
12	Cleveland Avenue & Bay Marina Drive	12.4	B	14.8	B	11.2/14.8	B/B	1.2/0.0	N
13	I-5 SB Ramps & Bay Marina Drive	24.4	C	30.9	C	24.7/31.2	C/C	-0.3/-1.2	N
14	I-5 NB Off-Ramps & Bay Marina Drive	24.1	C	13.1	B	28.6/16.6	C/B	-4.5/-3.5	N
15	Tidelands Avenue & West 28th Street	9.5	A	9.6	A	9.5/9.6	A/A	9.5/9.6	N
16	Tidelands Avenue & West 32nd Street*	7.6	A	7.7	A	7.6/7.7	A/A	7.6/7.7	N
17	West 32nd St & Marina Way	9.1	A	9.9	A	9.1/9.9	A/A	0.0/0.0	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Bay Marina Drive would be closed from Marina Way to the west, therefore the intersections of Tidelands Avenue & Bay Marina Drive and Marina Way and Bay Marina Drive would be removed.

Table 4.15 Freeway Segment LOS - Existing Plus Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	212,000	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,428	0.94	0.00	**E**	N
			SB	5M	11,750	60.9%	7.9%	5.0%	10,737	0.91	0.00	**E**	N
	Division Street and 8th Street	196,000	NB	4M	9400	78.0%	6.6%	5.0%	10,528	1.12	0.00	**F**	N
			SB	5M	11750	60.9%	7.9%	5.0%	9,937	0.85	0.00	D	N
	8th Street and Civic Center Drive	189,000	NB	4M	9,400	70.1%	6.2%	5.0%	8,628	0.92	0.00	**E**	N
			SB	5M	10,810	59.6%	7.8%	5.0%	9,337	0.86	0.00	D	N
	Civic Center Drive and Bay Marina Drive	190,700	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,728	0.66	0.00	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,437	0.80	0.01	D	N
	Bay Marina Drive and SR-54 Junction	190,000	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,763	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,345	0.71	0.00	D	N
	SR-54 Junction and E Street	132,000	NB	5M	11,750	70.1%	6.2%	5.0%	6,063	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.9 Existing Plus Partial Closure of Bay Marina Drive

Figure 4-11 displays the anticipated roadway and intersection geometrics for the Existing Plus Partial Closure of Bay Marina Drive scenario. Existing Plus Partial Closure of Bay Marina Drive traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective projected trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for Existing Plus Partial Closure of Bay Marina Drive scenario are displayed in **Figure 4-12**.

Table 4.16 displays the LOS analysis results for key roadway segments under the Existing Plus Partial Closure of Bay Marina Drive scenario. According to the results in Table 4.16, the addition of project trips associated with the Partial Closure of Bay Marina would not cause a significant impact to any of the study roadways. All roadways are anticipated to operate at LOS D or better under Existing Plus Partial Closure of Bay Marina Drive conditions.

Table 4.17 displays the LOS analysis results for the study intersections under the Existing Plus Partial Closure of Bay Marina Drive scenario. LOS calculation worksheets for Existing Plus Closure of Bay Marina Drive are provided in **Appendix E**. According to the results in Table 4.17, the addition of project trips associated with the Partial Closure of Bay Marina would not cause a significant impact to any of the study intersections. All study intersections are anticipated to operate at LOS D or better under Existing Plus Partial Closure of Bay Marina Drive conditions.

Table 4.18 displays the key study freeway mainline LOS under the Existing Plus Partial Closure of Bay Marina Drive scenario. According to the results in Table 4.18, the addition of project trips associated with the Partial Closure of Bay Marina Drive would not cause a significant impact to any of the study freeway mainline segments.

Although there are freeway segments that are projected to operate at LOS E or F, the addition of the Closure of Bay Marina Drive traffic does not cause an increase in the segment's v/c ratio of higher than 0.01. Therefore, based on the significance criteria presented in section 2.5, this freeway segment is not considered to be significantly impacted by the Partial Closure of Bay Marina Drive.

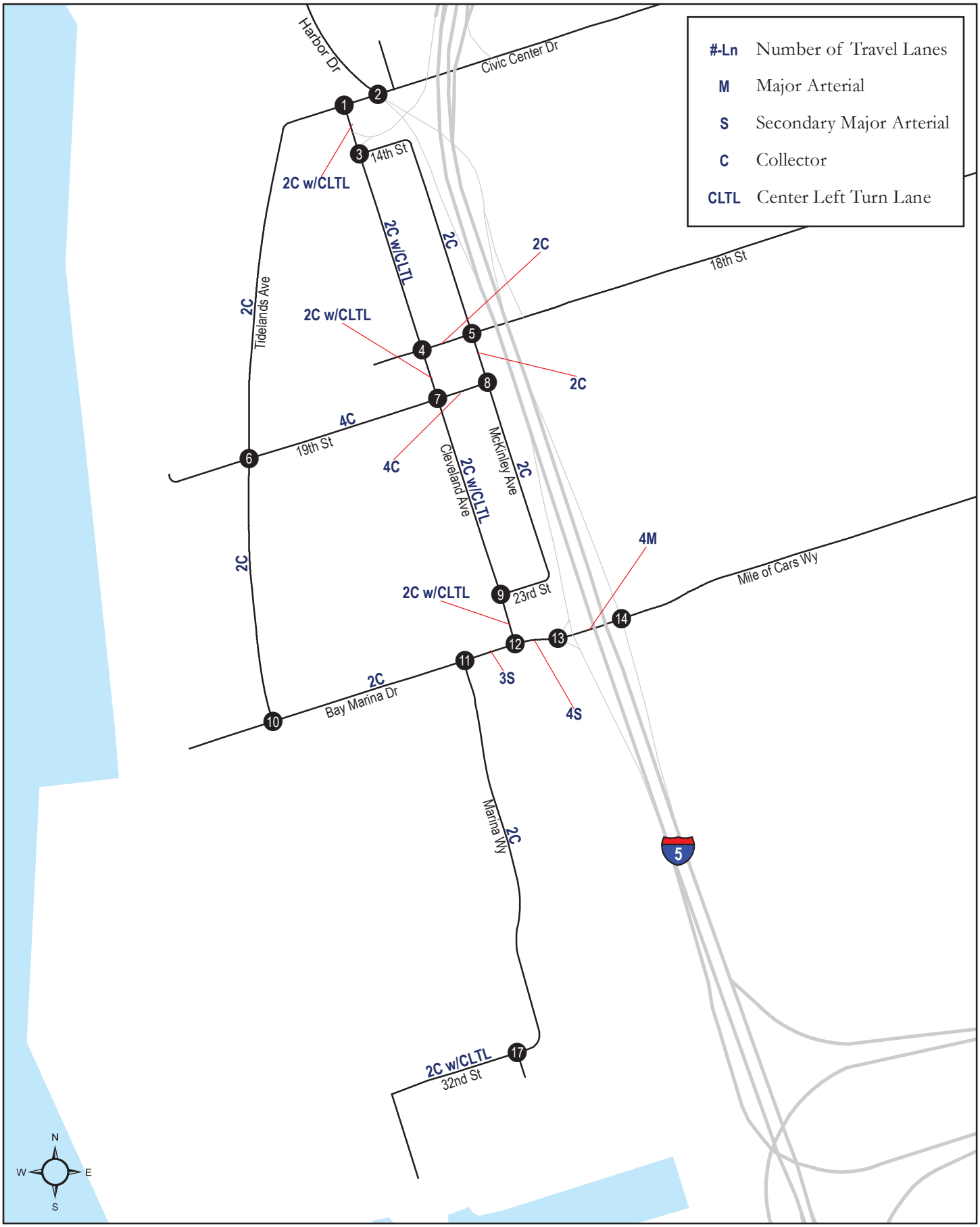

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Figure 4-11
Roadway Geometrics -
Partial Closure of Bay Marina Drive Conditions

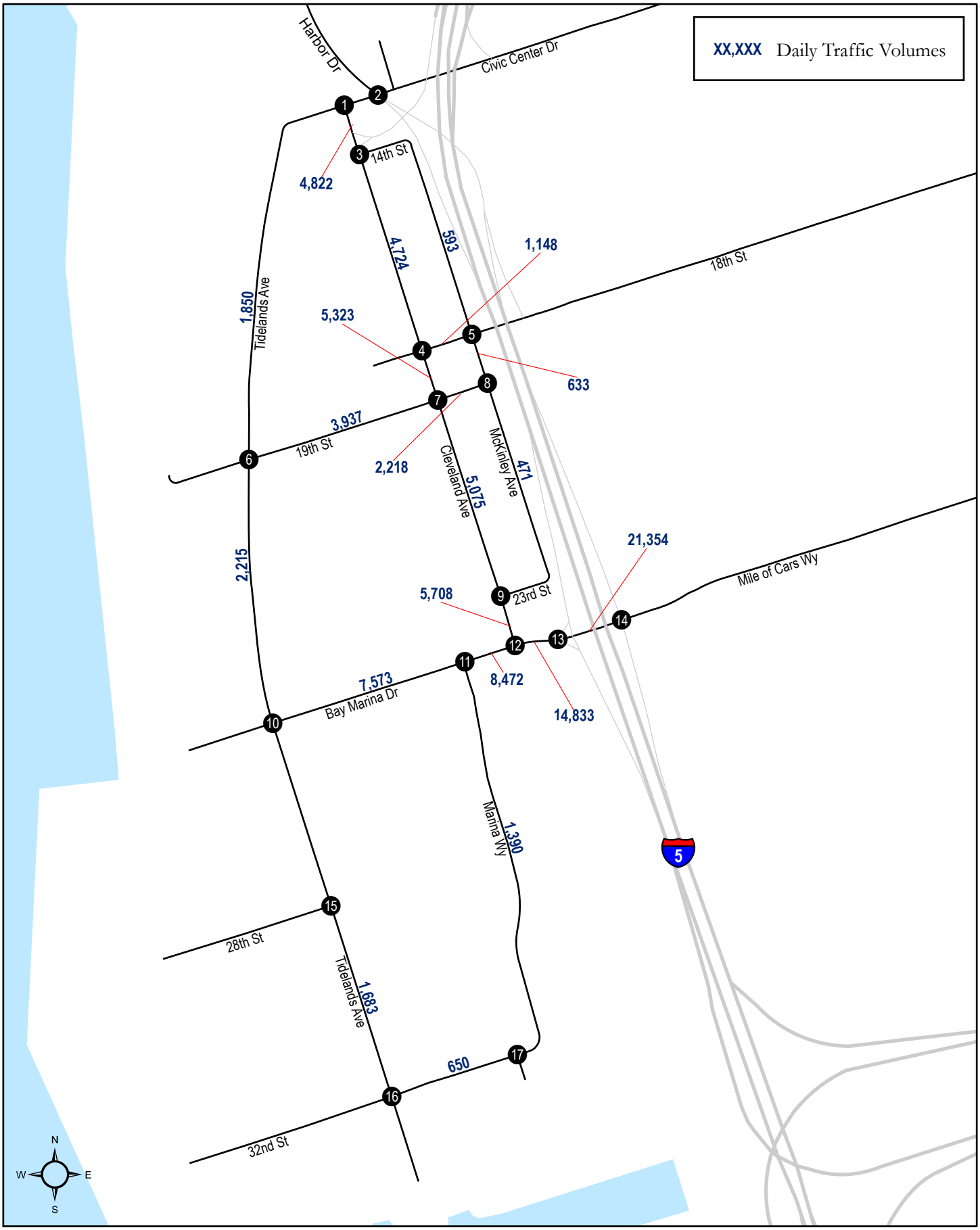

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Figure 4-12
Traffic Volumes -
Existing Plus Partial Closure of Bay Marina Drive Conditions

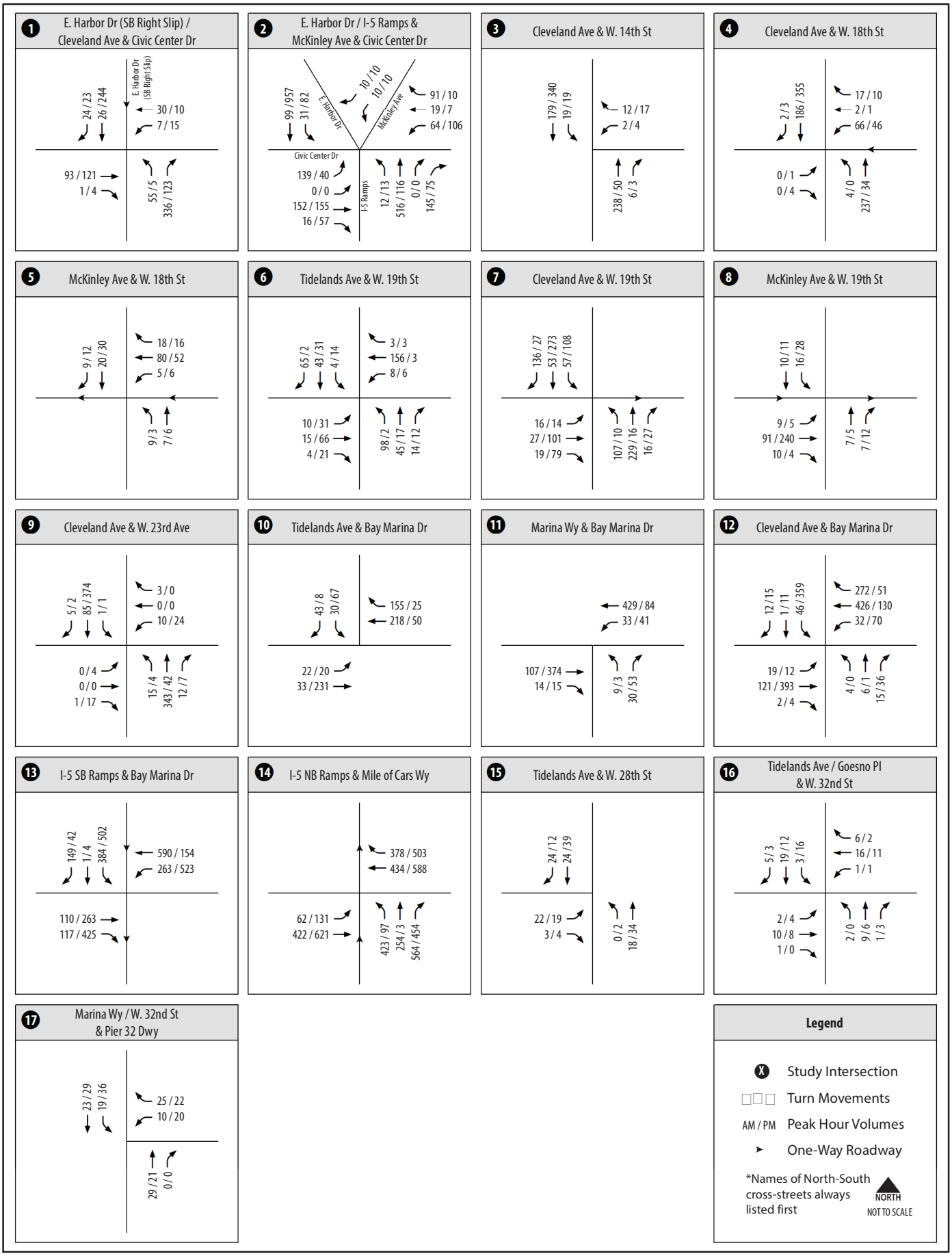

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Figure 4-12
Traffic Volumes -
Existing Plus Partial Closure of Bay Marina Drive Conditions

Table 4.16 Roadway Segment LOS Results - Existing Plus Partial Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Partial Closure of Bay Marina Drive			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850 / .185 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215 / .222 / A	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,683	0.168	A	1,683 / .168 / A	0.000	N
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	593	0.059	A	593 / .059 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector	10,000	633	0.063	A	633 / .063 / A	0.000	N
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	471	0.047	A	471 / .047 / A	0.000	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,822	0.321	A	4,822 / .321 / A	0.000	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,724	0.315	A	4,724 / .315 / A	0.000	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,323	0.355	B	5,323 / .355 / B	0.000	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,075	0.338	B	5,075 / .338 / B	0.000	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	5,708	0.381	B	5,708 / .381 / B	0.000	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector*	10,000	7,573	0.757	D	7,573 / .379 / B	0.379	N
	Marina Way to Cleveland Avenue	3-Lane Secondary Arterial	22,500	8,472	0.377	B	8,472 / .282 / A	0.094	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	14,833	0.494	C	14,833 / .494 / C	0.000	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	21,354	0.534	C	21,354 / .534 / C	0.000	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,148	0.115	A	1,148 / .115 / A	0.000	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	3,937	0.197	A	3,937 / .197 / A	0.000	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,218	0.111	A	2,218 / .111 / A	0.000	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,390	0.139	A	1,390 / .139 / A	0.000	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	650	0.043	A	650 / .043 / A	0.000	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*This segment of Bay Marina Dr is narrowed to 2-lanes

Table 4.17 Peak Hour Intersection LOS Results - Existing Plus Partial Closure of Bay Marina Drive Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	12.0	B	16.2	C	12/16.2	B/C	0.0/0.0	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	34.9	C	37.1	C	34.9/37.1	C/D	0.0/0.0	N
3	Cleveland Avenue & W 14th Street	11.3	B	10.6	B	11.3/10.6	B/B	0.0/0.0	N
4	Cleveland Avenue & West 18th Street	13.1	B	12.4	B	13.1/12.4	B/B	0.0/0.0	N
5	McKinley Avenue & West 18th Street	9.7	A	9.7	A	9.7/9.7	A/A	0.0/0.0	N
6	Tidelands Avenue & West 19th Street	7.7	A	7.0	A	7.7/7	A/A	0.0/0.0	N
7	Cleveland Avenue & West 19th Street	19.7	C	20.8	C	19.7/20.8	C/C	0.0/0.0	N
8	McKinley Avenue & West 19th Street	9.7	A	10.8	B	9.7/10.8	A/B	0.0/0.0	N
9	Cleveland Avenue & McKinley Avenue	13.8	B	14.0	B	13.8/14	B/B	0.0/0.0	N
10	Tidelands Avenue & Bay Marina Drive	6.4	A	6.1	A	7.2/7.4	A/A	-0.8/-1.3	N
11	Marina Way & Bay Marina Drive*	5.4	A	9.7	A	4.1/7.3	A/A	1.3/2.4	N
12	Cleveland Avenue & Bay Marina Drive	11.3	B	14.8	B	11.2/14.8	B/B	0.1/0.0	N
13	I-5 SB Ramps & Bay Marina Drive	24.7	C	31.0	C	24.7/31.2	C/C	0.0/-0.2	N
14	I-5 NB Off-Ramps & Bay Marina Drive	28.6	D	16.6	B	28.6/16.6	C/B	0.0/0.0	N
15	Tidelands Avenue & West 28th Street	9.5	A	9.6	A	9.5/9.6	A/A	0.0/0.0	N
16	Tidelands Avenue & West 32nd Street*	7.6	A	7.7	A	7.6/7.7	A/A	0.0/0.0	N
17	West 32nd St & Marina Way	9.4	A	10.4	B	9.1/9.9	A/A	0.3/0.5	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 4.18 Freeway Segment LOS - Existing Plus Partial Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 & Division St	212,000	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,428	0.94	0.00	**E**	N
			SB	5M	11,750	60.9%	7.9%	5.0%	10,737	0.91	0.00	**E**	N
	Division St & 8th St	196,000	NB	4M	9400	78.0%	6.6%	5.0%	10,528	1.12	0.00	**F**	N
			SB	5M	11750	60.9%	7.9%	5.0%	9,937	0.85	0.00	D	N
	8th Street & Civic Center Dr	189,000	NB	4M	9,400	70.1%	6.2%	5.0%	8,628	0.92	0.00	**E**	N
			SB	5M	10,810	59.6%	7.8%	5.0%	9,337	0.86	0.00	D	N
	Civic Center Dr & Bay Marina Dr	190,000	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,728	0.66	0.00	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,337	0.80	0.00	D	N
	Bay Marina Dr & SR-54	190,000	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,763	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,345	0.71	0.00	D	N
	SR-54 & E St	132,000	NB	5M	11,750	70.1%	6.2%	5.0%	6,063	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.10 Existing Plus Total Bayfront with Closure of Bay Marina Drive

Figure 4-13 displays the anticipated roadway and intersection geometrics for the Existing Plus Total Bayfront with Closure of Bay Marina Drive scenario. Existing Plus Total Bayfront with Closure of Bay Marina Drive traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective project trip assignment volumes (displayed in Figure 3-2) and the respective projected trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for Existing Plus Total Bayfront with Closure of Bay Marina Drive scenario are displayed in **Figure 4-14**.

Table 4.19 displays the LOS analysis results for key roadway segments under the Existing Plus Total Bayfront with Closure of Bay Marina Drive. According to the results in Table 4.19, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina would cause a total of one (1) significant impact to the following study roadway:

- Tidelands Avenue between West 19th Street to Bay Marina Drive – LOS E

Table 4.20 displays the LOS analysis results for the study intersections under the Existing Plus Total Bayfront with Closure of Bay Marina Drive. LOS calculation worksheets for Existing Plus Total Bayfront with Closure of Bay Marina Drive are provided in **Appendix E**. According to the results in Table 4.20, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina would cause a total of three (3) significant impacts to the following study intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – Degrades to LOS E and LOS F in the AM and PM peak hours, respectively
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – Degrades to LOS E in the AM and PM peak hours
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour

Table 4.21 displays the key study freeway mainline LOS under the Existing Plus Total Bayfront with Closure of Bay Marina Drive scenario. According to the results in Table 4.21, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina Drive would cause a total of five (5) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Degrades to LOS E conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS E conditions

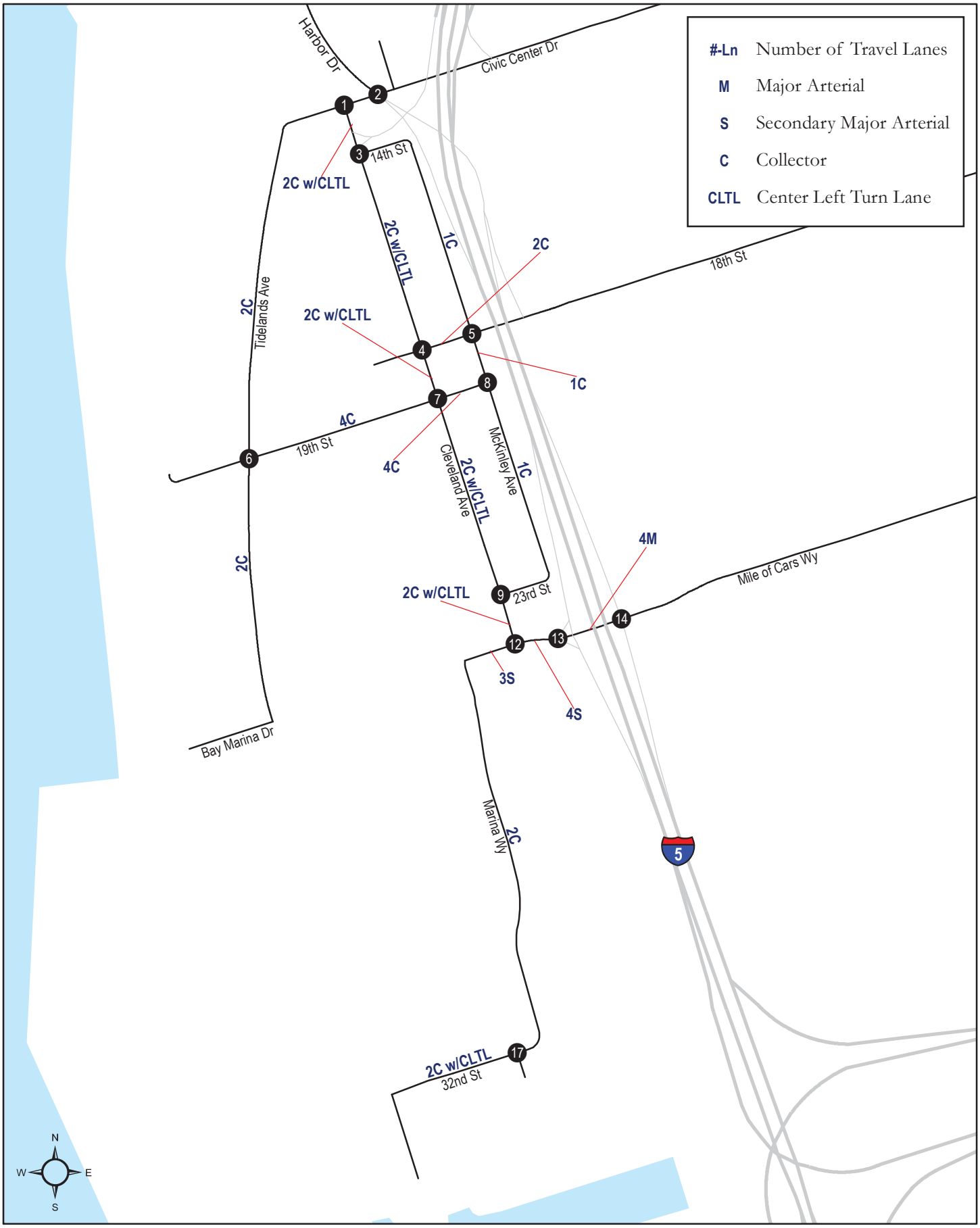

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Figure 4-13
Roadway Geometrics -
Total Bayfront with Closure of Bay Marina Drive Conditions

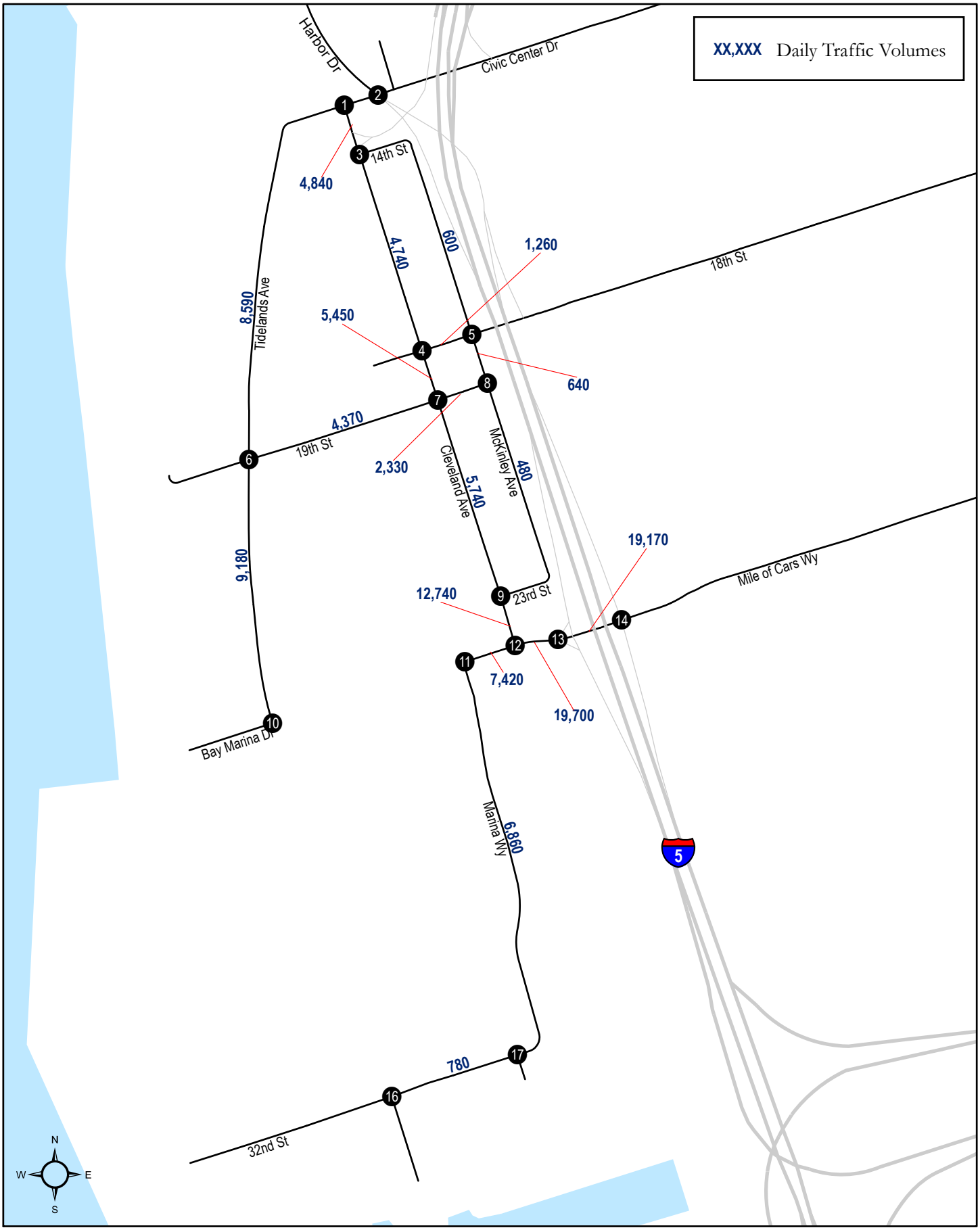

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Figure 4-14
Traffic Volumes -
Existing Plus Total Bayfront with Closure of Bay Marina Drive Scenario

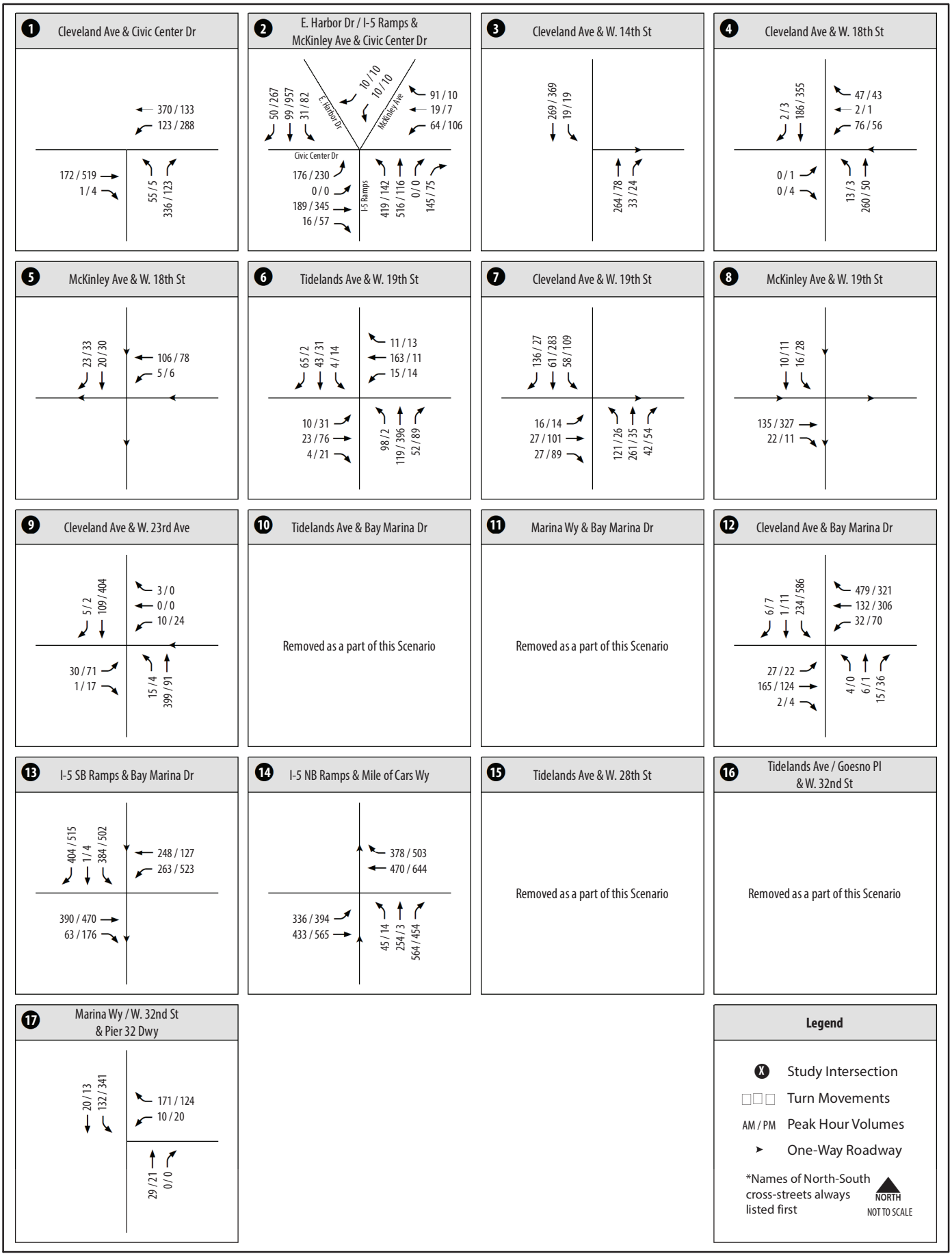

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Figure 4-14
Traffic Volumes -
Existing Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Table 4.19 Roadway Segment LOS Results - Existing Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Total Bayfront w/ Closure of Bay Marina			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	8,590	0.859	D	1,850 / .185 / A	0.674	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	9,180	0.918	**E**	2,215 / .222 / A	0.697	**Y**
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	600	0.120	A	593 / .059 / A	0.061	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	640	0.128	A	633 / .063 / A	0.065	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	480	0.096	A	471 / .047 / A	0.049	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,840	0.323	A	4,822 / .321 / A	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,740	0.316	A	4,724 / .315 / A	0.001	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,450	0.363	B	5,323 / .355 / B	0.008	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,740	0.383	B	5,075 / .338 / B	0.044	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,740	0.849	D	5,708 / .381 / B	0.469	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	Roadway Segment Closed			7,573 / .379 / B	-0.379	N
	Marina Way to Cleveland Avenue	3-Lane Secondary Arterial	22,500	7,420	0.330	A	8,472 / .282 / A	0.047	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	19,700	0.657	C	14,833 / .494 / C	0.162	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	19,170	0.479	B	21,354 / .534 / C	-0.055	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,260	0.126	A	1,148 / .115 / A	0.011	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,370	0.219	A	3,937 / .197 / A	0.022	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,330	0.117	A	2,218 / .111 / A	0.006	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,860	0.686	C	1,390 / .139 / A	0.547	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	780	0.052	A	650 / .043 / A	0.009	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
; Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) roadway

Table 4.20 Peak Hour Intersection LOS Results - Existing Plus Total Bayfront with Closure of Bay Marina Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	44.3	**E**	202.8	**F**	12/16.2	B/C	32.3/186.6	**Y**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	77.2	**E**	78.1	**E**	34.9/37.1	C/D	42.3/41.0	**Y**
3	Cleveland Avenue & W 14th Street	11.9	B	10.8	B	11.3/10.6	B/B	0.6/0.2	N
4	Cleveland Avenue & West 18th Street	14.0	B	12.7	B	13.1/12.4	B/B	0.9/0.3	N
5	McKinley Avenue & West 18th Street	7.8	A	7.7	A	9.7/9.7	A/A	-1.9/-2.0	N
6	Tidelands Avenue & West 19th Street	7.8	A	9.3	A	7.7/7	A/A	0.1/2.3	N
7	Cleveland Avenue & West 19th Street	22.6	C	24.8	C	19.7/20.8	C/C	2.9/4.0	N
8	McKinley Avenue & West 19th Street	8.1	A	9.7	A	9.7/10.8	A/B	-1.6/-1.1	N
9	Cleveland Avenue & McKinley Avenue	16.9	C	15.6	C	13.8/14	B/B	3.1/1.6	N
10	Tidelands Avenue & Bay Marina Drive*	Intersection Removed				7.2/7.4	A/A	-7.2/-7.4	N
11	Marina Way & Bay Marina Drive*	Intersection Removed				4.1/7.3	A/A	-4.1/-7.3	N
12	Cleveland Avenue & Bay Marina Drive	15.7	B	21.9	C	11.2/14.8	B/B	4.5/7.1	N
13	I-5 SB Ramps & Bay Marina Drive	31.2	C	60.8	**E**	24.7/31.2	C/C	6.5/29.6	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	35.8	D	22.4	C	28.6/16.6	C/B	7.2/5.8	N
15	Tidelands Avenue & West 28th Street**	Intersection Removed				9.5/9.6	A/A	-9.5/-9.6	N
16	Tidelands Avenue & West 32nd Street**	Intersection Removed				7.6/7.7	A/A	-7.6/-7.7	N
17	West 32nd St & Marina Way	12.6	B	9.7	A	9.1/9.9	A/A	3.5/-0.2	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Bay Marina Drive would be closed from Marina Way to the west, therefore the intersections of Tidelands Avenue & Bay Marina Drive and Marina Way and Bay Marina Drive would be removed.
**Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.

Table 4.21 Freeway Segment LOS - Existing Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	219,200	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,828	0.97	0.03	**E**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	11,137	0.95	0.04	**E**	**Y**
	Division Street and 8th Street	203,310	NB	4M	9400	78.0%	6.6%	5.0%	10,928	1.16	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	10,337	0.88	0.03	D	N
	8th Street and Civic Center Drive	196,310	NB	4M	9,400	70.1%	6.2%	5.0%	9,028	0.96	0.04	**E**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	9,737	0.90	0.04	**E**	**Y**
	Civic Center Drive and Bay Marina Drive	197,670	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,028	0.69	0.03	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,737	0.83	0.04	D	N
	Bay Marina Drive and SR-54 Junction	191,640	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,863	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,445	0.72	0.01	D	N
	SR-54 Junction and E Street	132,840	NB	5M	11,750	70.1%	6.2%	5.0%	6,163	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split. | [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.11 Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive

Figure 4-15 displays the anticipated roadway and intersection geometrics for the Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive scenario. Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), to the respective project trip assignment volumes (displayed in Figure 3-2) and the respective projected trip redistributions (displayed in Figure 3-3). Daily roadway and peak hour intersection volumes for Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive scenario are displayed in **Figure 4-16**.

Table 4.22 displays the LOS analysis results for key roadway segments under the Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive. According to the results in Table 4.22, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina would cause a total of one (1) significant impact to the following study roadway:

- Bay Marina Drive between Cleveland Avenue and the I-5 Southbound Ramps – LOS E

Table 4.23 displays the LOS analysis results for the study intersections under the Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive. LOS calculation worksheets for Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive are provided in **Appendix E**. According to the results in Table 4.23, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina would cause a total of one (1) significant impact to the following study intersection:

- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour

Table 4.24 displays the key study freeway mainline LOS under the Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive scenario. According to the results in Table 4.24, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina Drive would cause a total of five (5) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS E conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Degrades to LOS E conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS E conditions

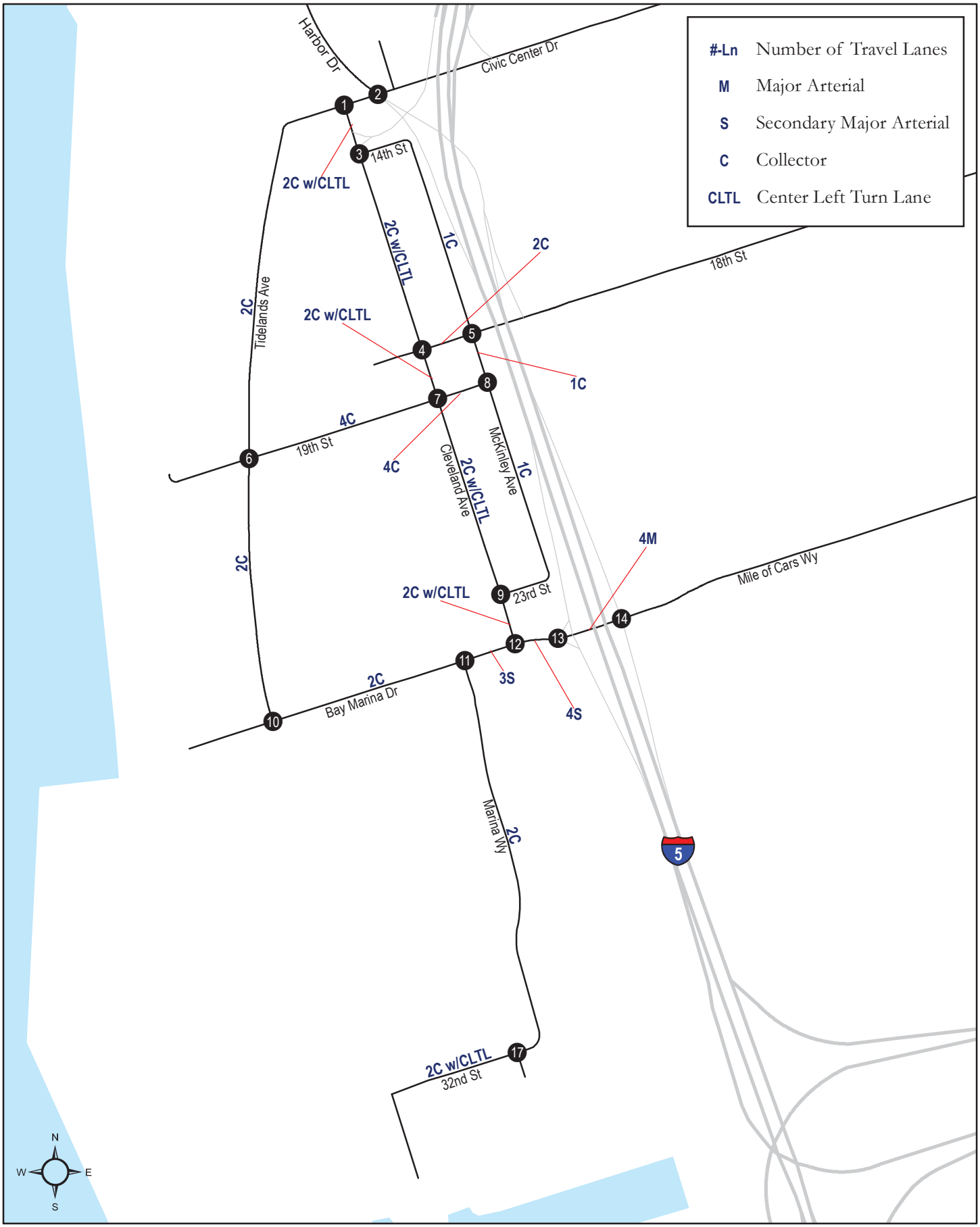

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Figure 4-15
Roadway Geometrics -
Total Bayfront with Partial Closure of Bay Marina Drive Conditions

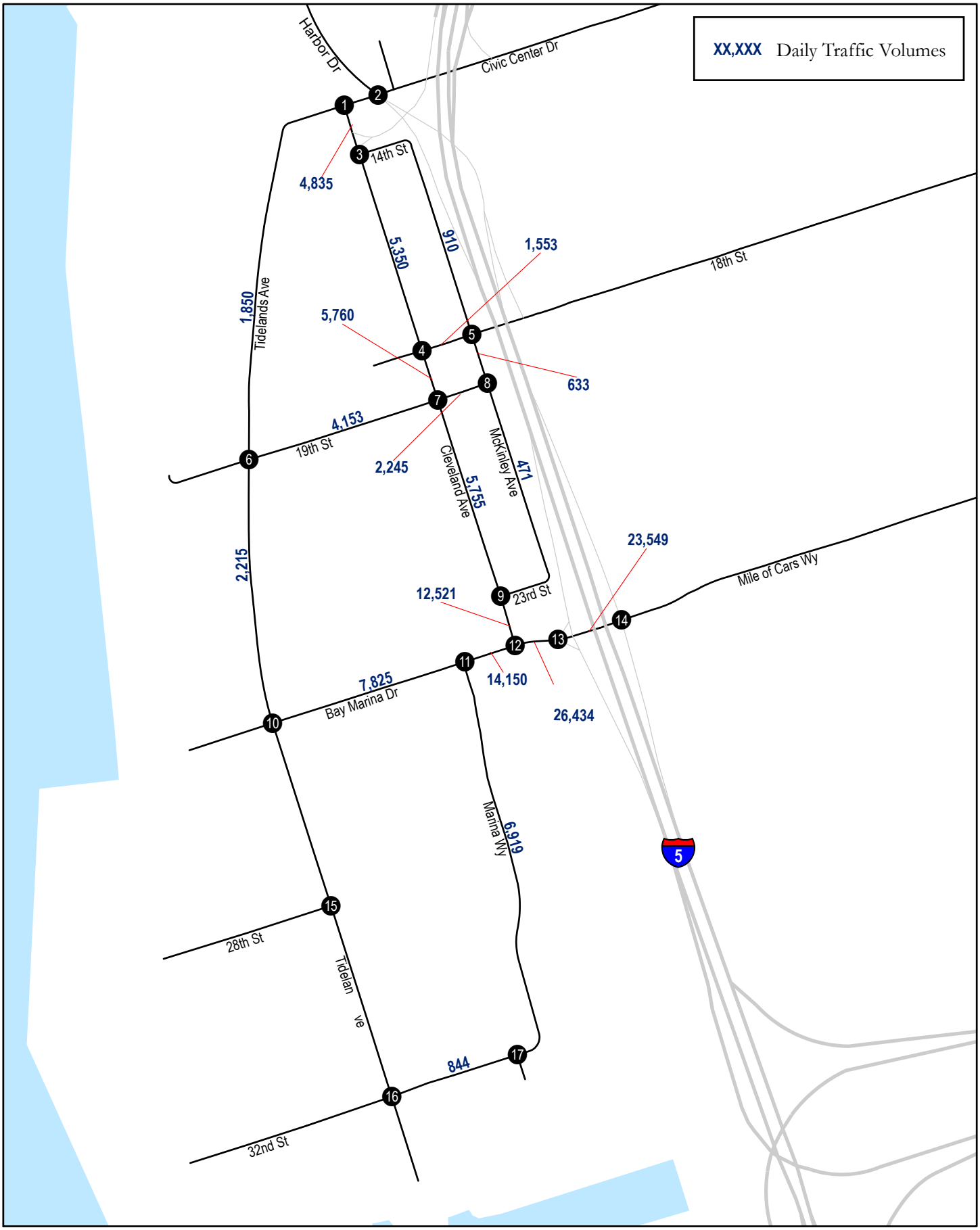

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Figure 4-16
Traffic Volumes -
Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

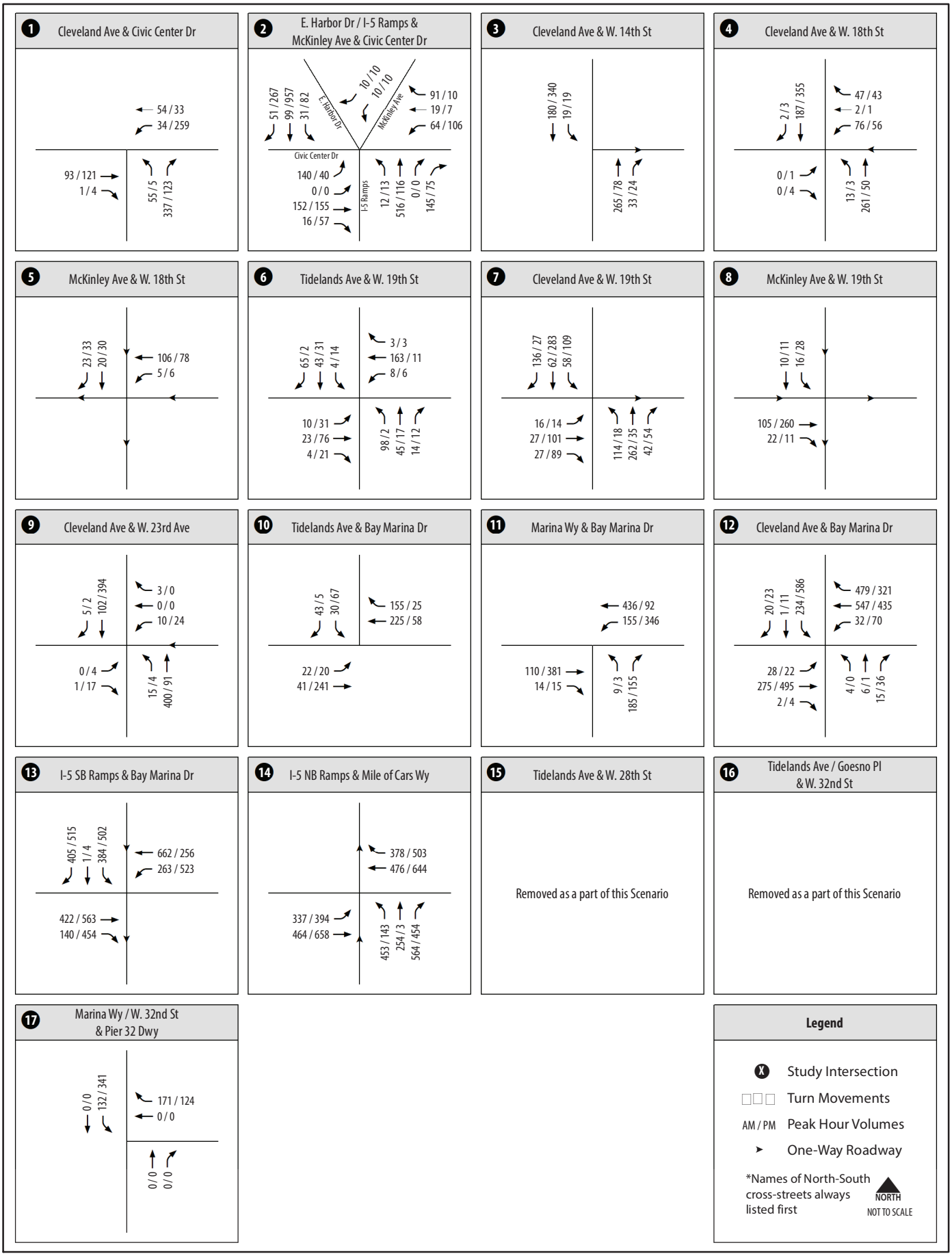

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Figure 4-16
Traffic Volumes -
Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Table 4.22 Roadway Segment LOS Results – Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Existing + Total Bayfront w/ Partial Closure of Bay Marina			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850 / .185 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215 / .222 / A	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	910	0.182	A	593 / .059 / A	0.123	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	633	0.127	A	633 / .063 / A	0.063	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	471	0.094	A	471 / .047 / A	0.047	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,835	0.322	A	4,822 / .321 / A	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,350	0.357	B	4,724 / .315 / A	0.042	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,760	0.384	B	5,323 / .355 / B	0.029	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,755	0.384	B	5,075 / .338 / B	0.045	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,521	0.835	D	5,708 / .381 / B	0.454	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	7,825	0.782	D	7,573 / .379 / B	0.404	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	14,150	0.629	C	8,472 / .282 / A	0.346	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	26,434	0.881	**E**	14,833 / .494 / C	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	23,549	0.589	C	21,354 / .534 / C	0.055	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,553	0.155	A	1,148 / .115 / A	0.040	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,153	0.208	A	3,937 / .197 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,245	0.112	A	2,218 / .111 / A	0.001	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,919	0.692	C	1,390 / .139 / A	0.553	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	844	0.056	A	650 / .043 / A	0.013	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable operations
V/C = Volume to Capacity Ratio; Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant

*McKinley Ave is converted to one-way (southbound) roadway
**This segment of Bay Marina Dr is narrowed to 2-lanes

Table 4.23 Peak Hour Intersection LOS Results - Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	12.0	B	25.5	D	12/16.2	B/C	0.0/9.3	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	31.9	C	30.8	C	34.9/37.1	C/D	-3.0/-6.3	N
3	Cleveland Avenue & W 14th Street	11.0	B	10.6	B	11.3/10.6	B/B	-0.3/0.0	N
4	Cleveland Avenue & West 18th Street	14.0	B	12.7	B	13.1/12.4	B/B	0.9/0.3	N
5	McKinley Avenue & West 18th Street	7.8	A	7.7	A	9.7/9.7	A/A	-1.9/-2.0	N
6	Tidelands Avenue & West 19th Street	7.8	A	7.0	A	7.7/7	A/A	0.1/0.0	N
7	Cleveland Avenue & West 19th Street	22.1	C	23.9	C	19.7/20.8	C/C	2.4/3.1	N
8	McKinley Avenue & West 19th Street	7.9	A	9.1	A	9.7/10.8	A/B	-1.8/-1.7	N
9	Cleveland Avenue & McKinley Avenue	13.4	B	13.6	B	13.8/14	B/B	-0.4/-0.4	N
10	Tidelands Avenue & Bay Marina Drive	7.6	A	7.2	A	7.2/7.4	A/A	0.4/-0.2	N
11	Marina Way & Bay Marina Drive**	13.1	B	28.8	C	4.1/7.3	A/A	9.0/21.5	N
12	Cleveland Avenue & Bay Marina Drive	19.3	B	24.4	C	11.2/14.8	B/B	8.1/9.6	N
13	I-5 SB Ramps & Bay Marina Drive	27.7	C	57.1	**E**	24.7/31.2	C/C	3.0/25.9	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	49.4	D	24.9	C	28.6/16.6	C/B	20.8/8.3	N
15	Tidelands Avenue & West 28th Street*	Intersection Removed				9.5/9.6	A/A	-9.5/-9.6	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				7.6/7.7	A/A	-7.6/-7.7	N
17	West 32nd Street & Marina Way	12.6	B	9.7	A	9.1/9.9	A/A	3.5/-0.2	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 4.24 Freeway Segment LOS - Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	219,200	NB	4M+2A	9,400	78.0%	6.6%	5.0%	11,828	0.97	0.03	**E**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	11,137	0.95	0.04	**E**	**Y**
	Division Street and 8th Street	203,310	NB	4M	9400	78.0%	6.6%	5.0%	10,928	1.16	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	10,337	0.88	0.03	D	N
	8th Street and Civic Center Drive	196,310	NB	4M	9,400	70.1%	6.2%	5.0%	9,028	0.96	0.04	**E**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	9,737	0.90	0.04	**E**	**Y**
	Civic Center Drive and Bay Marina Drive	196,970	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,028	0.69	0.03	C	N
			SB	5M	11,750	59.6%	7.8%	5.0%	9,737	0.83	0.04	D	N
	Bay Marina Drive and SR-54 Junction	191,640	NB	5M+1A	13,160	70.1%	6.2%	5.0%	8,863	0.67	0.00	C	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	9,445	0.72	0.01	D	N
	SR-54 Junction and E Street	132,840	NB	5M	11,750	70.1%	6.2%	5.0%	6,163	0.52	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	6,545	0.61	0.00	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

4.12 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would cause a significant impact to key roadways, intersections, and freeway mainline segments in the study area, as summarized in the following tables.

Table 4.25 summarizes the impacted project roadways under each of the seven (7) Existing Plus Project scenarios.

Table 4.25 Impacted Roadway Segment Summary – Existing Plus Project Conditions

Roadway	Segment	Ex + DP	Ex + DPW	Ex + TB	Ex + Cl of BM	Ex + Part Cl of BM	Ex + TB w/ Cl of BM	Ex + TB w/ Part Cl of BM
Tidelands Avenue	Harbor Drive to West 19th Street							
	West 19th Street to Bay Marina Drive						✓	
	Bay Marina Drive to West 32nd Street							
McKinley Avenue	West 14th Street to West 18th Street							
	West 18th Street to West 19th Street							
	West 19th Street to Cleveland Avenue							
Cleveland Avenue	Civic Center Drive to West 14th Street							
	West 14th Street to West 18th Street							
	West 18th Street to West 19th Street							
	West 19th Street to West 23rd Street							
	West 23rd Street to Bay Marina Drive							
Bay Marina Drive	Tidelands Avenue to Marina Way							
	Marina Way to Cleveland Avenue							
	Cleveland Avenue to I-5 SB Ramps	✓		✓			✓	✓
	I-5 SB Ramps to I-5 NB Ramps							
West 18th Street	Cleveland Avenue to McKinley Avenue							
West 19th Street	Tidelands Avenue to Cleveland Avenue							
	Cleveland Avenue to McKinley Avenue							
Marina Way	Bay Marina Drive to West 32nd Street							
West 32nd Street	Tidelands Avenue to Marina Way							

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works
TB = Total Bayfront

Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 4.26 summarizes the impacted study intersections under each of the seven (7) Existing Plus Project scenarios.

Table 4.26 Impacted Intersections Summary – Existing Plus Project Conditions

#	Intersection	Ex + DP	Ex + DPW	Ex + TB	Ex + Cl of BM	Ex + Part Cl of BM	Ex + TB w/ Cl of BM	Ex + TB w/ Part Cl of BM
1	Cleveland Avenue & Civic Center Drive				✓		✓	
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive				✓		✓	
3	Cleveland Avenue & W 14th Street							
4	Cleveland Avenue & West 18th Street							
5	McKinley Avenue & West 18th Street							
6	Tidelands Avenue & West 19th Street							
7	Cleveland Avenue & West 19th Street							
8	McKinley Avenue & West 19th Street							
9	Cleveland Avenue & McKinley Avenue							
10	Tidelands Avenue & Bay Marina Drive							
11	Marina Way & Bay Marina Drive							
12	Cleveland Avenue & Bay Marina Drive							
13	I-5 SB Ramps & Bay Marina Drive	✓		✓			✓	✓
14	I-5 NB Off-Ramps & Bay Marina Drive							
15	Tidelands Avenue & West 28th Street*							
16	Tidelands Avenue & West 32nd Street*							
17	West 32nd Street & Marina Way							

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works
TB = Total Bayfront

Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 4.27 summarizes the impacted freeway mainline segments under each of the seven (7) Existing Plus Project scenarios.

Table 4.27 Impacted Freeway Mainline Segments Summary – Existing Plus Project Conditions

Freeway	Segment		Ex + DP	Ex + DPW	Ex + TB	Ex + Cl of BM	Ex + Part Cl of BM	Ex + TB w/ Cl of BM	Ex + TB w/ Part Cl of BM
I-5	I-15 and Division Street	NB	✓		✓			✓	✓
		SB	✓		✓			✓	✓
	Division Street and 8th Street	NB	✓		✓			✓	✓
		SB							
	8th Street and Civic Center Drive	NB	✓		✓			✓	✓
		SB	✓		✓			✓	✓
	Civic Center Drive and Bay Marina Drive	NB							
		SB							
	Bay Marina Drive and SR-54 Junction	NB							
		SB							
	SR-54 Junction and E Street	NB							
		SB							

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works
TB = Total Bayfront

Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 4-28 summarizes the mitigation measures required to mitigate the project impact to less than significant.

Table 4.28 Impacted Study Facilities and Proposed Mitigations – Existing Plus Project Conditions

Study Facility			Existing Plus Project Scenarios							Mitigation	Feasible?	Responsibility Split	Direct Impact Mitigated?
			Ex + DP	Ex + DPW	Ex + TB	Ex + CI of BM	Ex + Part CI of BM	Ex + TB w/ CI of BM	Ex + TB w/ Part CI of BM				
ROADWAY SEGMENTS													
Tidelands Avenue	West 19th Street to Bay Marina Drive							✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Cleveland Avenue to I-5 SB Ramps		✓		✓		✓		✓	Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
INTERSECTIONS													
1	Cleveland Avenue & Civic Center Drive					✓		✓		Add a separate westbound left-turn and install a traffic signal	NO	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive					✓		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	YES	3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive		✓		✓			✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE													
I-5	I-15 and Division Street	NB	✓		✓			✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementation of this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓		✓			✓	✓				
	Division Street and 8th Street	NB	✓		✓			✓	✓				
	8th Street and Civic Center Drive	NB	✓		✓			✓	✓				
		SB	✓		✓			✓	✓				

✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works

TB = Total Bayfront
CI of BM = Closure of Bay Marina
Part CI of BM = Partial Closure of Bay Marina

TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Source: Chen Ryan Associates; October 2019

5.0 Near-Term Year 2030 Traffic Conditions

This section provides an analysis of Year 2030 traffic conditions, which is the anticipated completion of all the project components. The scenarios analyzed in this section include:

- Near-Term Year 2030 Base
- Near-Term Year 2030 Plus Total Bayfront
- Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive
- Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive

5.1 Near-Term Year 2030 Base Roadway Network and Traffic Volumes

Future year forecasts for Year 2030 was developed using the SANDAG Series 13 Travel Demand Model. The peak hour intersection turning movements were developed by comparing existing and forecasted Year 2030 ADTs, as well as peak hour approach and departure volumes, then applying the respective growth factors. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections are reasonably balanced. Year 2030 SANDAG Series 13 Travel Demand Model ADTs are included in **Appendix F.**

Roadway and intersection geometrics under Near-Term Year 2030 Base conditions were assumed to be identical to the Existing conditions, as shown in Figure 4-1 previously. **Figure 5-1** displays average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Near-Term Year 2030 Base conditions.

5.2 Near-Term Year 2030 Base Traffic Conditions

LOS analyses for the Near-Term Year 2030 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment, intersection LOS, and freeway mainline analysis results for Year 2030 Base conditions are discussed separately below.

Roadway Segment Analysis

Table 5.1 displays the LOS analysis results for key roadway segments under Near-Term Year 2030 Base conditions.

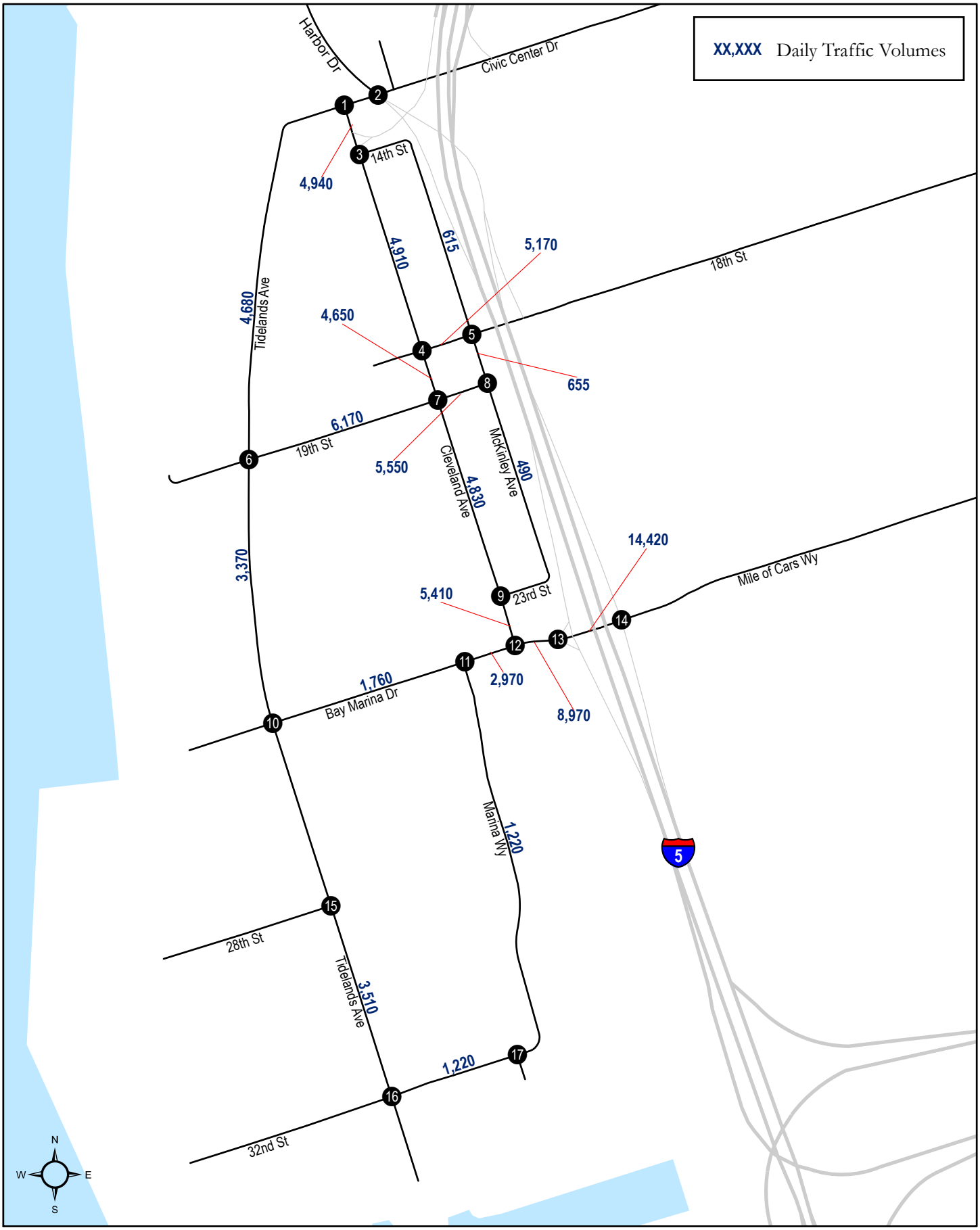

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Figure 5-1
Traffic Volumes -
Near-Term Year 2030 Base Conditions

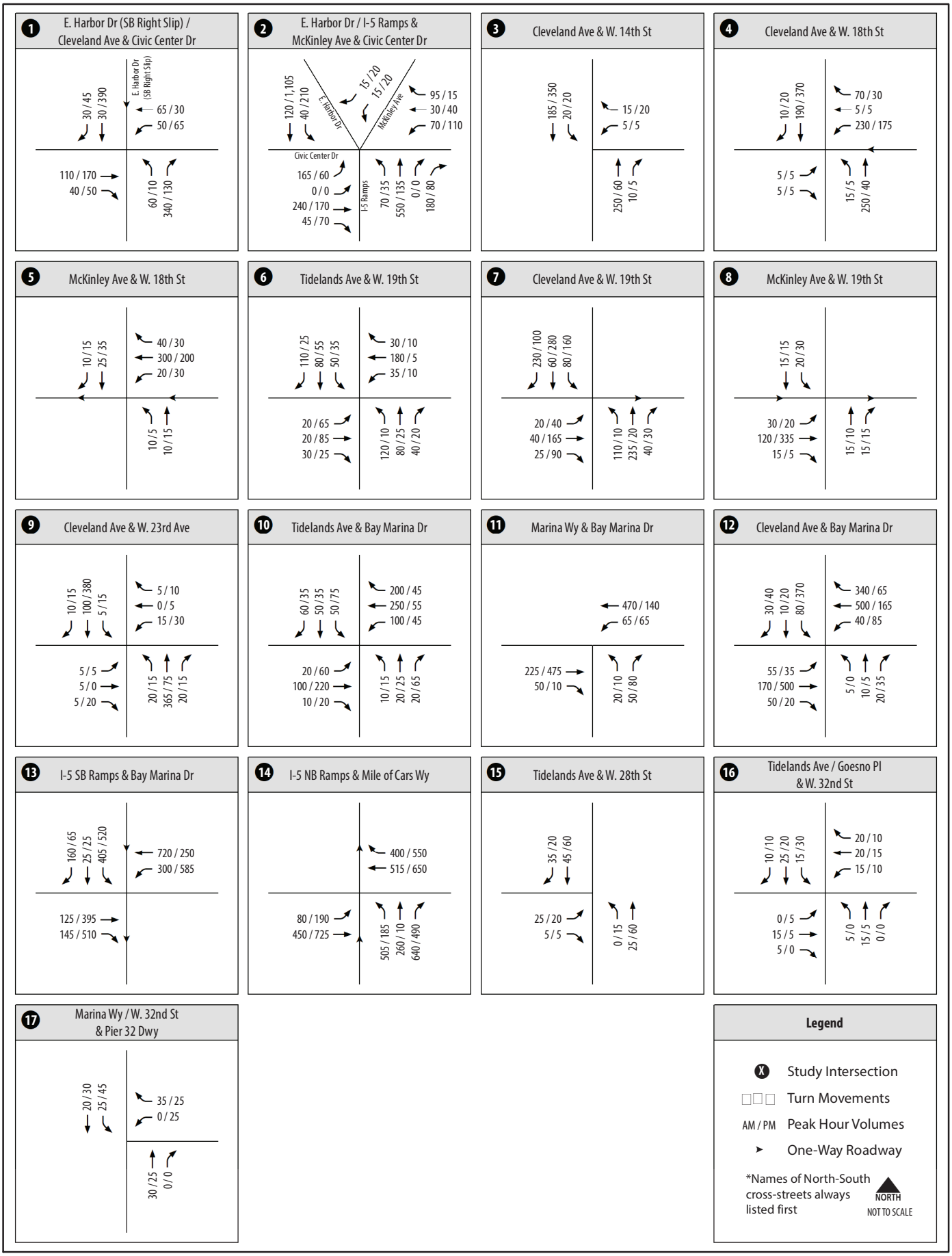

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Figure 5-1
Traffic Volumes -
Near-Term Year 2030 Base Conditions

Table 5.1 Roadway Segment LOS Results – Near-Term Year 2030 Base Conditions

Roadway Segment	Segment	Functional Classification	Threshold (LOS E)	ADT	V/C	LOS
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	3,600	0.360	A
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	4,300	0.430	B
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	3,300	0.330	A
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	700	0.070	A
	West 18th Street to West 19th Street	2-Lane Collector	10,000	700	0.070	A
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	600	0.060	A
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,200	0.347	B
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,100	0.340	B
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,700	0.380	B
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,500	0.367	B
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	6,100	0.407	B
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	10,800	0.540	C
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	12,100	0.403	B
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	21,100	0.703	D
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	30,400	0.760	D
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,300	0.130	A
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,300	0.215	A
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,400	0.120	A
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,500	0.150	A
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	700	0.047	A

Source: Chen Ryan Associates; August 2019

Notes:
CLTL = Center-Left-Turn-Lane
V/C = Volume to Capacity Ratio.

As shown in the table, all key study roadway segments are projected to operate at LOS D or better.

Intersection Analysis

Table 5.2 displays intersection LOS and average vehicle delay results under Near-Term Year 2030 Base conditions. LOS calculation worksheets for the Near-Term Year 2030 Base conditions are provided in **Appendix G**.

Table 5.2 Peak Hour Intersection LOS Results – Near-Term Year 2030 Base Conditions

#	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Cleveland Avenue & Civic Center Drive	SSSC	14.6	B	168.9	**F**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	Signal	42.3	D	71.3	**E**
3	Cleveland Avenue & W 14th Street	SSSC	12.4	B	10.7	B
4	Cleveland Avenue & West 18th Street	SSSC	21.4	C	16.5	C
5	McKinley Avenue & West 18th Street	AWSC	12.2	B	11.8	B
6	Tidelands Avenue & West 19th Street	Signal	8.5	A	7.8	A
7	Cleveland Avenue & West 19th Street	SSSC	28.0	D	39.9	**E**
8	McKinley Avenue & West 19th Street	AWSC	10.7	B	12.6	B
9	Cleveland Avenue & McKinley Avenue	SSSC	15.4	C	15.5	C
10	Tidelands Avenue & Bay Marina Drive	Signal	8.1	A	8.1	A
11	Marina Way & Bay Marina Drive**	Signal	6.6	A	9.7	A
12	Cleveland Avenue & Bay Marina Drive	Signal	14.0	B	16.2	B
13	I-5 SB Ramps & Bay Marina Drive	Signal	25.2	C	31.7	C
14	I-5 NB Off-Ramps & Bay Marina Drive	Signal	43.3	D	21.0	C
15	Tidelands Avenue & West 28th Street	SSSC	10.2	B	10.7	B
16	Tidelands Avenue & West 32nd Street	AWSC	8.0	A	7.9	A
17	West 32nd St & Marina Way	SSSC	8.8	A	11.2	B

Source: Chen Ryan Associates; March 2019

Notes:
Bold indicates unacceptable LOS E or F
AWSC indicates all-way stop controlled intersection.
SSSC indicates side street stop-controlled intersection, the delay shown is the worst delay experienced by any of the approaches.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

As shown, all key study intersections are projected to operate at acceptable LOS D or better under Near-Term Year 2030 Base conditions, with the exception of the following three (3) intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – LOS F during the PM peak hour
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – LOS E during the PM peak hour
- Cleveland Avenue & West 19th Street (Int 7) – LOS E during the PM peak hour

Freeway Segment LOS

Table 5.3 displays the key study freeway mainline LOS analysis results under Near-Term Year 2030 Base conditions.

Table 5.3 Freeway Segment LOS – Near-Term Year 2030 Base Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	LOS
I-5	I-15 & Division St	232,800	NB	4M+2A	9,400	78.0%	6.6%	5.0%	12,528	1.03	**F**
			SB	5M	11,750	60.9%	7.9%	5.0%	11,737	1.00	**F**
	Division St & 8th St	218,300	NB	4M	9400	78.0%	6.6%	5.0%	11,728	1.25	**F**
			SB	5M	11750	60.9%	7.9%	5.0%	11,037	0.94	**E**
	8th Street & Civic Center Dr	212,300	NB	4M	9,400	70.1%	6.2%	5.0%	9,728	1.03	**F**
			SB	5M	10,810	59.6%	7.8%	5.0%	10,437	0.97	**E**
	Civic Center Dr & Bay Marina Dr	211,500	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,728	0.74	D
			SB	5M	11,750	59.6%	7.8%	5.0%	10,437	0.89	**E**
	Bay Marina Dr & SR-54	212,800	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,763	0.74	D
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	10,545	0.80	D
	SR-54 & E St	144,600	NB	5M	11,750	70.1%	6.2%	5.0%	6,663	0.57	C
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,145	0.66	C

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
M = Mainline. A = Auxiliary Lane.
[a] Traffic volumes from the SANDAG Series 13 Model
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

As shown, the following seven (7) freeway mainline segments are anticipated to operate at unacceptable LOS E or F:

- I-5 between I-15 and Division Street – LOS F in the NB direction
- I-5 between I-15 and Division Street – LOS F in the SB direction
- I-5 between Division Street and 8th Street – LOS F in the NB direction
- I-5 between Division Street and 8th Street – LOS E in the SB direction
- I-5 between 8th Street and Civic Center Drive – LOS F in the NB direction
- I-5 between 8th Street and Civic Center Drive – LOS E in the SB direction
- I-5 between Civic Center Drive & Bay Marina Drive – LOS E in the SB direction

5.3 Near-Term Year 2030 Plus Total Bayfront

The anticipated roadway and intersection geometrics under Near-Term Year 2030 Plus Total Bayfront conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront conditions, previously displayed in Figure 4-7**.**

Near-Term Year 2030 Plus Total Bayfront traffic volumes were derived by combining the Near-Term Year 2030 Base traffic volumes (displayed in Figure 5-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Near-Term Year 2030 Plus Total Bayfront are displayed in **Figure 5-2**

Table 5.4 displays the LOS analysis results for key roadway segments under the Near-Term Year 2030 Plus Total Bayfront scenario. According to the results in Table 5.4, the addition of project trips associated with the Total Bayfront project would cause a total of one (1) significant impact to the following study roadway:

- Bay Marina Drive between Cleveland Avenue the I-5 Southbound Ramps – LOS E

Tables 5.5 displays the LOS analysis results the study intersections under the Near-Term Year 2030 Plus Total Bayfront scenario. LOS calculation worksheets for the Near-Term Year 2030 Plus Total Bayfront conditions are provided in **Appendix H.** According to the results in Table 5.5, the addition of project trips associated with the Total Bayfront project would cause a total of three (3) significant impacts to the following intersections:

- Cleveland Avenue & West 19th Street (Int 7) – Degrades to LOS E and LOS F in the AM and PM peak hours, respectively
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour
- I-5 Northbound Ramps & Bay Marina Drive (Int 14) – Degrades to LOS E in the AM peak hour

While the Cleveland Avenue & Civic Center Drive intersection is anticipated to operate at LOS F without and with the Total Bayfront, the addition of the Total Bayfront traffic does not increase the intersection's overall delay by two seconds or higher. Therefore, based on the significance criteria presented in section 2.5, the Cleveland Avenue & Civic Center Drive is not considered to be significantly impacted by the Total Bayfront project.

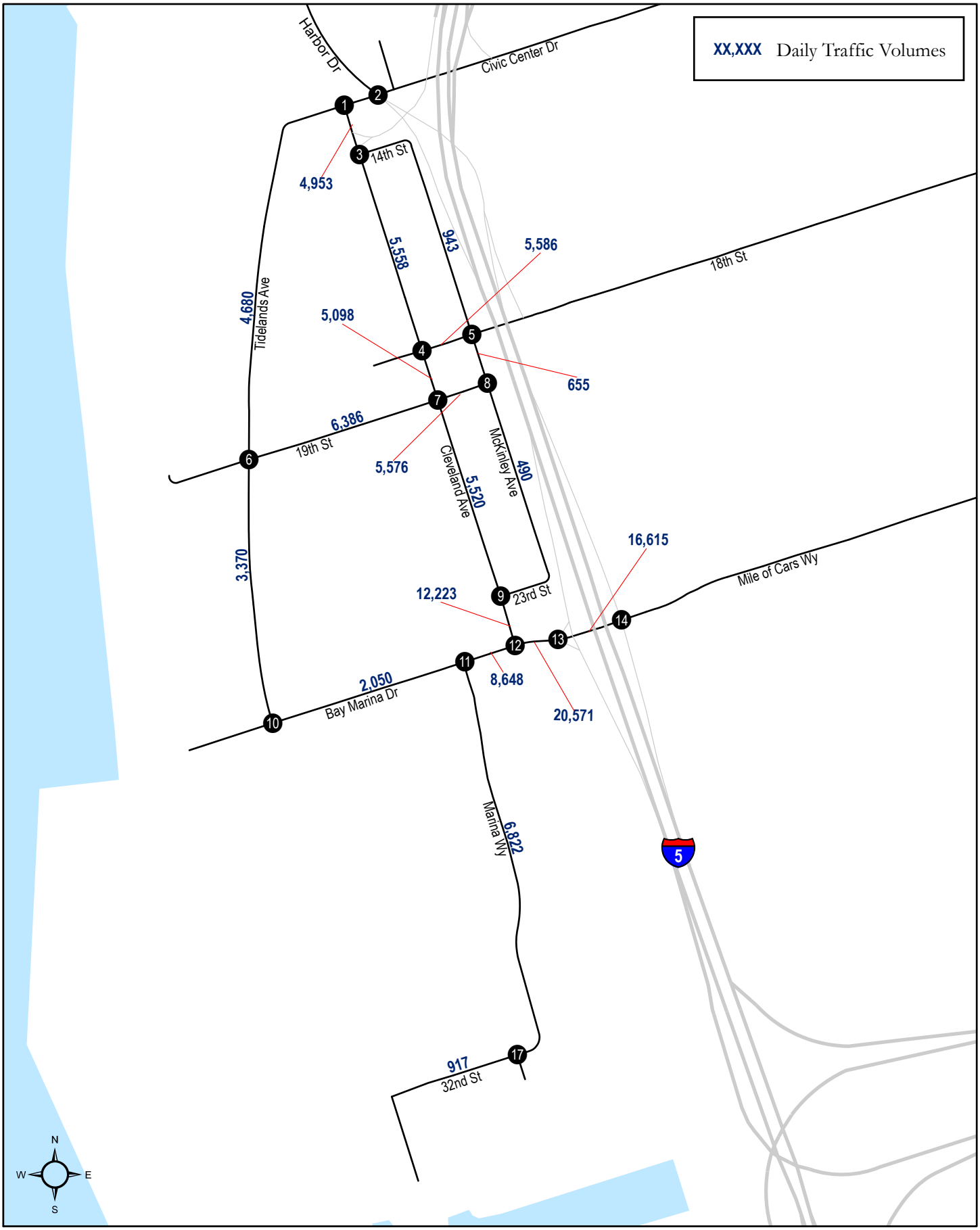

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Figure 5-2
Traffic Volumes -
Near-Term Year 2030 Plus Total Bayfront Conditions

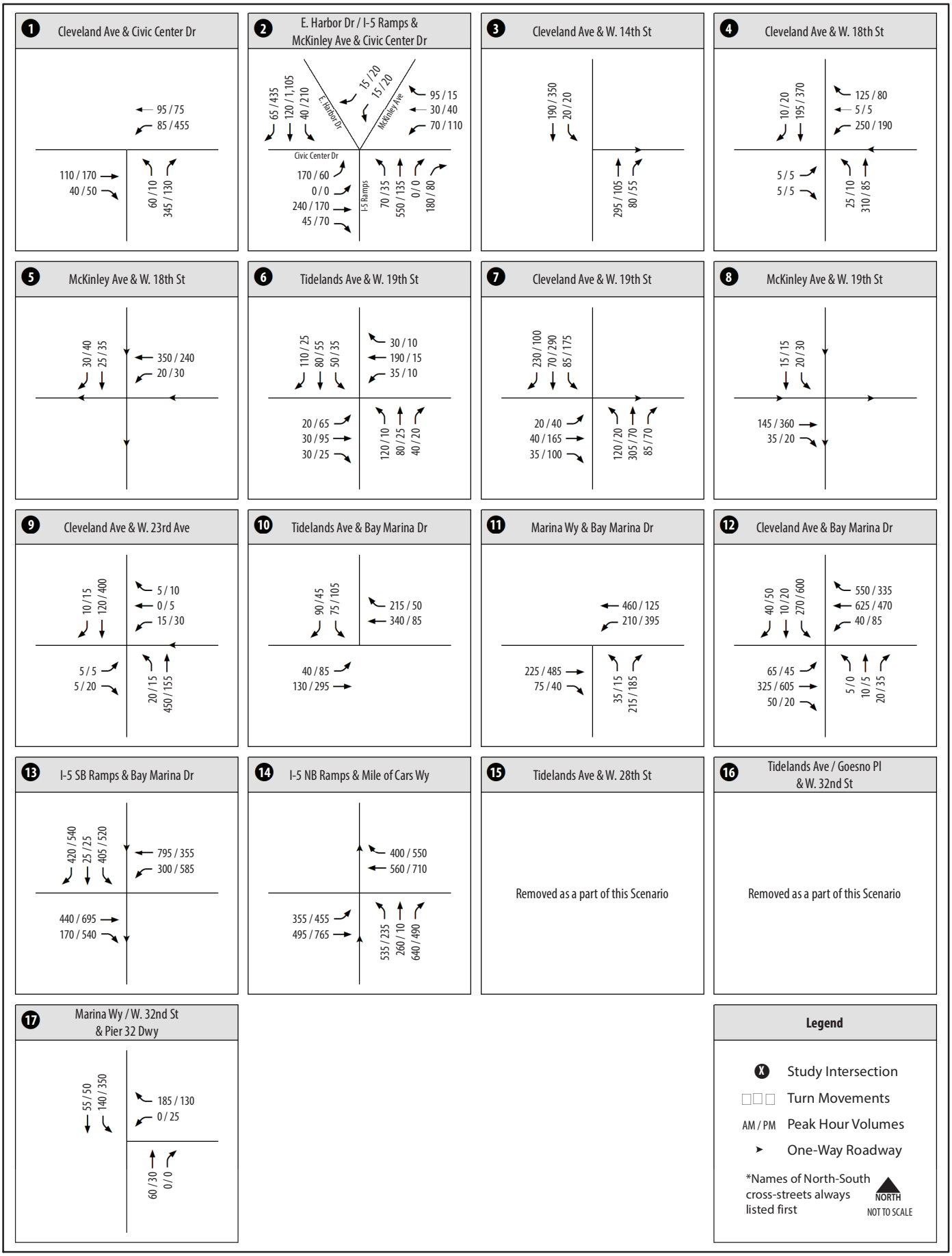

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Figure 5-2
Traffic Volumes -
Near-Term Year 2030 Plus Total Bayfront Conditions

Table 5.4 Roadway Segment LOS Results – Near-Term Year 2030 Plus Total Bayfront Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Near Term Year 2030 + Total Bayfront			Near Term Year 2030 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	3,600	0.360	A	3,600 / .360 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	4,300	0.430	B	4,300 / .430 / B	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	1,050	0.210	A	700 / .070 / A	0.140	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	700	0.140	A	700 / .070 / A	0.070	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	600	0.120	A	600 / .060 / A	0.060	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,213	0.348	B	5,200 / .347 / B	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,813	0.388	B	5,100 / .340 / B	0.048	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	6,171	0.411	B	5,700 / .380 / B	0.031	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	6,245	0.416	B	5,500 / .367 / B	0.050	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,913	0.861	D	6,100 / .407 / B	0.454	N
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	11,086	0.554	C	10,800 / .540 / C	0.014	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	17,778	0.790	D	12,100 / .403 / B	0.387	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	32,701	1.090	**F**	21,100 / .703 / D	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	32,595	0.815	D	30,400 / .760 / D	0.055	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,758	0.176	A	1,300 / .130 / A	0.046	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,516	0.226	A	4,300 / .215 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,458	0.123	A	2,400 / .120 / A	0.003	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	7,094	0.709	C	1,500 / .150 / A	0.559	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	909	0.061	A	700 / .047 / A	0.014	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) only roadway

Table 5.5 Peak Hour Intersection LOS Results – Near-Term Year 2030 Plus Total Bayfront Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	15.0	B	164.7	**F**	14.6/168.9	B/**F**	0.4/-4.2	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	38.9	D	48.7	D	42.3/71.3	D/**E**	-3.4/-22.6	N
3	Cleveland Avenue & W 14th Street	12.2	B	10.7	B	12.4/10.7	B/B	-0.2/0	N
4	Cleveland Avenue & West 18th Street	29.9	D	18.0	C	21.4/16.5	C/C	8.5/1.5	N
5	McKinley Avenue & West 18th Street	9.8	A	9.1	A	12.2/11.8	B/B	-2.4/-2.7	N
6	Tidelands Avenue & West 19th Street	8.6	A	7.9	A	8.5/7.8	A/A	0.1/0.1	N
7	Cleveland Avenue & West 19th Street	38.3	**E**	73.0	**F**	28/39.9	D/E	10.3/33.1	**Y**
8	McKinley Avenue & West 19th Street	8.2	A	10.0	A	10.7/12.6	B/B	-2.5/-2.6	N
9	Cleveland Avenue & McKinley Avenue	14.6	B	14.3	B	15.4/15.5	C/C	-0.8/-1.2	N
10	Tidelands Avenue & Bay Marina Drive	7.9	A	7.3	A	8.1/8.1	A/A	-0.2/-0.8	N
11	Marina Way & Bay Marina Drive**	16.5	B	33.2	C	6.6/9.7	A/A	9.9/23.5	N
12	Cleveland Avenue & Bay Marina Drive	27.1	C	28.8	C	14/16.2	B/B	13.1/12.6	N
13	I-5 SB Ramps & Bay Marina Drive	29.7	C	59.1	**E**	25.2/31.7	C/C	4.5/27.4	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	83.6	**F**	39.0	D	43.3/21	D/C	40.3/18.0	**Y**
15	Tidelands Avenue & West 28th Street*	Intersection Removed				10.2/10.7	B/B	-10.2/-10.7	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				8.0/7.9	A/A	-8.0/-7.9	N
17	West 32nd St & Marina Way	12.6	B	9.9	A	8.8/10.9	A/B	3.5/-1.0	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Tables 5.6 displays the key study freeway mainline LOS under the Near-Term Year 2030 Plus Total Bayfront scenario. According to the results in Table 5.12, the addition of project trips associated with the Total Bayfront would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS E conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 5.6 Freeway Segment LOS – Near-Term Year 2030 Plus Total Bayfront Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	240,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	12,928	1.06	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	Division Street and 8th Street	225,610	NB	4M	9400	78.0%	6.6%	5.0%	12,128	1.29	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	11,437	0.97	0.03	**E**	**Y**
	8th Street and Civic Center Drive	219,610	NB	4M	9,400	70.1%	6.2%	5.0%	10,028	1.07	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	10,837	1.00	0.03	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	218,470	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,028	0.76	0.02	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	10,737	0.91	0.02	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	214,440	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,863	0.75	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	10,545	0.80	0.00	D	N
	SR-54 Junction and E Street	145,440	NB	5M	11,750	70.1%	6.2%	5.0%	6,663	0.57	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,245	0.67	0.01	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

5.4 Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive

The anticipated roadway and intersection geometrics under Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront with Closure of Bay Marina Dive conditions, previously displayed in Figure 4-9**.**

Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina traffic volumes were derived by combining the Near-Term Year 2030 Base traffic volumes (displayed in Figure 5-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue and Bay Marina Drive (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive are displayed in **Figure 5-3**

Table 5.7 displays the LOS analysis results for key roadway segments under the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive. According to the results in Table 5.7, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina would cause a total of two (2) significant impacts to the following study roadways:

- Tidelands Avenue between Harbor Drive to West 19th Street – LOS F
- Tidelands Avenue between West 19th Street to Bay Marina Drive – LOS F

Table 5.8 displays the LOS analysis results for the study intersections under the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive. LOS calculation worksheets for the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive conditions are provided in **Appendix H** According to the results in Table 5.8, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina Drive would cause a total of four (4) significant impacts to the following study intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – Degrades to LOS F in the AM peak hour and exacerbates LOS F in the PM peak hours
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – Exacerbates LOS F operations in the AM and PM peak hours
- Cleveland Avenue & West 19th Street (Int 7) – Degrades to LOS E in the AM peak hour and exacerbates LOS F operations in the PM peak hour
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour

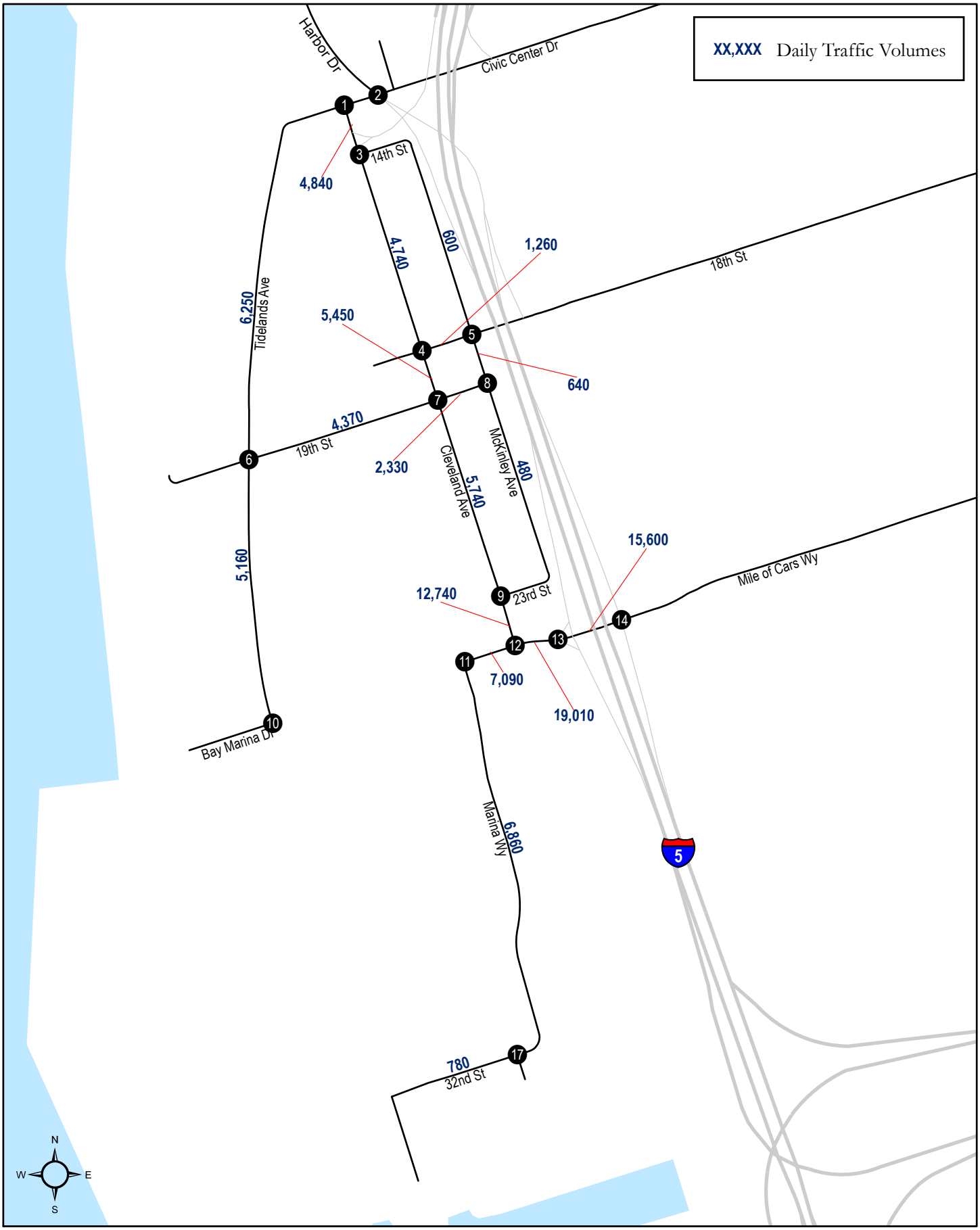

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Figure 5-3
Traffic Volumes -
Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

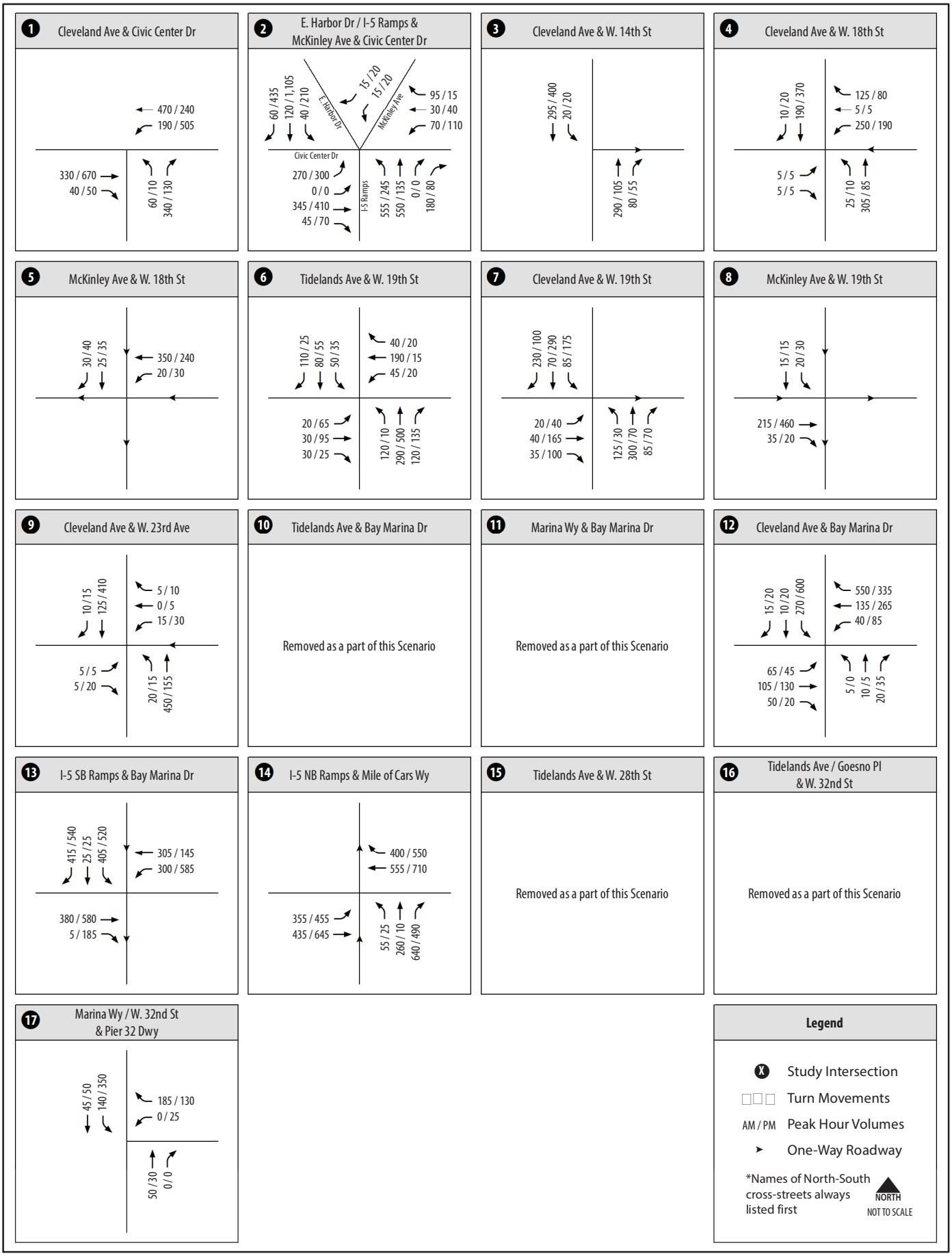

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Figure 5-3
Traffic Volumes - Near-Term Year 2030
Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Table 5.7 Roadway Segment LOS Results – Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Near-Term Year 2030 + Total Bayfront w/ Closure of Bay Marina			Near-Term Year 2030 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	13,220	1.322	**F**	3,600 / .360 / A	0.962	**Y**
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	14,130	1.413	**F**	4,300 / .430 / B	0.983	**Y**
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	600	0.120	A	700 / .070 / A	0.050	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	640	0.128	A	700 / .070 / A	0.058	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	480	0.096	A	600 / .060 / A	0.036	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,840	0.323	A	5,200 / .347 / B	-0.024	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,740	0.316	A	5,100 / .340 / B	-0.024	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,450	0.363	B	5,700 / .380 / B	-0.017	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,740	0.383	B	5,500 / .367 / B	0.016	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,740	0.849	D	6,100 / .407 / B	0.443	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	Roadway Segment Closed			7,573 / .379 / B	-0.379	N
	Marina Way to Cleveland Avenue	3-Lane Secondary Arterial	22,500	8,170	0.363	B	12,100 / .403 / B	-0.040	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	23,090	0.770	D	21,100 / .703 / D	0.066	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	26,350	0.659	C	30,400 / .760 / D	-0.101	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,260	0.126	A	1,300 / .130 / A	-0.004	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,370	0.219	A	4,300 / .215 / A	0.004	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,330	0.117	A	2,400 / .120 / A	-0.003	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,860	0.686	C	1,500 / .150 / A	0.536	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	780	0.052	A	700 / .047 / A	0.005	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
; Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) roadway

Table 5.8 Peak Hour Intersection LOS Results – Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	444.7	**F**	189.6	**F**	14.6/168.9	B/**F**	430.1/20.7	**Y**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	144.2	**F**	150.3	**F**	42.3/71.3	D/**E**	101.9/79	**Y**
3	Cleveland Avenue & W 14th Street	13.5	B	11.2	B	12.4/10.7	B/B	1.1/0.5	N
4	Cleveland Avenue & West 18th Street	29.1	D	18.0	C	21.4/16.5	C/C	7.7/1.5	N
5	McKinley Avenue & West 18th Street	9.8	A	9.1	A	12.2/11.8	B/B	-2.4/-2.7	N
6	Tidelands Avenue & West 19th Street	9.6	A	13.7	B	8.5/7.8	A/A	1.1/5.9	N
7	Cleveland Avenue & West 19th Street	39.0	**E**	82.6	**F**	28.0/39.9	D/**E**	11/42.7	**Y**
8	McKinley Avenue & West 19th Street	8.6	A	11.5	B	10.7/12.6	B/B	-2.1/-1.1	N
9	Cleveland Avenue & McKinley Avenue	18.2	C	17.4	C	15.4/15.5	C/C	2.8/1.9	N
10	Tidelands Avenue & Bay Marina Drive*	Intersection Removed				8.1/8.1	A/A	-8.1/-8.1	N
11	Marina Way & Bay Marina Drive*	Intersection Removed				6.6/9.7	A/A	-6.6/-9.7	N
12	Cleveland Avenue & Bay Marina Drive	20.5	B	22.6	C	14.0/16.2	B/B	6.5/6.4	N
13	I-5 SB Ramps & Bay Marina Drive	32.9	C	66.7	**E**	25.2/31.7	C/C	7.7/35	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	48.8	D	32.5	C	43.3/21.0	D/C	5.5/11.5	N
15	Tidelands Avenue & West 28th Street**	Intersection Removed				10.2/10.7	B/B	-10.2/-10.7	N
16	Tidelands Avenue & West 32nd Street**	Intersection Removed				8.0/7.9	A/A	-8.0/-7.9	N
17	West 32nd St & Marina Way	10.3	B	9.9	A	8.8/10.9	A/B	3.5/-1.0	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Bay Marina Drive would be closed from Marina Way to the west, therefore the intersections of Tidelands Avenue & Bay Marina Drive and Marina Way and Bay Marina Drive would be removed.
**Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.

Table 5.9 displays the key study freeway mainline LOS under the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive scenario. According to the results in Table 5.9, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina Drive would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS E conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 5.9 Freeway Segment LOS – Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	240,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	12,928	1.06	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	Division Street and 8th Street	225,610	NB	4M	9400	78.0%	6.6%	5.0%	12,128	1.29	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	11,437	0.97	0.03	**E**	**Y**
	8th Street and Civic Center Drive	219,610	NB	4M	9,400	70.1%	6.2%	5.0%	10,028	1.07	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	10,837	1.00	0.03	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	219,170	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,028	0.76	0.02	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	10,837	0.92	0.03	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	214,440	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,863	0.75	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	10,545	0.80	0.00	D	N
	SR-54 Junction and E Street	145,440	NB	5M	11,750	70.1%	6.2%	5.0%	6,663	0.57	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,245	0.67	0.01	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

5.5 Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive

The anticipated roadway and intersection geometrics under Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront with Partial Closure of Bay Marina Dive conditions, previously displayed in Figure 4-11**.**

Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive traffic volumes were derived by combining the Near-Term Year 2030 Base traffic volumes (displayed in Figure 5-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue and Bay Marina Drive (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive are displayed in **Figure 5-4**

Table 5.10 displays the LOS analysis results for key roadway segments under the Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive. LOS calculation worksheets for the Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive conditions are provided in **Appendix H**. According to the results in Table 5.10, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina Drive would cause a total of two (2) significant impact to the following study roadway:

- Bay Marina Drive between Tidelands Avenue and Marina Way – LOS F
- Bay Marina Drive between Cleveland Avenue and the I-5 Southbound Ramps – LOS F

Tables 5.11 displays the LOS analysis results for the study intersections under the Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive. According to the results in Table 5.11, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina would cause a total of three (3) significant impacts to the following study intersections:

-
- Cleveland Avenue & West 19th Street (Int 7) – Degrades to LOS E in the AM peak hour and exacerbates LOS F in the PM peak hours
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour
- I-5 Northbound Ramps & Bay Marina Drive (Int 14) – Degrades to LOS E in the AM peak hour

While the Cleveland Avenue & Civic Center Drive and I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive intersections are anticipated to operate at LOS E or F in the PM peak hour without and with the Total Bayfront with Partial Closure of Bay Marina Drive, the addition of the project traffic does not increase the intersection's overall delay by two seconds or higher. Therefore, based on the significance criteria presented in section 2.5, the Cleveland Avenue & Civic Center Drive and I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive are not considered to be significantly impacted by the Total Bayfront with the Partial Closure of Bay Marina Drive.

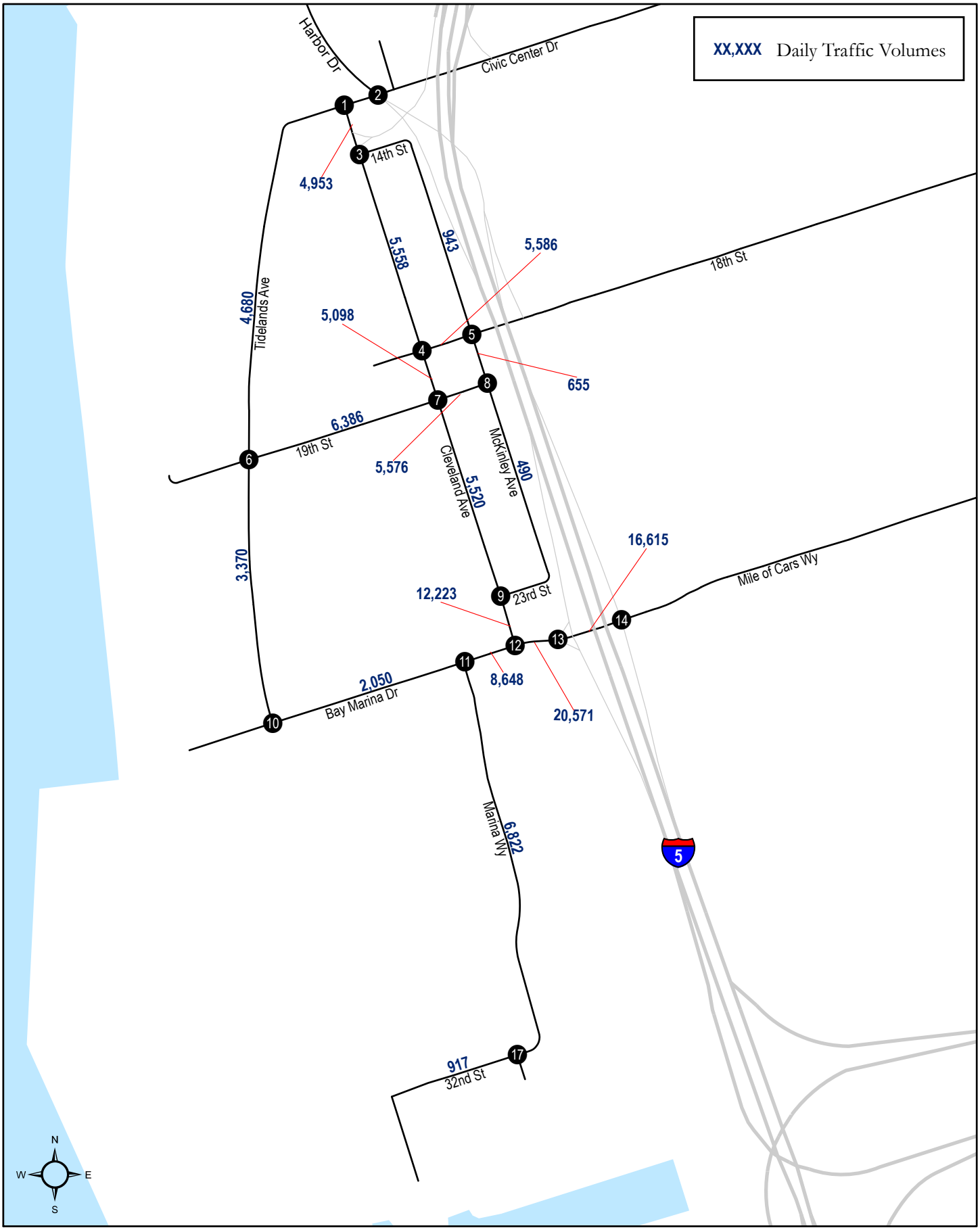

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Figure 5-4
Traffic Volumes - Near-Term Year 2030
Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

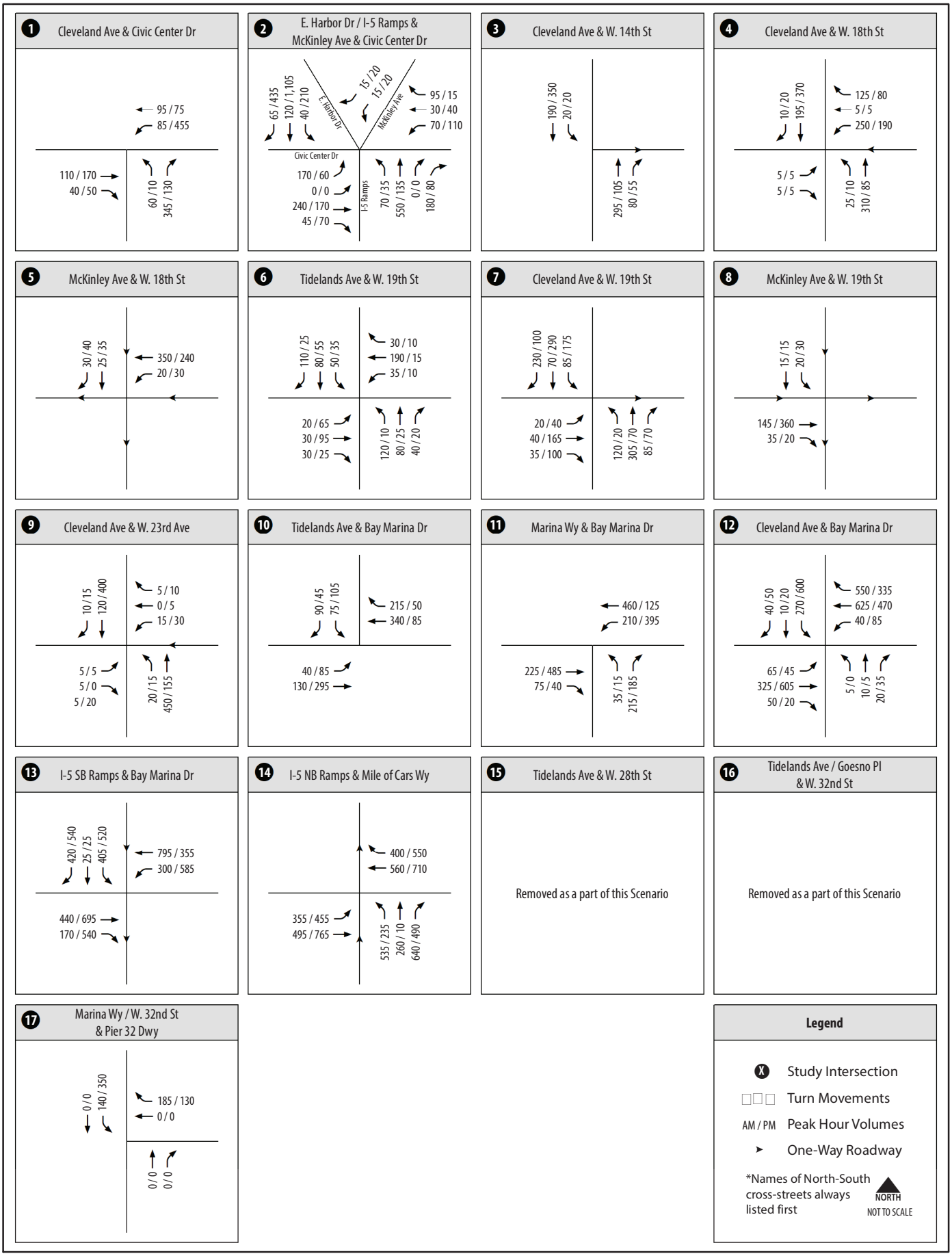

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Figure 5-4
Traffic Volumes - Near-Term Year 2030
Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Table 5.10 Roadway Segment LOS Results – Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Near-Term + Total Bayfront w/ Partial Closure of Bay Marina			Near-Term Year 2030 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	3,600	0.360	A	3,600 / .360 / A	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	4,300	0.430	B	4,300 / .430 / B	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	1,050	0.210	A	700 / .070 / A	0.140	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	700	0.140	A	700 / .070 / A	0.070	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	600	0.120	A	600 / .060 / A	0.060	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,213	0.348	B	5,200 / .347 / B	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,813	0.388	B	5,100 / .340 / B	0.048	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	6,171	0.411	B	5,700 / .380 / B	0.031	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	6,245	0.416	B	5,500 / .367 / B	0.050	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,913	0.861	D	6,100 / .407 / B	0.454	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	11,086	1.109	**F**	10,800 / .540 / C	0.569	**Y**
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	17,778	0.790	D	12,100 / .403 / B	0.387	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	32,701	1.090	**F**	21,100 / .703 / D	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	32,595	0.815	D	30,400 / .760 / D	0.055	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,758	0.176	A	1,300 / .130 / A	0.046	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,516	0.226	A	4,300 / .215 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,458	0.123	A	2,400 / .120 / A	0.003	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	7,094	0.709	C	1,500 / .150 / A	0.559	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	909	0.061	A	700 / .047 / A	0.014	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable operations
V/C = Volume to Capacity Ratio; Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant

*McKinley Ave is converted to one-way (southbound) roadway
**This segment of Bay Marina Dr is narrowed to 2-lanes

Table 5.11 Peak Hour Intersection LOS Results – Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	15.0	B	164.7	**F**	14.6/168.9	B/**F**	0.4/-4.2	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	38.9	D	57.9	**E**	42.3/71.3	D/**E**	-3.4/-13.4	N
3	Cleveland Avenue & W 14th Street	12.2	B	10.7	B	12.4/10.7	B/B	-0.2/0	N
4	Cleveland Avenue & West 18th Street	29.9	D	18.0	C	21.4/16.5	C/C	8.5/1.5	N
5	McKinley Avenue & West 18th Street	9.8	A	9.1	A	12.2/11.8	B/B	-2.4/-2.7	N
6	Tidelands Avenue & West 19th Street	8.6	A	7.9	A	8.5/7.8	A/A	0.1/0.1	N
7	Cleveland Avenue & West 19th Street	38.3	**E**	73.0	**F**	28.0/39.9	D/**E**	10.3/33.1	**Y**
8	McKinley Avenue & West 19th Street	8.2	A	10.0	A	10.7/12.6	B/B	-2.5/-2.6	N
9	Cleveland Avenue & McKinley Avenue	14.8	B	14.3	B	15.4/15.5	C/C	-0.6/-1.2	N
10	Tidelands Avenue & Bay Marina Drive	10.3	B	8.2	A	8.1/8.1	A/A	2.2/0.1	N
11	Marina Way & Bay Marina Drive**	21.8	C	48.6	D	6.6/9.7	A/A	15.2/38.9	N
12	Cleveland Avenue & Bay Marina Drive	27.1	C	28.8	C	14.0/16.2	B/B	13.1/12.6	N
13	I-5 SB Ramps & Bay Marina Drive	29.7	C	59.6	**E**	25.2/31.7	C/C	4.5/27.9	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	83.6	**F**	36.5	D	43.3/21.0	D/C	40.3/15.5	**Y**
15	Tidelands Avenue & West 28th Street*	Intersection Removed				10.2/10.7	B/B	-10.2/-10.7	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				8.0/7.9	A/A	-8.0/-7.9	N
17	West 32nd Street & Marina Way	10.3	B	9.9	A	8.8/10.9	A/B	3.5/-1.0	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table

Tables 5.12 displays the key study freeway mainline LOS under the Near-Term Year 2030 Plus Total Bayfront with Closure of Bay Marina Drive scenario. According to the results in Table 5.12, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina Drive would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS E conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 5.12 Freeway Segment LOS – Near-Term Year 2030 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	240,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	12,928	1.06	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	Division Street and 8th Street	225,610	NB	4M	9400	78.0%	6.6%	5.0%	12,128	1.29	0.04	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	11,437	0.97	0.03	**E**	**Y**
	8th Street and Civic Center Drive	219,610	NB	4M	9,400	70.1%	6.2%	5.0%	10,028	1.07	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	10,837	1.00	0.03	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	218,470	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,028	0.76	0.02	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	10,737	0.91	0.02	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	214,440	NB	5M+1A	13,160	70.1%	6.2%	5.0%	9,863	0.75	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	10,545	0.80	0.00	D	N
	SR-54 Junction and E Street	145,440	NB	5M	11,750	70.1%	6.2%	5.0%	6,663	0.57	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,245	0.67	0.01	C	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

5.6 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would cause a significant impact to key roadways, intersections, and freeway mainline segments in the study area.

Table 5.13 summarizes the impacted project roadways under each of the four (4) Near-Tern Year 2030 Plus Project scenarios.

Table 5.13 Impacted Roadway Segment Summary – Near-Term Year 2030 Plus Project Conditions

Roadway	Segment	NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM
Tidelands Avenue	Harbor Drive to West 19th Street		✓	
	West 19th Street to Bay Marina Drive		✓	
	Bay Marina Drive to West 32nd Street			
McKinley Avenue	West 14th Street to West 18th Street			
	West 18th Street to West 19th Street			
	West 19th Street to Cleveland Avenue			
Cleveland Avenue	Civic Center Drive to West 14th Street			
	West 14th Street to West 18th Street			
	West 18th Street to West 19th Street			
	West 19th Street to West 23rd Street			
	West 23rd Street to Bay Marina Drive			
Bay Marina Drive	Tidelands Avenue to Marina Way			✓
	Marina Way to Cleveland Avenue			
	Cleveland Avenue to I-5 SB Ramps	✓		✓
	I-5 SB Ramps to I-5 NB Ramps			
West 18th Street	Cleveland Avenue to McKinley Avenue			
West 19th Street	Tidelands Avenue to Cleveland Avenue			
	Cleveland Avenue to McKinley Avenue			
Marina Way	Bay Marina Drive to West 32nd Street			
West 32nd Street	Tidelands Avenue to Marina Way			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Table 5.14 summarizes the impacted study intersections under each of the three (3) Near-Term Year 2030 Plus Project scenarios.

Table 5.14 Impacted Intersections Summary – Near-Term Year 2030 Plus Project Conditions

#	Intersection	Ex + TB	Ex + TB w/ CI of BM	Ex + TB w/ Part CI of BM
1	Cleveland Avenue & Civic Center Drive		✓	
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive		✓	
3	Cleveland Avenue & W 14th Street			
4	Cleveland Avenue & West 18th Street			
5	McKinley Avenue & West 18th Street			
6	Tidelands Avenue & West 19th Street			
7	Cleveland Avenue & West 19th Street	✓	✓	✓
8	McKinley Avenue & West 19th Street			
9	Cleveland Avenue & McKinley Avenue			
10	Tidelands Avenue & Bay Marina Drive			
11	Marina Way & Bay Marina Drive			
12	Cleveland Avenue & Bay Marina Drive			
13	I-5 SB Ramps & Bay Marina Drive	✓	✓	✓
14	I-5 NB Off-Ramps & Bay Marina Drive	✓		✓
15	Tidelands Avenue & West 28th Street*			
16	Tidelands Avenue & West 32nd Street*			
17	West 32nd Street & Marina Way			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront

TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Table 5.15 summarizes the impacted freeway mainline segments under each of the three (3) Near-Term Year 2030 Plus Project scenarios.

Table 5.15 Impacted Freeway Mainline Segments Summary – Near-Term Year 2030 Plus Project Conditions

Freeway	Segment		NT + TB	NT + TB w/ Cl of BM	NT + TB w/ Part Cl of BM
I-5	I-15 and Division Street	NB	✓	✓	✓
		SB	✓	✓	✓
	Division Street and 8th Street	NB	✓	✓	✓
		SB	✓	✓	✓
	8th Street and Civic Center Drive	NB	✓	✓	✓
		SB	✓	✓	✓
	Civic Center Drive and Bay Marina Drive	NB			
		SB	✓	✓	✓
	Bay Marina Drive and SR-54 Junction	NB			
		SB			
	SR-54 Junction and E Street	NB			
		SB			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 5.16 summarizes the mitigation measures required to mitigate the project impact to less than significant. Since these impacts are considered cumulative impacts, the fair share calculations are also presented for each mitigation.

Table 5.16 Impacted Study Facilities and Proposed Mitigations – Near-Term Year 2030 Plus Project Conditions

Study Facility		Near-Term Year 2030 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
		NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM				
ROADWAY SEGMENTS								
Tidelands Avenue	Harbor Drive to West 19th Street		✓		Widen roadway and reclassify as a 4-Lane Collector	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	West 19th Street to Bay Marina Drive		✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Tidelands Avenue to Marina Way			✓	Reclassify roadway to a 2-Lane Collector with Center-Left-Turn Lane	YES	Project Fair Share: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, this improvement could be done within the existing right-of-way. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
	Cleveland Avenue to I-5 SB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
INTERSECTIONS								
1	Cleveland Avenue & Civic Center Drive		✓		Add a separate westbound left-turn and install a traffic signal	NO	Fair Share: 82.2% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	YES	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
7	Cleveland Avenue & West 19th Street	✓	✓	✓	Restripe the eastbound left/through to an exclusive left-turn lane, and restripe the eastbound right-turn lane to a through/right	YES	Fair Share: 45.5% Responsibility Split: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. This improvement can be achieved within the existing right-or-way and would reduce the impact to less-than-significant conditions. However, since this intersection is under the City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive	✓	✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	Direct Impact: 100% Responsibility Split: 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*

Table 5.16 Impacted Study Facilities and Proposed Mitigations – Near-Term Year 2030 Plus Project Conditions

Study Facility			Near-Term Year 2030 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
			NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM				
14	I-5 Northbound Ramps & Bay Marina Drive		✓		✓	Restripe the northbound left/through/right lane to a northbound left/through lane, and add widen the ramp to construct a second northbound right-turn lane	NO	Direct Impact: 100% Responsibility Split: 62% Development Projects (City Program) 35% Development Projects (GB Capital) 3% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, while there is adequate right-of-way to add a second northbound right-turn lane, constructing this improvement would require substantial relocation of existing utility lines and large electrical power towers. Therefore, due to the close proximity of the ramp to the existing utility lines, the construction of this improvement is considered infeasible. Therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE									
I-5	I-15 and Division Street	NB	✓	✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	Fair Share: 25.2% Responsibility Split: 24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementing this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓	✓	✓				
	Division Street and 8th Street	NB	✓	✓	✓				
	8th Street and Civic Center Drive	NB	✓	✓	✓				
		SB	✓	✓	✓				
	Civic Center Drive and Bay Marina Drive	SB	✓	✓	✓				

Notes:
✓ Indicates a significant impact
TB = Total Bayfront
TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

6.0 Future Year 2050 Traffic Conditions

This section provides an analysis of Year 2050 traffic conditions, which is the anticipated opening year for all the project components, both with and without project traffic. The scenarios analyzed in this section include:

- Future Year 2050 Base
- Future Year 2050 Plus Total Bayfront
- Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive
- Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive

6.1 Future Year Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Future Year 2050 Base conditions were assumed to be identical to the Existing conditions, as shown in Figure 4-1 previously. It should be noted that while SANDAG's Regional Transportation Plan (RTP) does identify freeway widening improvements to the I-5 segments within the study area by Year 2050, those improvements were not assumed in the analysis as funding and timing of implementation are uncertain. Consequently, precluding the I-5 improvements results in a more conservative analysis.

Future year forecasts for Year 2050 was developed using the SANDAG Series 13 Travel Demand Model that includes all the land use changes associated with the PMPU. The peak hour intersection turning movements were developed by comparing existing and forecasted Year 2050 ADTs, as well as peak hour approach and departure volumes, then applying the respective growth factors. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections are reasonably balanced. Year 2050 SANDAG Series 13 Travel Demand Model ADTs are included in **Appendix I.**

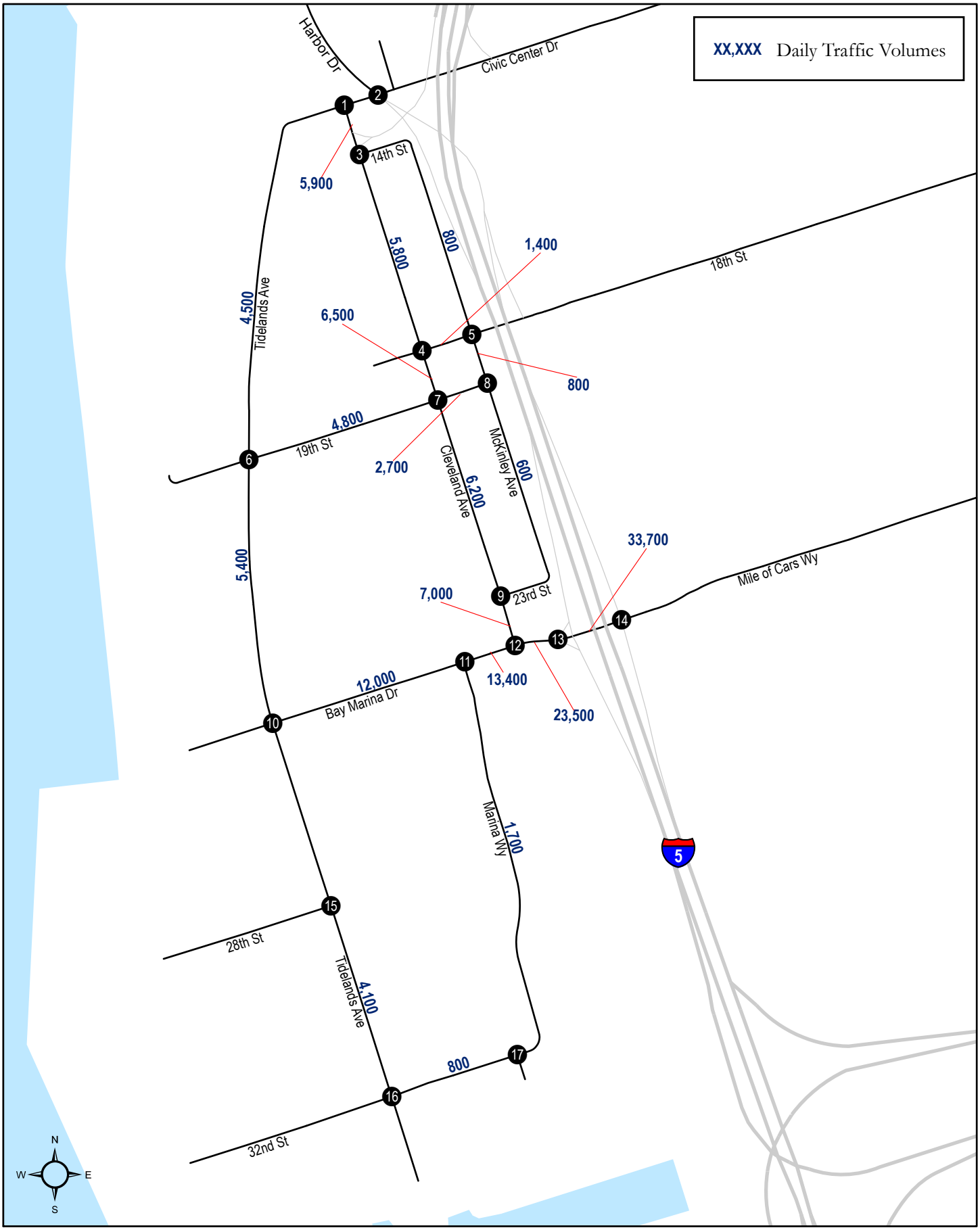
Figure 6-1 displays average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Future Year 2050 Base conditions.

6.2 Future Year 2050 Base Traffic Conditions

LOS analyses for the Future Year 2050 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment, intersection LOS, and freeway mainline analysis results for Year 2050 Base conditions are discussed separately below.

Roadway Segment Analysis

Table 6.1 displays the LOS analysis results for key roadway segments under Future Year 2050 Base conditions.



National City Bayfront Projects
Transportation Impact Study
CHEN RYAN

Figure 6-1
Traffic Volumes - Future Year 2050 Base Conditions

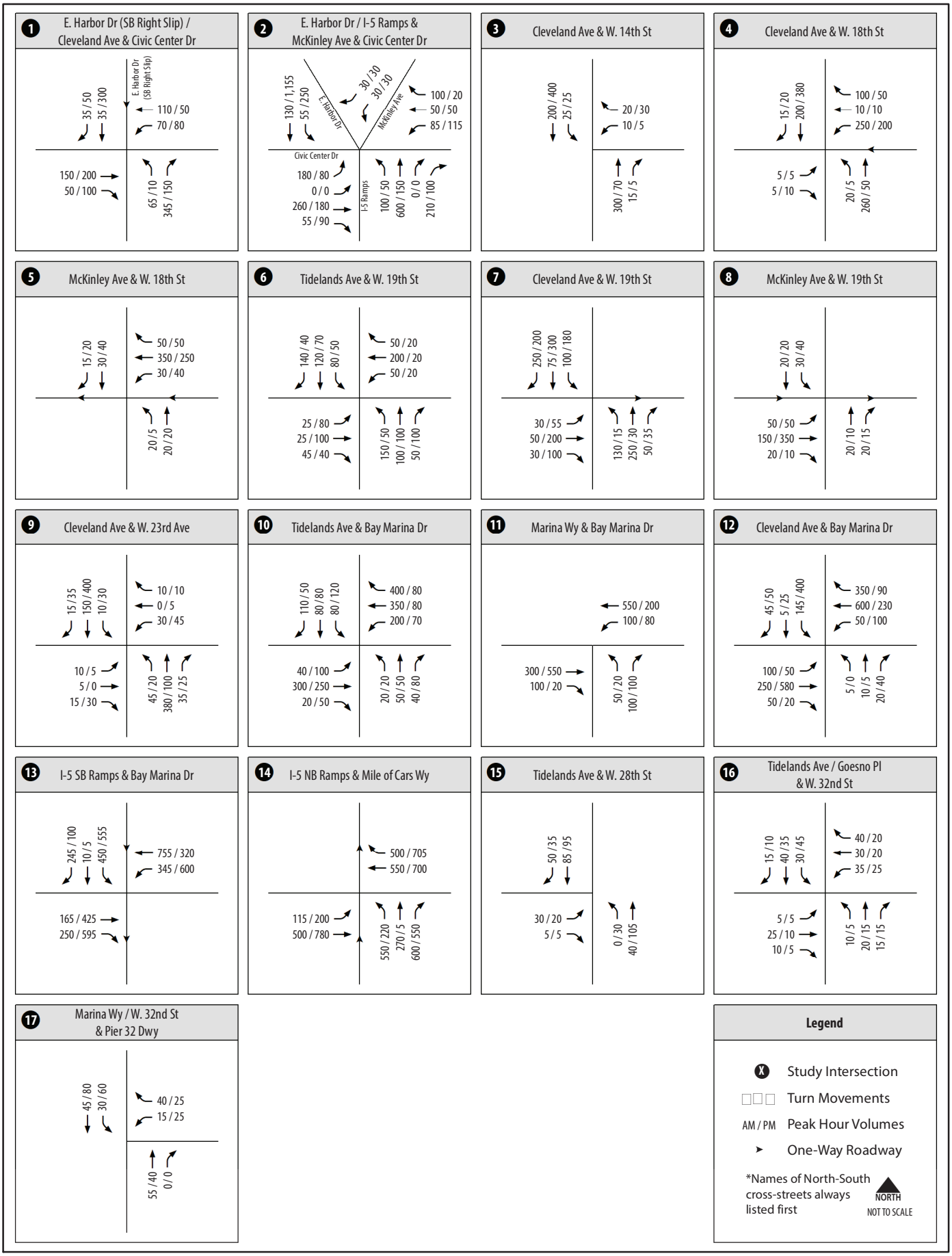


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Figure 6-1
Traffic Volumes -
Future Year 2050 Base Conditions

Table 6.1 Roadway Segment LOS Results – Future Year 2050 Base Conditions

Roadway Segment	Segment	Functional Classification	Threshold (LOS E)	ADT	V/C	LOS
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	4,500	0.450	B
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	5,400	0.540	B
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	4,100	0.410	B
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	800	0.080	A
	West 18th Street to West 19th Street	2-Lane Collector	10,000	800	0.080	A
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	600	0.060	A
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,900	0.393	B
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,800	0.387	B
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	6,500	0.433	B
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	6,200	0.413	B
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	7,000	0.467	B
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	12,000	0.600	C
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	13,400	0.447	B
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	23,500	0.783	D
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	33,700	0.843	D
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,400	0.140	A
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,800	0.240	A
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,700	0.135	A
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,700	0.170	A
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	800	0.053	A

Source: Chen Ryan Associates; October 2019

Notes:
CLTL = Center-Left-Turn-Lane
V/C = Volume to Capacity Ratio.

As shown in the table, all key study roadway segments are anticipated operate at LOS D or better under Future Year 2050 Base conditions.

Intersection Analysis

Table 6.2 displays intersection LOS and average vehicle delay results under Future Year 2050 Base conditions. LOS calculation worksheets for the Future Year 2050 Base conditions are provided in **Appendix J**.

Table 6.2 Peak Hour Intersection LOS Results – Future Year 2050 Base Conditions

#	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Cleveland Avenue & Civic Center Drive	SSSC	20.3	C	**210.2**	**F**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	Signal	52.6	D	**108.9**	**F**
3	Cleveland Avenue & W 14th Street	SSSC	13.6	B	13.4	B
4	Cleveland Avenue & West 18th Street	SSSC	21.6	C	18.9	C
5	McKinley Avenue & West 18th Street	AWSC	13.8	B	13.2	B
6	Tidelands Avenue & West 19th Street	Signal	9.8	A	8.5	A
7	Cleveland Avenue & West 19th Street	SSSC	**50.6**	**F**	**128.8**	**F**
8	McKinley Avenue & West 19th Street	AWSC	11.8	B	14.5	B
9	Cleveland Avenue & McKinley Avenue	SSSC	21.0	C	21.0	C
10	Tidelands Avenue & Bay Marina Drive	Signal	10.8	B	9.7	A
11	Marina Way & Bay Marina Drive**	Signal	8.7	A	10.4	B
12	Cleveland Avenue & Bay Marina Drive	Signal	18.9	B	17.8	B
13	I-5 SB Ramps & Bay Marina Drive	Signal	26.9	C	30.6	C
14	I-5 NB Off-Ramps & Bay Marina Drive	Signal	53.1	D	35.4	D
15	Tidelands Avenue & West 28th Street	SSSC	11.7	B	12.9	B
16	Tidelands Avenue & West 32nd Street	AWSC	8.7	A	8.4	A
17	West 32nd St & Marina Way	SSSC	10.2	B	12.8	B

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
AWSC indicates all-way stop controlled intersection.
SSSC indicates side street stop-controlled intersection, the delay shown is the worst delay experienced by any of the approaches.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table

As shown, all key study intersections are projected to operate at acceptable LOS D or better under Future Year 2050 Base conditions, with the exception of the following three (3) intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – LOS F during the PM peak hour
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – LOS F during the PM peak hour
- Cleveland Avenue & West 19th Street (Int 7) – LOS F during the AM and PM peak hours

Freeway Segment LOS

Table 6.3 displays the key study freeway mainline LOS analysis results under Future Year 2050 Base conditions.

Table 6.3 Freeway Segment LOS – Near-Term Year 2030 Base Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	LOS
I-5	I-15 & Division St	247,800	NB	4M+2A	9,400	78.0%	6.6%	5.0%	13,328	1.09	**F**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,537	1.07	**F**
	Division St & 8th St	231,900	NB	4M	9400	78.0%	6.6%	5.0%	12,528	1.33	**F**
			SB	5M	11750	60.9%	7.9%	5.0%	11,737	1.00	**F**
	8th Street & Civic Center Dr	218,100	NB	4M	9,400	70.1%	6.2%	5.0%	10,028	1.07	**F**
			SB	5M	10,810	59.6%	7.8%	5.0%	10,737	0.99	**E**
	Civic Center Dr & Bay Marina Dr	221,200	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,128	0.77	D
			SB	5M	11,750	59.6%	7.8%	5.0%	10,937	0.93	**E**
	Bay Marina Dr & SR-54	224,100	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,263	0.78	D
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	11,045	0.84	D
	SR-54 & E St	154,400	NB	5M	11,750	70.1%	6.2%	5.0%	7,163	0.61	C
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,645	0.71	D

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
M = Mainline. A = Auxiliary Lane.
[a] Traffic volumes from the SANDAG Series 13 Model
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

As shown, the following seven (7) freeway mainline segments are anticipated to operate at unacceptable LOS E or F:

- I-5 between I-15 and Division Street – LOS F in the NB direction
- I-5 between I-15 and Division Street – LOS F in the SB direction
- I-5 between Division Street and 8th Street – LOS F in the NB direction
- I-5 between Division Street and 8th Street – LOS F in the SB direction
- I-5 between 8th Street and Civic Center Drive – LOS F in the NB direction
- I-5 between 8th Street and Civic Center Drive – LOS E in the SB direction
- I-5 between Civic Center Drive & Bay Marina Drive – LOS E in the SB direction

6.3 Future Year 2050 Plus Total Bayfront Conditions

The anticipated roadway and intersection geometrics under Future Year 2050 Plus Total Bayfront conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront conditions, previously displayed in Figure 4-7**.**

Future Year 2050 Plus Total Bayfront traffic volumes were derived by combining the Future Year 2050 Base traffic volumes (displayed in Figure 6-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Future Year 2050 Plus Total Bayfront are displayed in **Figure 6-2**

Table 6.4 displays the LOS analysis results for key roadway segments under the Future Year 2050 Plus Total Bayfront scenario. LOS calculation worksheets for the Future Year 2050 Plus Total Bayfront conditions are provided in **Appendix K.** According to the results in Table 6.4, the addition of project trips associated with the Total Bayfront project would cause a total of three (3) significant impacts to the following study roadways:

- Cleveland Avenue between West 23rd Street and Bay Marina Drive – LOS E
- Bay Marina Drive between Cleveland Avenue the I-5 Southbound Ramps – LOS F
- Bay Marina Drive between I-5 Southbound and Northbound Ramps – LOS E

Tables 6.5 displays the LOS analysis results the study intersections under the Future Year 2050 Plus Total Bayfront scenario. According to the results in Table 6.5, the addition of project trips associated with the Total Bayfront project would cause a total of three (3) significant impacts to the following intersections:

- Cleveland Avenue & West 19th Street (Int 7) – Exacerbates LOS F in the AM and PM peak hours
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour
- I-5 Northbound Ramps & Bay Marina Drive (Int 14) – Degrades to LOS F in the AM and PM peak hours

While the Cleveland Avenue & Civic Center Drive and the I-5 Northbound Off-Ramp/E Harbor Drive and Civic Center Drive intersections are anticipated to operate at LOS F without and with the Total Bayfront, the addition of the Total Bayfront traffic does not increase the intersection's overall delay by two seconds or higher. Therefore, based on the significance criteria presented in section 2.5, the Cleveland Avenue & Civic Center Drive and the I-5 Northbound Off-Ramp/E Harbor Drive and Civic Center Drive intersections are not considered to be significantly impacted by the Total Bayfront project.

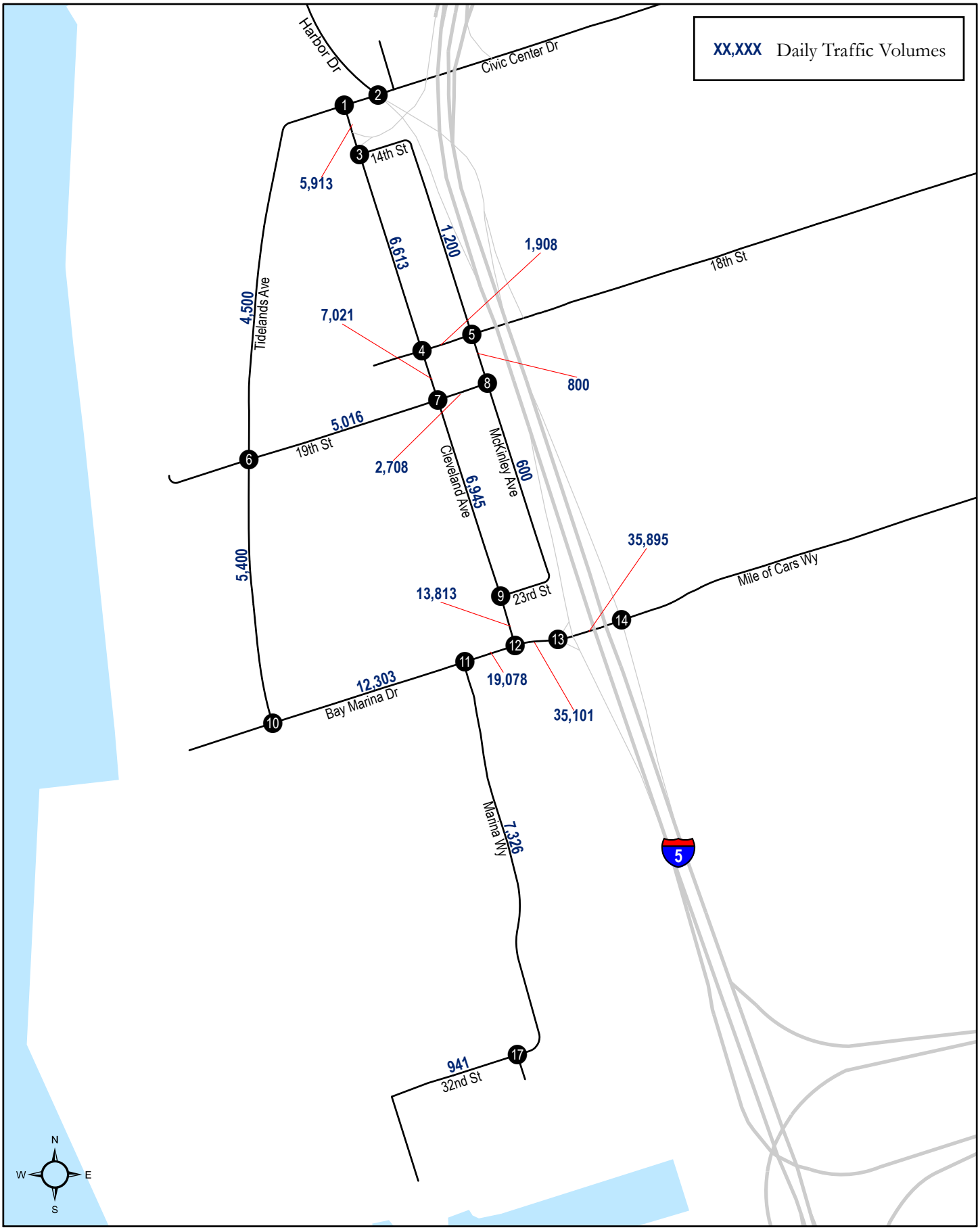

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Figure 6-2
Traffic Volumes -
Future Year 2050 Plus Total Bayfront Conditions

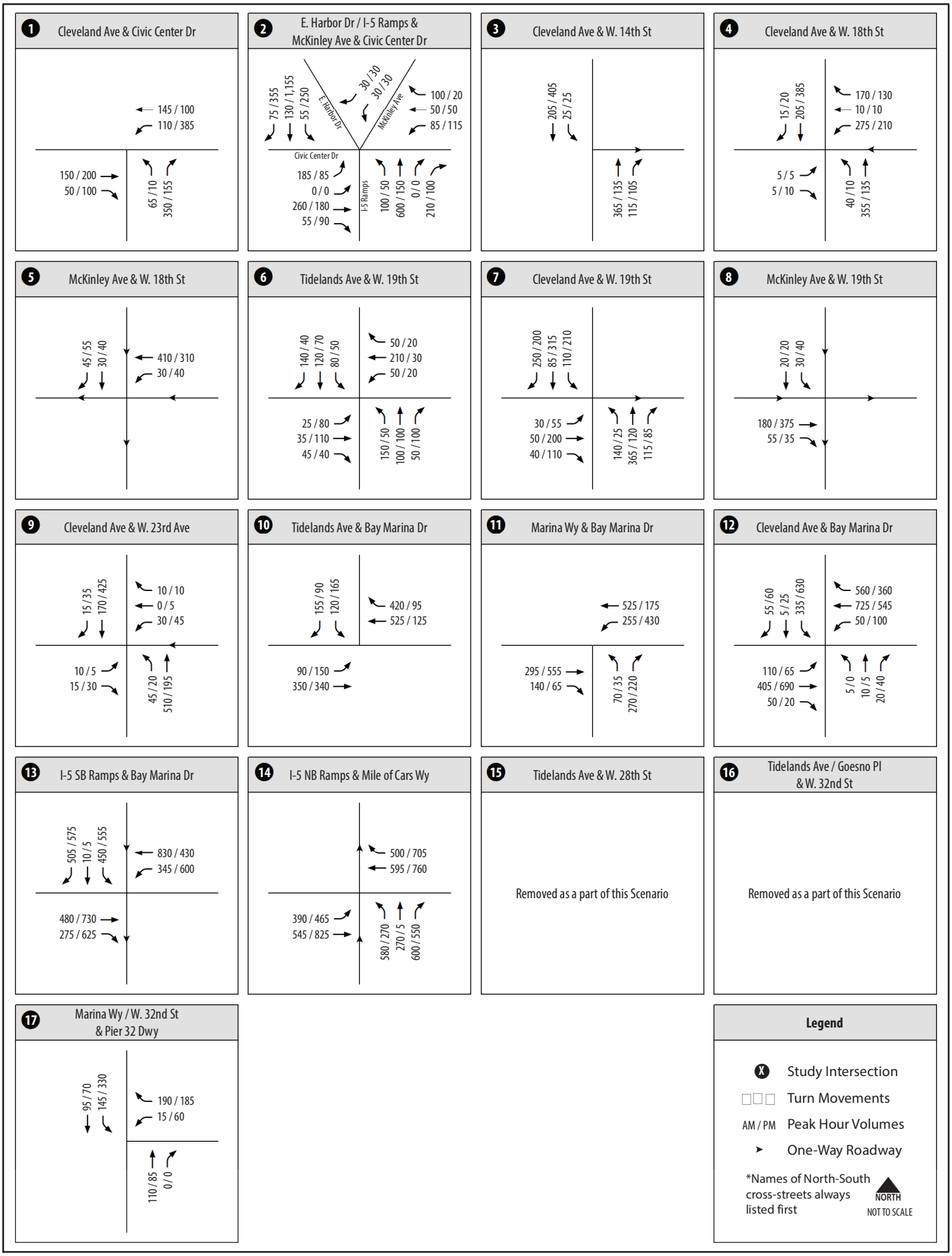

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Figure 6-2
Traffic Volumes -
Future Year 2050 Plus Total Bayfront Conditions

Table 6.4 Roadway Segment LOS Results – Future Year 2050 Plus Total Bayfront Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Near Term Year 2030 + Total Bayfront			Near Term Year 2030 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	4,500	0.450	B	4,500 / .450 / B	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	5,400	0.540	B	5,400 / .540 / B	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	1,200	0.240	A	800 / .080 / A	0.160	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	800	0.160	A	800 / .080 / A	0.080	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	600	0.120	A	600 / .060 / A	0.060	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,913	0.394	B	5,900 / .393 / B	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	6,613	0.441	B	5,800 / .387 / B	0.054	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	7,021	0.468	C	6,500 / .433 / B	0.035	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	6,945	0.463	B	6,200 / .413 / B	0.050	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	13,813	0.921	**E**	7,000 / .467 / B	0.454	**Y**
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	12,303	0.615	C	12,000 / .600 / C	0.015	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	19,078	0.636	C	13,400 / .447 / B	0.189	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	35,101	1.170	**F**	23,500 / .783 / D	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	35,895	0.897	**E**	33,700 / .843 / D	0.055	**Y**
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,908	0.191	A	1,400 / .140 / A	0.051	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	5,016	0.251	A	4,800 / .240 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,708	0.135	A	2,700 / .135 / A	0.000	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	7,326	0.733	C	1,700 / .170 / A	0.563	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	941	0.063	A	800 / .053 / A	0.009	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) only roadway

Table 6.5 Peak Hour Intersection LOS Results – Future Year 2050 Plus Total Bayfront Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	20.3	C	132.8	**F**	20.3/210.2	C/**F**	0/-77.4	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	48.7	D	89.5	**F**	52.6/108.9	D/**F**	-3.9/-19.4	N
3	Cleveland Avenue & W 14th Street	13.5	B	13.6	B	13.6/13.4	B/B	-0.1/0.2	N
4	Cleveland Avenue & West 18th Street	34.0	D	21.9	C	21.6/18.9	C/C	12.4/3.0	N
5	McKinley Avenue & West 18th Street	10.6	B	9.9	A	13.8/13.2	B/B	-3.2/-3.3	N
6	Tidelands Avenue & West 19th Street	9.9	A	8.6	A	9.8/8.5	A/A	0.1/0.1	N
7	Cleveland Avenue & West 19th Street	113.6	**F**	151.7	**F**	50.6/128.8	**F/F**	63.0/22.9	**Y**
8	McKinley Avenue & West 19th Street	8.5	A	10.4	B	11.8/14.5	B/B	-3.3/-4.1	N
9	Cleveland Avenue & McKinley Avenue	18.2	C	17.0	C	21/21	C/C	-2.8/-4	N
10	Tidelands Avenue & Bay Marina Drive	10.1	B	8.3	A	10.8/9.7	B/A	-0.7/-1.4	N
11	Marina Way & Bay Marina Drive**	25.1	C	51.0	D	8.7/10.4	A/B	16.4/40.6	N
12	Cleveland Avenue & Bay Marina Drive	42.7	D	35.6	D	18.9/17.8	B/B	23.8/17.8	N
13	I-5 SB Ramps & Bay Marina Drive	48.5	D	67.2	**E**	26.9/30.6	C/C	21.6/36.6	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	89.1	**F**	86.6	**F**	53.1/35.4	D/D	36.0/51.2	**Y**
15	Tidelands Avenue & West 28th Street*	Intersection Removed				11.7/12.9	B/B	-11.7/-12.9	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				8.7/8.4	A/A	-8.7/-8.4	N
17	West 32nd St & Marina Way	16.9	B	11.7	B	10.2/12.8	B/B	4.6/-1.1	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table

Tables 6.6 displays the key study freeway mainline LOS under the Future Year 2050 Plus Total Bayfront scenario. According to the results in Table 6.6, the addition of project trips associated with the Total Bayfront would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 6.6 Freeway Segment LOS – Future Year 2050 Plus Total Bayfront Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	255,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	13,728	1.12	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,937	1.10	0.03	**F**	**Y**
	Division Street and 8th Street	239,210	NB	4M	9400	78.0%	6.6%	5.0%	12,928	1.38	0.05	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	8th Street and Civic Center Drive	225,410	NB	4M	9,400	70.1%	6.2%	5.0%	10,328	1.10	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	11,137	1.03	0.04	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	228,170	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,428	0.79	0.02	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	11,237	0.96	0.03	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	225,740	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,363	0.79	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	11,145	0.85	0.01	D	N
	SR-54 Junction and E Street	155,240	NB	5M	11,750	70.1%	6.2%	5.0%	7,163	0.61	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,645	0.71	0.00	D	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

6.4 Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

The anticipated roadway and intersection geometrics under Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront with Closure of Bay Marina Drive conditions, previously displayed in Figure 4-9**.**

Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive traffic volumes were derived by combining the Future Year 2050 Base traffic volumes (displayed in Figure 6-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue and Bay Marina Drive (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive are displayed in **Figure 6-3**

Table 6.7 displays the LOS analysis results for key roadway segments under the Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive. LOS calculation worksheets for the Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive conditions are provided in **Appendix K**. According to the results in Table 6.7, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina would cause a total of two (2) significant impacts to the following study roadways:

- Tidelands Avenue between Harbor Drive to West 19th Street – LOS F
- Tidelands Avenue between West 19th Street to Bay Marina Drive – LOS F

Table 6.8 displays the LOS analysis results for the study intersections under the Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive. According to the results in Table 6.8, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina would cause a total of four (4) significant impacts to the following study intersections:

- Cleveland Avenue & Civic Center Drive (Int 1) – Degrades to LOS F in the AM peak hour and exacerbates LOS F in the PM peak hours
- I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive (Int 2) – E Degrades to LOS F in the AM peak hour and exacerbates LOS F in the PM peak hours
- Cleveland Avenue & West 19th Street (Int 7) – Degrades to LOS E in the AM peak hour and exacerbates LOS F operations in the PM peak hour
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the AM and PM peak hours

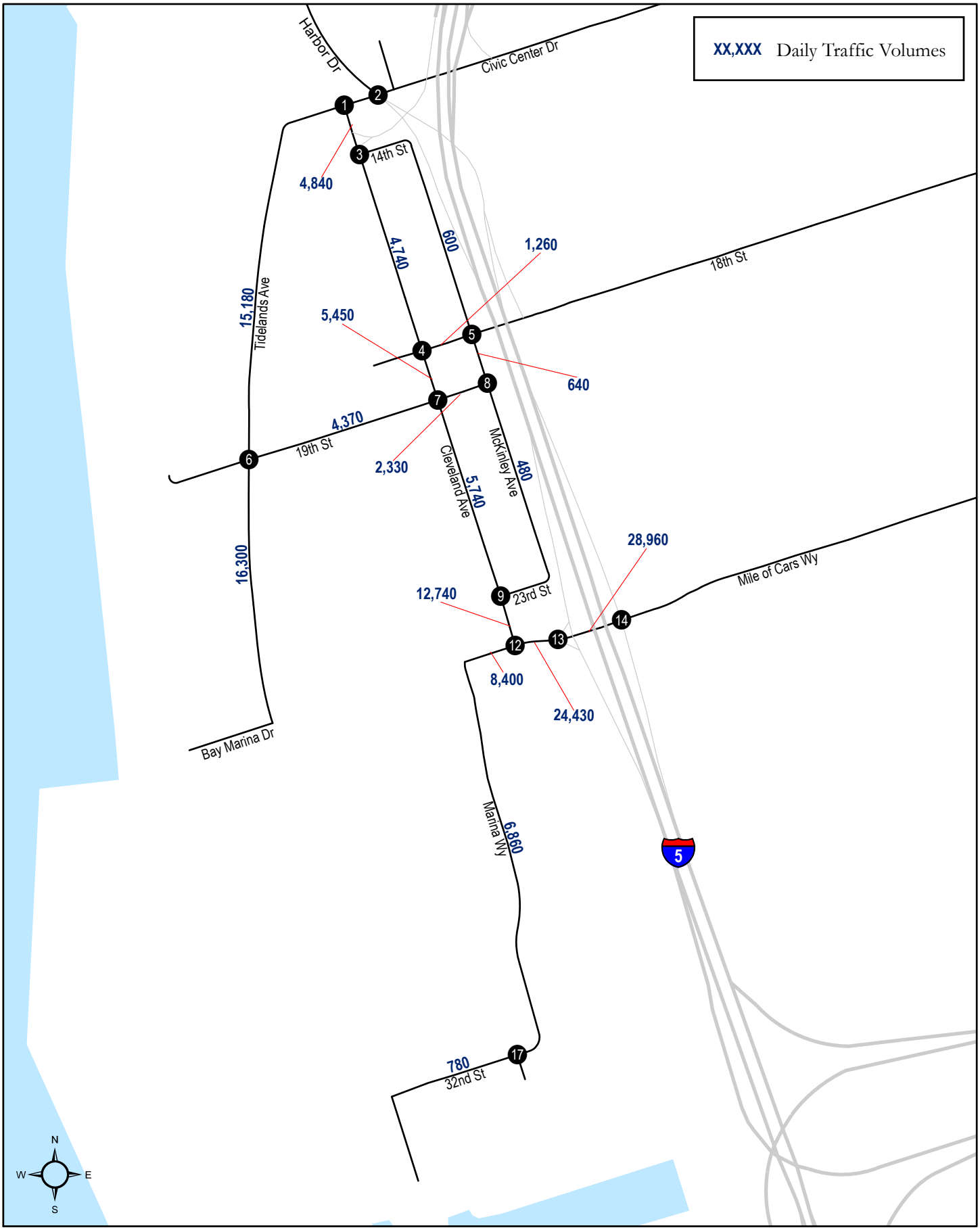

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Figure 6-3
Traffic Volumes -
Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

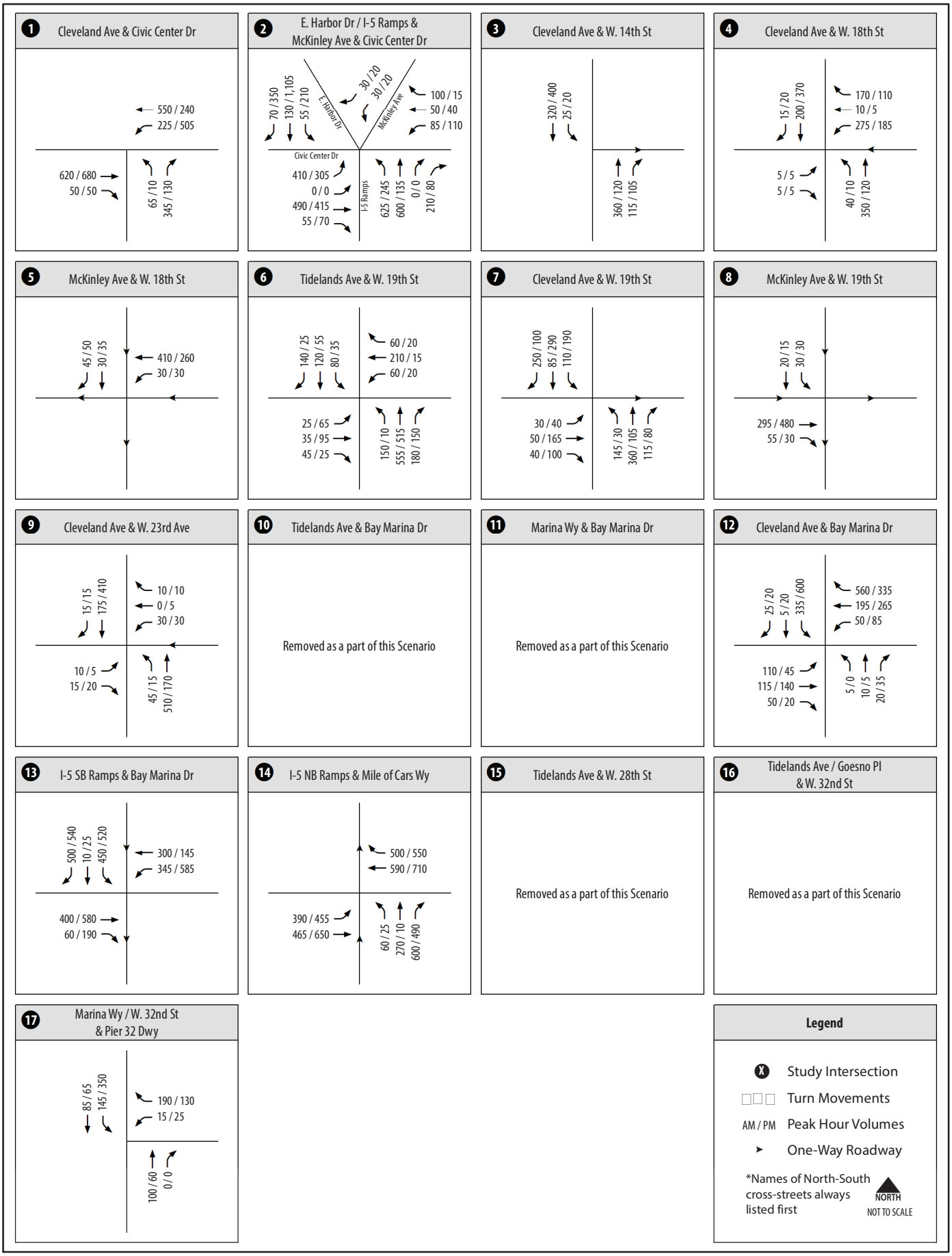

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Figure 6-3
Traffic Volumes -
Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Table 6.7 Roadway Segment LOS Results – Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Future Year 2050 + Total Bayfront w/ Closure of Bay Marina			Future Year 2050 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	15,180	1.518	**F**	4,500 / .450 / B	1.068	**Y**
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	16,300	1.630	**F**	5,400 / .540 / B	1.090	**Y**
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	600	0.120	A	800 / .080 / A	0.040	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	640	0.128	A	800 / .080 / A	0.048	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	480	0.096	A	600 / .060 / A	0.036	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	4,840	0.323	A	5,900 / .393 / B	-0.071	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	4,740	0.316	A	5,800 / .387 / B	-0.071	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,450	0.363	B	6,500 / .433 / B	-0.070	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,740	0.383	B	6,200 / .413 / B	-0.031	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	12,740	0.849	D	7,000 / .467 / B	0.383	N
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	Roadway Segment Closed			7,573 / .379 / B	-0.379	N
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	8,400	0.280	A	13,400 / .447 / B	-0.167	N
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	24,430	0.814	D	23,500 / .783 / D	0.031	N
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	28,960	0.724	C	33,700 / .843 / D	-0.119	N
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,260	0.126	A	1,400 / .140 / A	-0.014	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	4,370	0.219	A	4,800 / .240 / A	-0.022	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,330	0.117	A	2,700 / .135 / A	-0.019	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	6,860	0.686	C	1,700 / .170 / A	0.516	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	780	0.052	A	800 / .053 / A	-0.001	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
V/C = Volume to Capacity Ratio
Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant
*McKinley Ave converted to one-way (southbound) roadway

Table 6.8 Peak Hour Intersection LOS Results – Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	4609.8	**F**	198.3	**F**	20.3/210.2	C/**F**	4589.5/-11.9	**Y**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	226.7	**F**	149.1	**F**	52.6/108.9	D/**F**	174.1/40.2	**Y**
3	Cleveland Avenue & W 14th Street	15.2	C	11.2	B	13.6/13.4	B/B	1.6/-2.2	N
4	Cleveland Avenue & West 18th Street	34.3	D	18.3	C	21.6/18.9	C/C	12.7/-0.6	N
5	McKinley Avenue & West 18th Street	10.6	B	9.2	A	13.8/13.2	B/B	-3.2/-4.0	N
6	Tidelands Avenue & West 19th Street	18.6	B	15.2	B	9.8/8.5	A/A	8.8/6.7	N
7	Cleveland Avenue & West 19th Street	111.5	**F**	122.1	**F**	50.6/128.8	**F/F**	60.9/-6.7	**Y**
8	McKinley Avenue & West 19th Street	9.3	A	11.8	B	11.8/14.5	B/B	-2.5/-2.7	N
9	Cleveland Avenue & McKinley Avenue	31.3	D	18.5	C	21/21	C/C	10.3/-2.5	N
10	Tidelands Avenue & Bay Marina Drive*	Intersection Removed				10.8/9.7	A/A	-10.8/-9.7	N
11	Marina Way & Bay Marina Drive**	Intersection Removed				8.7/10.4	A/A	-8.7/-10.4	N
12	Cleveland Avenue & Bay Marina Drive	28.5	C	22.6	C	18.9/17.8	B/B	9.6/4.8	N
13	I-5 SB Ramps & Bay Marina Drive	58.1	**E**	66.7	**E**	26.9/30.6	C/C	31.2/36.1	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	49.1	D	32.4	C	53.1/35.4	D/D	-4/-3	N
15	Tidelands Avenue & West 28th Street**	Intersection Removed				11.7/12.9	B/B	11.7/12.9	N
16	Tidelands Avenue & West 32nd Street**	Intersection Removed				8.7/8.4	A/A	8.7/8.4	N
17	West 32nd St & Marina Way	16.3	C	13.8	B	10.2/12.8	B/B	6.1/1.0	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Bay Marina Drive would be closed from Marina Way to the west, therefore the intersections of Tidelands Avenue & Bay Marina Drive and Marina Way and Bay Marina Drive would be removed.
**Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table

Tables 6.9 displays the key study freeway mainline LOS under the Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive scenario. According to the results in Table 6.9, the addition of project trips associated with the Total Bayfront with Closure of Bay Marina Drive would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 6.9 Freeway Segment LOS – Future Year 2050 Plus Total Bayfront with Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	255,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	13,728	1.12	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,937	1.10	0.03	**F**	**Y**
	Division Street and 8th Street	239,210	NB	4M	9400	78.0%	6.6%	5.0%	12,928	1.38	0.05	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	8th Street and Civic Center Drive	225,410	NB	4M	9,400	70.1%	6.2%	5.0%	10,328	1.10	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	11,137	1.03	0.04	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	228,870	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,528	0.80	0.03	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	11,337	0.96	0.03	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	225,740	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,363	0.79	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	11,145	0.85	0.01	D	N
	SR-54 Junction and E Street	155,240	NB	5M	11,750	70.1%	6.2%	5.0%	7,163	0.61	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,645	0.71	0.00	D	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

6.5 Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

The anticipated roadway and intersection geometrics under Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive conditions are assumed to be identical to those assumed under Existing Plus Total Bayfront with Partial Closure of Bay Marina Drive conditions, previously displayed in Figure 4-9**.**

Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive traffic volumes were derived by combining the Future Year 2050 Base traffic volumes (displayed in Figure 6-1), the project trip assignment volumes (displayed in Figure 3-2), and the projected redistribution of traffic with the closure of Tidelands Avenue and Bay Marina Drive (displayed in Figure 3-3). Daily and peak hour intersection volumes for the Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive are displayed in **Figure 6-4**

Table 6.10 displays the LOS analysis results for key roadway segments under the Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive. LOS calculation worksheets for the Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive conditions are provided in **Appendix K**. According to the results in Table 6.10, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina would cause a total of four (4) significant impacts to the following study roadways:

- Cleveland Avenue between West 23rd Street and Bay Marina Drive – LOS E
- Bay Marina Drive between Tidelands Avenue and Marina Way – LOS F
- Bay Marina Drive between Cleveland Avenue the I-5 Southbound Ramps – LOS F
- Bay Marina Drive between I-5 Southbound and Northbound Ramps – LOS E

Tables 6.11 displays the LOS analysis results for the study intersections under the Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive. According to the results in Table 6.11, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina would cause a total of five (5) significant impacts to the following study intersections:

- Cleveland Avenue & West 19th Street (Int 7) – Exacerbates LOS F in the AM and PM peak hours
- Tidelands Avenue & Bay Marina Drive (Int 10) – Degrades to LOS E in the AM peak hour
- Marina Way & Bay Marina Drive (Int 11) – Degrades to LOS F in the PM peak hour
- I-5 Southbound Ramps & Bay Marina Drive (Int 13) – Degrades to LOS E in the PM peak hour
- I-5 Northbound Ramps & Bay Marina Drive (Int 14) – Degrades to LOS F in the AM peak hour and LOS E in the PM peak hour

While the Cleveland Avenue & Civic Center Drive and I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive intersections are anticipated to operate at LOS F in the PM peak hour without and with the Total Bayfront with Partial Closure of Bay Marina Drive, the addition of the project traffic does not increase the intersection's overall delay by two seconds or higher. Therefore, based on the significance criteria presented in section 2.5, the Cleveland Avenue & Civic Center Drive and I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive are not considered to be significantly impacted by the Total Bayfront with the Partial Closure of Bay Marina Drive.

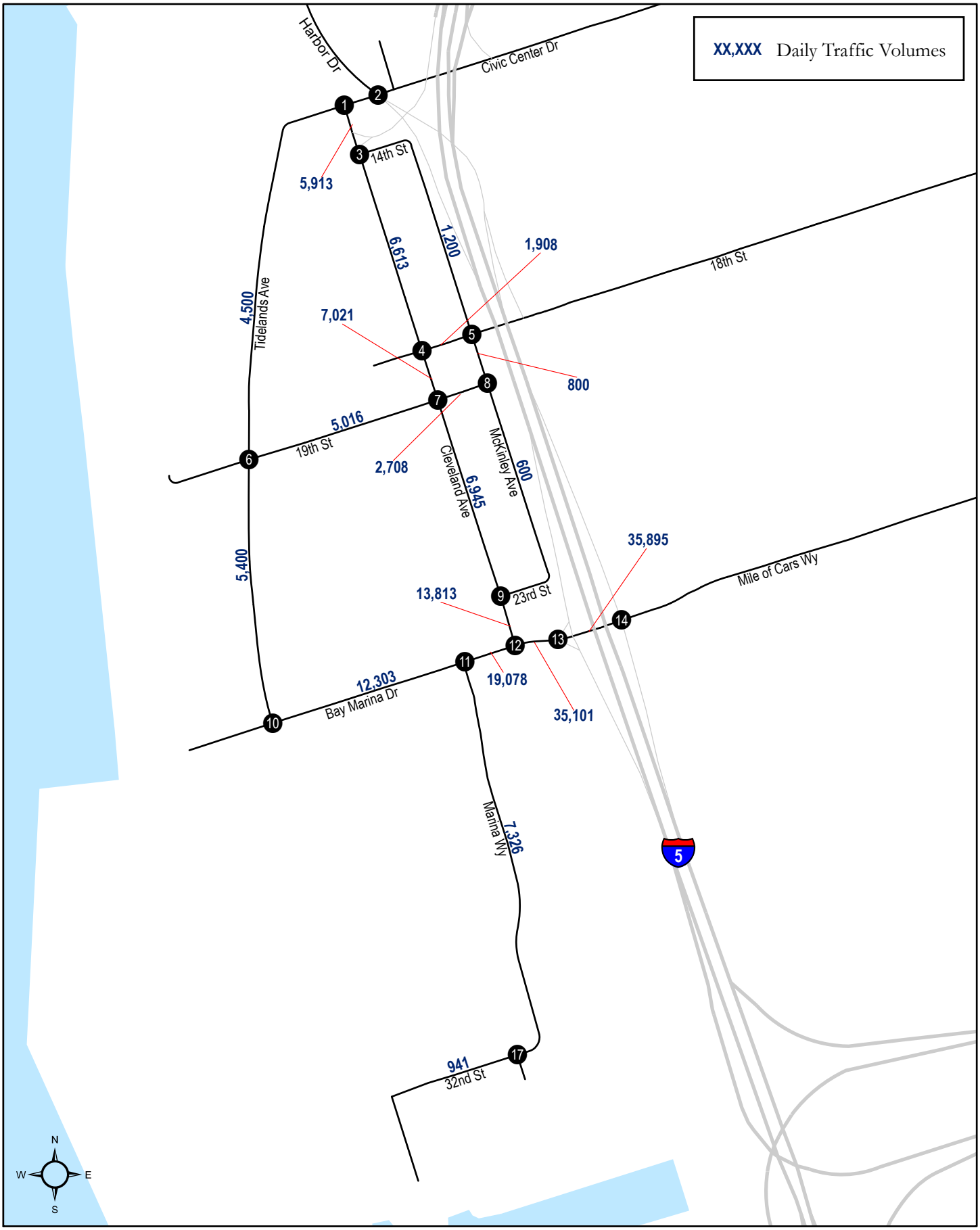

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Figure 6-4
Traffic Volumes - Future Year 2050
Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

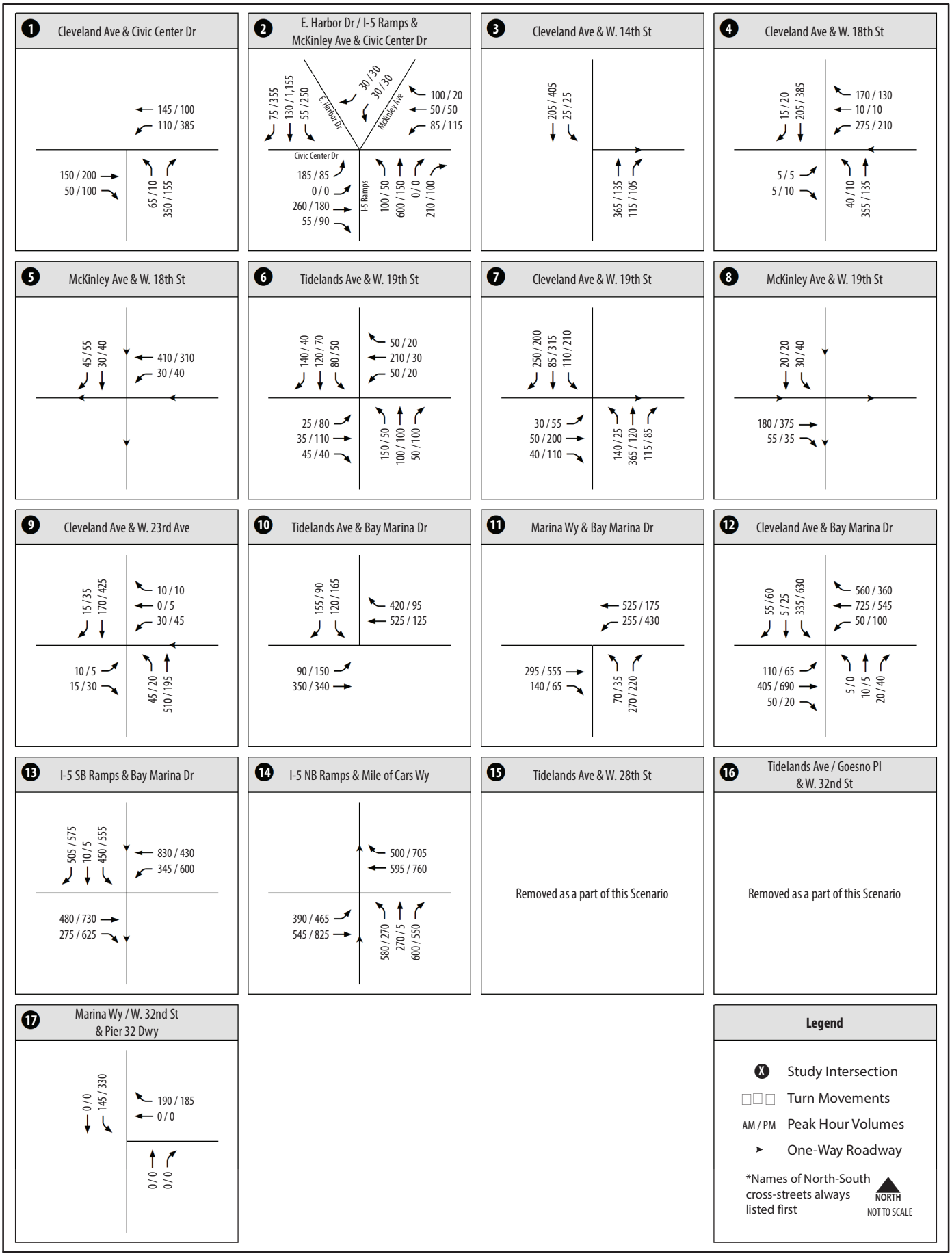

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Figure 6-4
Traffic Volumes - Future Year 2050
Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Table 6.10 Roadway Segment LOS Results – Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Roadway	Segment	Functional Classification	Threshold (LOS E)	Near-Term + Total Bayfront w/ Partial Closure of Bay Marina			Future Year 2050 Base	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	4,500	0.450	B	4,500 / .450 / B	0.000	N
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	5,400	0.540	B	5,400 / .540 / B	0.000	N
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	Roadway Segment Closed			1,683 / .168 / A	-0.168	N
McKinley Avenue	West 14th Street to West 18th Street	1-Lane Collector*	5,000	1,200	0.240	A	800 / .080 / A	0.160	N
	West 18th Street to West 19th Street	1-Lane Collector*	5,000	800	0.160	A	800 / .080 / A	0.080	N
	West 19th Street to Cleveland Avenue	1-Lane Collector*	5,000	600	0.120	A	600 / .060 / A	0.060	N
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,913	0.394	B	5,900 / .393 / B	0.001	N
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	6,613	0.441	B	5,800 / .387 / B	0.054	N
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	7,021	0.468	C	6,500 / .433 / B	0.035	N
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	6,945	0.463	B	6,200 / .413 / B	0.050	N
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	13,813	0.921	**E**	7,000 / .467 / B	0.454	**Y**
Bay Marina Drive	Tidelands Avenue to Marina Way	2-Lane Collector	10,000	12,303	1.230	**F**	12,000 / .600 / C	0.630	**Y**
	Marina Way to Cleveland Avenue	3-Lane Secondary Arterial	22,500	19,078	0.848	**E**	13,400 / .447 / B	0.401	**Y**
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	35,101	1.170	**F**	23,500 / .783 / D	0.387	**Y**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	35,895	0.897	**E**	33,700 / .843 / D	0.055	**Y**
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,908	0.191	A	1,400 / .140 / A	0.051	N
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	5,016	0.251	A	4,800 / .240 / A	0.011	N
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,708	0.135	A	2,700 / .135 / A	0.000	N
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	7,326	0.733	C	1,700 / .170 / A	0.563	N
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	941	0.063	A	800 / .053 / A	0.009	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable operations
V/C = Volume to Capacity Ratio; Δ = Change in V/C Ratio
S? = Indicates if change in V/C ratio is significant

*McKinley Ave is converted to one-way (southbound) roadway
**This segment of Bay Marina Dr is narrowed to 2-lanes

Table 6.11 Peak Hour Intersection LOS Results – Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Cleveland Avenue & Civic Center Drive	20.3	C	132.8	**F**	20.3/210.2	C/**F**	0/-77.4	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	48.7	D	89.5	**F**	52.6/108.9	D/**F**	-3.9/-19.4	N
3	Cleveland Avenue & W 14th Street	13.5	B	13.6	B	13.6/13.4	B/B	-0.1/0.2	N
4	Cleveland Avenue & West 18th Street	34.0	D	21.9	C	21.6/18.9	C/C	12.4/3.0	N
5	McKinley Avenue & West 18th Street	10.6	B	9.9	A	13.8/13.2	B/B	-3.2/-3.3	N
6	Tidelands Avenue & West 19th Street	9.9	A	8.6	A	9.8/8.5	A/A	0.1/0.1	N
7	Cleveland Avenue & West 19th Street	109.5	**F**	151.7	**F**	50.6/128.8	**F/F**	58.9/22.9	**Y**
8	McKinley Avenue & West 19th Street	8.5	A	10.4	B	11.8/14.5	B/B	-3.3/-4.1	N
9	Cleveland Avenue & McKinley Avenue	19.0	C	17.0	C	21/21	C/C	-2.0/-4.0	N
10	Tidelands Avenue & Bay Marina Drive	77.5	**E**	9.3	A	10.8/9.7	B/A	66.7/-0.4	**Y**
11	Marina Way & Bay Marina Drive**	50.0	D	85.3	**F**	8.7/10.4	A/B	41.3/74.9	**Y**
12	Cleveland Avenue & Bay Marina Drive	42.7	D	35.6	D	18.9/17.8	B/B	23.8/17.8	N
13	I-5 SB Ramps & Bay Marina Drive	48.5	D	67.2	**E**	26.9/30.6	C/C	21.6/36.6	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	89.1	**F**	68.3	**E**	53.1/35.4	D/D	36/32.9	**Y**
15	Tidelands Avenue & West 28th Street*	Intersection Removed				11.7/12.9	B/B	-11.7/-12.9	N
16	Tidelands Avenue & West 32nd Street*	Intersection Removed				8.7/8.4	A/A	-8.7/-8.4	N
17	West 32nd Street & Marina Way	16.9	B	11.7	B	10.2/12.8	B/B	4.6/-1.1	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table

Tables 6.12 displays the key study freeway mainline LOS under the Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive scenario. According to the results in Table 6.12, the addition of project trips associated with the Total Bayfront with Partial Closure of Bay Marina Drive would cause a total of seven (7) significant impacts to the following freeway mainline segments:

- I-5 Northbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Southbound between I-15 and Division Street – Exacerbates LOS F conditions
- I-5 Northbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Southbound between Division Street and 8th Street – Exacerbates LOS F conditions
- I-5 Northbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between 8th Street and Civic Center Drive – Exacerbates LOS F conditions
- I-5 Southbound between Civic Center Drive and Bay Marina Drive – Exacerbates LOS E conditions

Table 6.12 Freeway Segment LOS – Future Year 2050 Plus Total Bayfront with Partial Closure of Bay Marina Drive Conditions

Freeway	Segment	ADT[a]	Dir	# of Lanes	Capacity [b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	Change in V/C	LOS	SI?
I-5	I-15 and Division Street	255,110	NB	4M+2A	9,400	78.0%	6.6%	5.0%	13,728	1.12	0.03	**F**	**Y**
			SB	5M	11,750	60.9%	7.9%	5.0%	12,937	1.10	0.03	**F**	**Y**
	Division Street and 8th Street	239,210	NB	4M	9400	78.0%	6.6%	5.0%	12,928	1.38	0.05	**F**	**Y**
			SB	5M	11750	60.9%	7.9%	5.0%	12,137	1.03	0.03	**F**	**Y**
	8th Street and Civic Center Drive	225,410	NB	4M	9,400	70.1%	6.2%	5.0%	10,328	1.10	0.03	**F**	**Y**
			SB	5M	10,810	59.6%	7.8%	5.0%	11,137	1.03	0.04	**F**	**Y**
	Civic Center Drive and Bay Marina Drive	228,170	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,428	0.79	0.02	D	N
			SB	5M	11,750	59.6%	7.8%	5.0%	11,237	0.96	0.03	**E**	**Y**
	Bay Marina Drive and SR-54 Junction	225,740	NB	5M+1A	13,160	70.1%	6.2%	5.0%	10,363	0.79	0.01	D	N
			SB	5M+1A	13,160	59.6%	7.8%	5.0%	11,145	0.85	0.01	D	N
	SR-54 Junction and E Street	155,240	NB	5M	11,750	70.1%	6.2%	5.0%	7,163	0.61	0.00	C	N
			SB	4M+1A	10,810	59.6%	7.8%	5.0%	7,645	0.71	0.00	D	N

Source: Chen Ryan Associates; October 2019

Notes:
Bold letter indicates unacceptable LOS E or F.
SI? = Significant Impact?
M = Mainline. A = Auxiliary Lane.
[a] Average Daily Traffic volumes.
[b] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[c] D = Directional split.| [d] K = Peak hour %. | [e] HV = Heavy vehicle %, assumed to be the same as existing.

6.6 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would cause a significant impact to key roadways, intersections, and freeway mainline segments in the study area, as summarized in the following tables.

Table 6.13 summarizes the impacted project roadways under each of the three (3) Future Year 2050 Plus Project scenarios.

Table 6.13 Impacted Roadway Segment Summary – Future Year 2050 Plus Project Conditions

Roadway	Segment	FUT + TB	FUT + TB w/ Cl of BM	FUT + TB w/ Part Cl of BM
Tidelands Avenue	Harbor Drive to West 19th Street		✓	
	West 19th Street to Bay Marina Drive		✓	
	Bay Marina Drive to West 32nd Street			
McKinley Avenue	West 14th Street to West 18th Street			
	West 18th Street to West 19th Street			
	West 19th Street to Cleveland Avenue			
Cleveland Avenue	Civic Center Drive to West 14th Street			
	West 14th Street to West 18th Street			
	West 18th Street to West 19th Street			
	West 19th Street to West 23rd Street			
	West 23rd Street to Bay Marina Drive	✓		✓
Bay Marina Drive	Tidelands Avenue to Marina Way			✓
	Marina Way to Cleveland Avenue			
	Cleveland Avenue to I-5 SB Ramps	✓		✓
	I-5 SB Ramps to I-5 NB Ramps	✓		✓
West 18th Street	Cleveland Avenue to McKinley Avenue			
West 19th Street	Tidelands Avenue to Cleveland Avenue			
	Cleveland Avenue to McKinley Avenue			
Marina Way	Bay Marina Drive to West 32nd Street			
West 32nd Street	Tidelands Avenue to Marina Way			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 6.14 summarizes the impacted study intersections under each of the three (3) Future Year 2050 Plus Project scenarios.

Table 6.14 Impacted Intersections Summary – Future Year 2050 Plus Project Conditions

#	Intersection	Fut + TB	Fut + TB w/ Cl of BM	Fut + TB w/ Part Cl of BM
1	Cleveland Avenue & Civic Center Drive		✓	
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive		✓	
3	Cleveland Avenue & W 14th Street			
4	Cleveland Avenue & West 18th Street			
5	McKinley Avenue & West 18th Street			
6	Tidelands Avenue & West 19th Street			
7	Cleveland Avenue & West 19th Street	✓	✓	✓
8	McKinley Avenue & West 19th Street			
9	Cleveland Avenue & McKinley Avenue			
10	Tidelands Avenue & Bay Marina Drive			✓
11	Marina Way & Bay Marina Drive			✓
12	Cleveland Avenue & Bay Marina Drive			
13	I-5 SB Ramps & Bay Marina Drive	✓	✓	✓
14	I-5 NB Off-Ramps & Bay Marina Drive	✓		✓
15	Tidelands Avenue & West 28th Street*			
16	Tidelands Avenue & West 32nd Street*			
17	West 32nd Street & Marina Way			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 6.15 summarizes the impacted freeway mainline segments under each of the three (3) Future Year 2050 Plus Project scenarios.

Table 6.15 Impacted Freeway Mainline Segments Summary – Future Year 2050 Plus Project Conditions

Freeway	Segment		NT + TB	NT + TB w/ CI of BM	NT + TB w/ Part CI of BM
I-5	I-15 and Division Street	NB	✓	✓	✓
		SB	✓	✓	✓
	Division Street and 8th Street	NB	✓	✓	✓
		SB	✓	✓	✓
	8th Street and Civic Center Drive	NB	✓	✓	✓
		SB	✓	✓	✓
	Civic Center Drive and Bay Marina Drive	NB			
		SB	✓	✓	✓
	Bay Marina Drive and SR-54 Junction	NB			
		SB			
	SR-54 Junction and E Street	NB			
		SB			

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact
TB = Total Bayfront
TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

Table 6.16 summarizes the mitigation measures required to mitigate the project impact to less than significant. Since these impacts are considered cumulative impacts, the fair share calculations are also presented for each feasible mitigation.

Table 6.16 Impacted Study Facilities and Proposed Mitigations – Future Year 2050 Plus Project Conditions

Study Facility		Future Year 2050 Plus Project			Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
		Fut + TB	Fut + TB w/ CI of BM	Fut + TB w/ Part CI of BM				
ROADWAY SEGMENTS								
Tidelands Avenue	Harbor Drive to West 19th Street		✓		Widen roadway and reclassify as a 4-Lane Collector	NO	Direct Impact: 100% Responsibility Split: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	West 19th Street to Bay Marina Drive		✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Cleveland Avenue	West 23rd Street to Bay Marina Drive	✓		✓	Reclassify roadway to a 4-Lane Collector	NO	Direct Impact: 100% Project Responsibility: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
Bay Marina Drive	Tidelands Avenue to Marina Way			✓	Reclassify roadway to a 2-Lane Collector with Center-Left-Turn Lane	YES	Project Fair Share: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, this improvement could be done within the existing right-of-way. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
	Cleveland Avenue to I-5 SB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	I-5 SB Ramps to I-5 NB Ramps	✓		✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way (such as widening below the I-5 overpass bridge) would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
INTERSECTIONS								
1	Cleveland Avenue & Civic Center Drive		✓		Add a separate westbound left-turn and install a traffic signal	NO	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Drive		✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	NO	Direct Impact: 100% Project Responsibility: 3% District Public Works (Pepper Park) 97% Partial Closure of Bay Marina	Implementing this improvement would improve the overall intersection delay; however, the delay would still be higher than pre-project conditions, so the improvement would only partially mitigate the impact. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*

Study Facility			Future Year 2050 Plus Project: Fut + TB	Fut + TB w/ CI of BM	Fut + TB w/ Part CI of BM	Mitigation	Feasible ?	Fair Share & Responsibility Split	Cumulative Impact Mitigated?
7	Cleveland Avenue & West 19th Street		✓	✓	✓	Restripe the eastbound left/through to an exclusive left-turn lane, and restripe the eastbound right-turn lane to a through/right	YES	Fair Share: 45.5% Project Responsibility: 48% Development Projects (City Program) 52% Development Projects (Bayshore Bikeway)	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. This improvement can be achieved within the existing right-or-way and would reduce the impact to less-than-significant conditions. However, since this intersection is under the City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
10	Tidelands Avenue & Bay Marina Drive				✓	Add a separate westbound right-turn lane	YES	Project Fair Share: 50.5% Project Responsibility: 100% Closure of Bay Marina Drive	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
11	Marina Way & Bay Marina Drive				✓	Add a second westbound left-turn lane	YES	Project Fair Share: 51% Project Responsibility: 70% Closure of Bay Marina Drive 28% Development Projects (GB Capital) 1% Development Projects (City Program) 1% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Since the Partial Closure of Bay Marina Drive would be reducing the through lanes to one lane in each direction, that would leave adequate right-of-way to construct this improvement. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
13	I-5 Southbound Ramps & Bay Marina Drive		✓	✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
14	I-5 Northbound Ramps & Bay Marina Drive		✓		✓	Restripe the northbound left/through/right lane to a northbound left/through lane, and add widen the ramp to construct a second northbound right-turn lane	NO	Direct Impact: 100% Responsibility Split: 62% Development Projects (City Program) 35% Development Projects (GB Capital) 3% District Public Works (Pepper Park)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, while there is adequate right-of-way to add a second northbound right-turn lane, constructing this improvement would require substantial relocation of existing utility lines and large electrical power towers. Therefore, due to the close proximity of the ramp to the existing utility lines, the construction of this improvement is considered infeasible. Therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE									
I-5	I-15 and Division Street	NB	✓	✓	✓	SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	Fair Share: 18.4% Responsibility Split: 24% Development Projects (City Program) 64% Development Projects (GB Capital) 1% District Public Works (Pepper Park) 11% Closure of Bay Marina	Implementation of this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB	✓	✓	✓				
	Division Street and 8th Street	NB	✓	✓	✓				
	8th Street and Civic Center Drive	NB	✓	✓	✓				
		SB	✓	✓	✓				
	Civic Center Drive and Bay Marina Drive	SB	✓	✓	✓				

Source: Chen Ryan Associates; October 2019

Notes:

✓ Indicates a significant impact

TB = Total Bayfront

TB w/ CI of BM = Total Bayfront with Closure of Bay Marina

TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

7.0 Granger Hall Alternative

This section provides an analysis of the relocation of Granger Hall alternative as part of the Pepper Park Expansion. The scenarios analyzed in this section include:

- Existing Plus District Public Works with Granger Hall
- Existing Plus Total Bayfront with Granger Hall
- Existing Plus Total Bayfront with Granger Hall and Closure of Bay Marina Drive
- Existing Plus Total Bayfront with Granger Hall and Partial Closure of Bay Marina Drive
- Near-Term Year 2030 Plus Total Bayfront with Granger Hall
- Near-Term Year 2030 Plus Total Bayfront with Granger Hall and Closure of Bay Marina Drive
- Near-Term Year 2030 Plus Total Bayfront with Granger Hall and Partial of Bay Marina Drive
- Future Year 2050 Plus Total Bayfront with Granger Hall
- Future Year 2050 Plus Total Bayfront with Granger Hall and Closure of Bay Marina Drive
- Future Year 2050 Plus Total Bayfront with Granger Hall and Partial of Bay Marina Drive

7.1 Granger Hall Trip Estimates

An optional feature to the Pepper Park Expansion (which is part of the "District Public Works" project component) is the relocation of the historic Granger Hall to Pepper Park. If Granger Hall were to be relocated, it could be used as a restaurant of a special event center. For conservative purposes, a restaurant use was analyzed for a worst-case condition, with a size of 6,760 square feet. **Table 7.1** displays daily, as well as AM and PM Peak hour trip generations for the Total Bayfront project with the Granger Hall alternative.

Table 7.1 Total Bayfront with Granger Hall Trip Generation

Project	Land Use	Units	Trip Rate	ADT	AM Peak Hour				PM Peak Hour			
					%	Trips	In	Out	%	Trips	In	Out
Development Projects												
City Program	High Turnover Restaurant	15.5 ksf	160 / ksf	2,480	8%	199	100	99	8%	199	119	80
	Resort Hotel[1]	150 rooms	8 / room	1,200	5%	60	36	24	7%	84	34	50
	Specialty Retail	12 ksf	40 / ksf	480	3%	15	9	6	9%	44	22	22
	TOTAL			**4,160**		**274**	**145**	**129**		**327**	**175**	**152**
GB Capital[4]	Resort Hotel[1]	463 rooms	8 / room	3,704	5%	186	74	112	7%	261	208	53
	Recreational Vehicle (RV)[2]	70 sites	4 / site	280	4%	12	4	8	7%	23	16	7
	Specialty Retail	16.5 ksf	40 / ksf	660	3%	20	8	12	9%	60	48	12
	Modules	60 sites	4 / site	240	4%	10	6	4	8%	20	16	4

Table 7.1 Total Bayfront with Granger Hall Trip Generation

Project	Land Use	Units	Trip Rate	ADT	AM Peak Hour				PM Peak Hour			
					%	Trips	In	Out	%	Trips	In	Out
GB Capital[4]	Dry Boat Storage[3]	210 boat storage	1.48 / boat storage	311	3%	10	3	7	7%	22	13	9
	Office	10 ksf	14 / ksf	140	15%	21	19	2	15 %	21	4	17
	Marina	95 berths	4 / berth	380	3%	12	4	8	7%	27	16	11
	TOTAL			**5,715**		**271**	**118**	**153**		**434**	**321**	**113**
DEVELOPMENT PROJECTS NET TOTAL				**9,875**		**545**	**263**	**282**		**761**	**496**	**265**
District Public Works with Granger Hall												
Pepper Park Expansion	City Parks	2.54 acres	50 / acre	127	13%	17	9	8	9%	12	6	6
	Restaurant	6.76 ksf	160 / ksf	1,082	8%	87	44	43	8%	87	52	35
DISTRICT PUBLIC WORKS W/ GRANGER HALL NET TOTAL				**1,209**		**104**	**53**	**51**		**99**	**58**	**41**
TOTAL BAYFRONT W/ GRANGER HALL NET NEW TRIPS				**11,084**		**649**	**314**	**335**		**860**	**554**	**306**

Source: Chen Ryan Associates, October 2019

Notes:
KSF = Thousand Square Feet
[1]Resort Hotel cater to tourist and the vacation industry, often providing a wide variety of recreational facilities rather than the conventional business meeting spaces. Resort hotels are normally located in suburban or outlying locations.
[2]Campground trip rate used for Recreational Vehicles
[3]Dry boat storage is based on 50% of ITE's Trip Generation Manual "Marina" trip rate. A reduced rate was applied since the boat storage would not be generating regular trips as would a Marina.
[4]The changes to the Aquatic Center would remove the restrictions of reduced travel to the site. This is already included in the base traffic volumes, and therefore, is not included in the net new traffic estimates.

As shown in the table, the Granger Hall restaurant would generate an additional 1,082 daily weekday trips, with 87 occurring in the AM peak hour (44 inbound, 43 outbound), and 87 occurring in the PM peak hour (52 inbound, 35 outbound). The District Public Works component, which includes the Granger Hall alternative, would generate a total of 1,209 daily weekday trips, with 104 occurring in the AM peak hour (53 inbound, 51 outbound) and 99 occurring in the PM peak hour (58 inbound, 41 outbound). Furthermore, the Total Bayfront project would generate a total of 11,084 daily weekday trips, with 649 occurring in the AM peak hour (314 inbound, 335 outbound) and 860 occurring in the PM peak hour (554 inbound, 306 outbound).

The Granger Hall trip distribution was developed based on the geographical location of the project, the characteristic of the proposed land use, nearest freeway facilities and locations of residential neighborhoods. **Figure 7-1** displays the trip distribution patterns associated with the Granger Hall restaurant.

Based upon the project trip generation and distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figure 7-2.**



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Figure 7-1
Granger Hall Trip Distribution

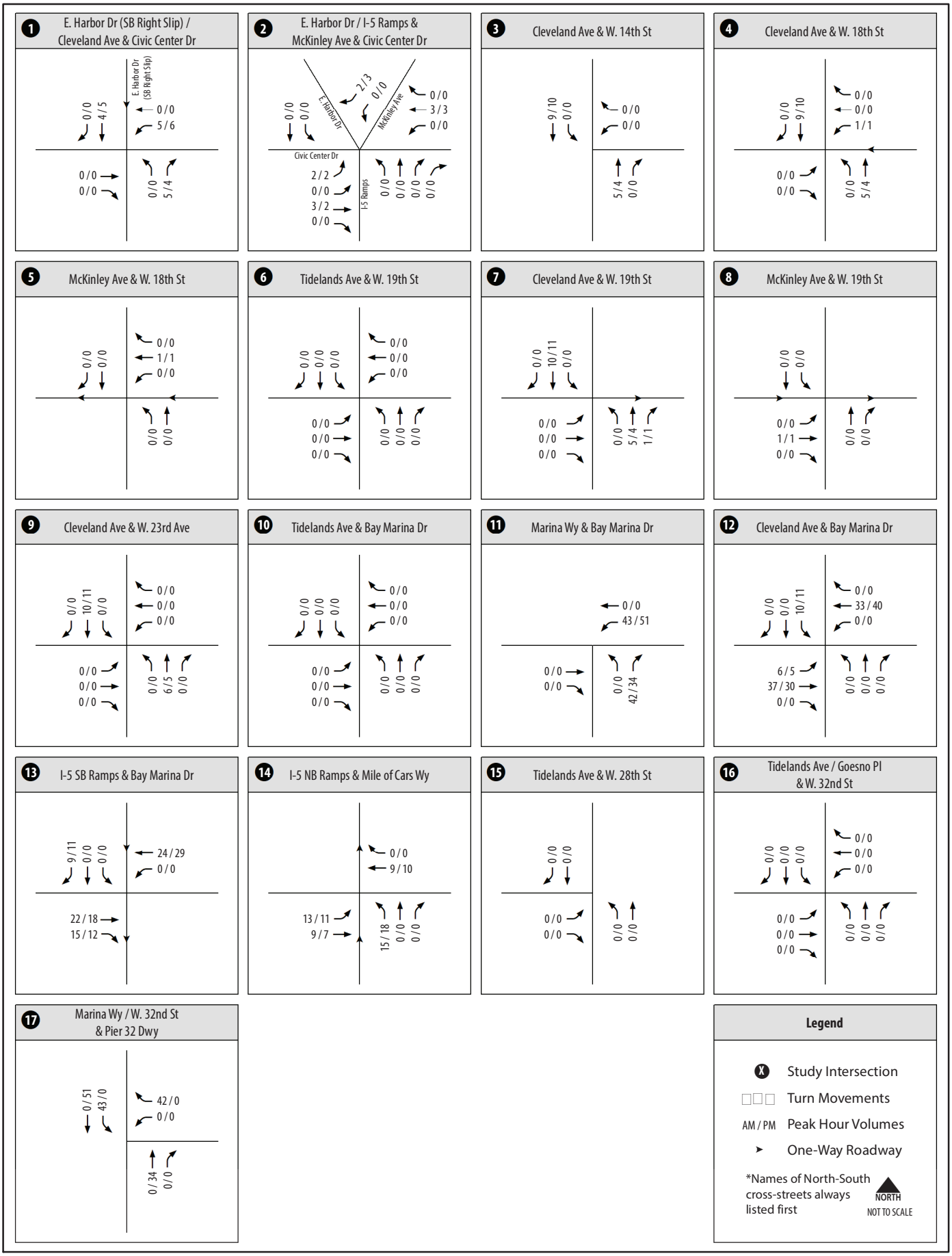

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Figure 7-2
Intersection AM/PM Peak Hour Traffic Volumes
Granger Hall Trip Assignment

7.2 Vehicle Operations Analysis

Table 7.2 displays the LOS analysis results for key roadway segments with the relocation of Granger Hall, and **Table 7.3** displays the impacted key roadway segments based on the significance criteria outline in Chapter 2.5.

Table 7.4 displays the intersection LOS analysis and average vehicle delay results with the relocation Granger Hall, and **Table 7.5** displays the impacted study intersections based on the significance criteria outline in Chapter 2.5. Peak hour analysis worksheets are provided in **Appendix L**.

Table 7.6 displays the key study freeway mainline LOS with the relocation Granger Hall, and **Table 7.7** displays the impacted key freeway mainline segments based on the significance criteria outline in Chapter 2.5.

Full analysis tables, similar to the tables presented in the previous chapters, for the Granger Hall Alternative are provided in **Appendix M**.

Table 7.2 Roadway Segment LOS Results – Granger Hall Alternative

Roadway Segment	Segment	Functional Class	Threshold (LOS E)	EXISTING CONDITIONS WITH GRANGER HALL												NEAR-TERM YEAR 2030 WITH GRANGER HALL									FUTURE YEAR 2050 WITH GRANGER HALL								
				District Public Works			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr		
				ADT	V/C	LOS	ADT	V/C	LOS	ADT	V/C	LOS	ADT	V/C	LOS		ADT	V/C	LOS	ADT	V/C	LOS	ADT	V/C	LOS		ADT	V/C	LOS	ADT	V/C	LOS	ADT	V/C	LOS
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	1,850	0.185	A	1,850	0.185	A	8,590	0.859	D	1,850	0.185	A		3,600	0.360	A	13,220	1.322	**F**	3,600	0.360	A		4,500	0.450	B	15,180	1.518	**F**	4,500	0.450	B
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	2,215	0.222	A	2,215	0.222	A	9,180	0.918	**E**	2,215	0.222	A		4,300	0.430	B	14,130	1.413	**F**	4,300	0.430	B		5,400	0.540	B	16,300	1.630	**F**	5,400	0.540	B
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	1,683	0.168	A	Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed				Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed				Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed		
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	593	0.059	A	910	0.182	A	600	0.120	A	910	0.182	A		700	0.070	A	600	0.120	A	1,050	0.210	A		1,200	0.240	A	600	0.120	A	1,200	0.240	A
	West 18th Street to West 19th Street	2-Lane Collector	10,000	633	0.063	A	633	0.127	A	640	0.128	A	633	0.127	A		700	0.070	A	640	0.128	A	700	0.140	A		800	0.160	A	640	0.128	A	800	0.160	A
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	471	0.047	A	471	0.094	A	480	0.096	A	471	0.094	A		600	0.060	A	480	0.096	A	600	0.120	A		600	0.120	A	480	0.096	A	600	0.120	A
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	5,171	0.345	B	5,171	0.345	B	5,180	0.345	B	5,171	0.345	B		5,549	0.370	B	5,180	0.345	B	5,549	0.370	B		6,249	0.417	B	5,180	0.345	B	6,249	0.417	B
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	5,073	0.338	B	5,686	0.379	B	5,080	0.339	B	5,686	0.379	B		5,449	0.363	B	5,080	0.339	B	6,149	0.410	B		6,949	0.463	B	5,080	0.339	B	6,949	0.463	B
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	5,694	0.380	B	6,118	0.408	B	5,810	0.387	B	6,118	0.408	B		6,071	0.405	B	5,810	0.387	B	6,529	0.435	B		7,379	0.492	C	5,810	0.387	B	7,379	0.492	C
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	5,466	0.364	B	6,133	0.409	B	5,900	0.393	B	6,133	0.409	B		5,891	0.393	B	6,120	0.408	B	6,623	0.442	B		7,323	0.488	C	6,120	0.408	B	7,323	0.488	C
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	6,099	0.407	B	12,899	0.860	D	13,120	0.875	**E**	12,899	0.860	D		6,491	0.433	B	18,450	1.230	**F**	13,291	0.886	**E**		14,191	0.946	**E**	13,120	0.875	**E**	14,191	0.946	**E**
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	7,573	0.379	B	7,825	0.391	B	Roadway Segment Closed			7,825	0.782	D		10,800	0.540	C	Roadway Segment Closed			11,086	1.109	**F**		12,303	0.615	C	Roadway Segment Closed			12,303	1.230	**F**
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	10,719	0.357	B	16,270	0.723	D	9,540	0.424	B	16,270	0.557	C		14,347	0.478	C	10,290	0.457	B	19,898	0.774	D		21,198	0.737	D	10,520	0.351	B	21,198	0.732	D
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	16,689	0.556	C	28,176	0.939	**E**	21,440	0.715	D	28,176	0.939	**E**		22,956	0.765	D	24,840	0.828	D	34,443	1.148	**F**		36,843	1.228	**F**	26,170	0.872	**E**	36,843	1.228	**F**
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	22,594	0.565	C	24,687	0.617	C	20,310	0.508	B	24,687	0.617	C		31,640	0.791	D	27,490	0.687	C	33,733	0.843	D		37,033	0.926	**E**	30,100	0.753	D	37,033	0.926	**E**
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	1,170	0.117	A	1,575	0.157	A	1,280	0.128	A	1,575	0.157	A		1,322	0.132	A	1,280	0.128	A	1,780	0.178	A		1,930	0.193	A	1,280	0.128	A	1,930	0.193	A
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	3,937	0.197	A	4,153	0.208	A	4,370	0.219	A	4,153	0.208	A		4,300	0.215	A	4,370	0.219	A	4,516	0.226	A		5,016	0.251	A	4,370	0.219	A	5,016	0.251	A
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	2,238	0.112	A	2,265	0.113	A	2,350	0.118	A	2,265	0.113	A		2,420	0.121	A	2,350	0.118	A	2,478	0.124	A		2,728	0.136	A	2,350	0.118	A	2,728	0.136	A
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	3,637	0.364	A	9,039	0.904	**E**	8,980	0.898	D	9,039	0.904	**E**		3,747	0.375	A	8,980	0.898	D	9,214	0.921	**E**		9,446	0.945	**E**	8,980	0.898	D	9,446	0.945	**E**
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	2,897	0.193	A	2,964	0.198	A	2,900	0.193	A	2,964	0.198	A		2,947	0.196	A	2,900	0.193	A	3,029	0.202	A		3,061	0.204	A	2,900	0.193	A	3,061	0.204	A

Source: Chen Ryan Associates; December 2019

Notes:
CLTL = Center-Left-Turn-Lane
V/C = Volume to Capacity Ratio.
Bold indicates unacceptable LOS E or F

Table 7.3 Roadway Segment Impacts – Granger Hall Alternative

Roadway Segment	Segment	Functional Class	Threshold (LOS E)	EXISTING CONDITIONS WITH GRANGER HALL												NEAR-TERM YEAR 2030 WITH GRANGER HALL												FUTURE YEAR 2050 WITH GRANGER HALL											
				District Public Works			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr			
				LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?		LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?		LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?	LOS	Δ in V/C	SI?	
Tidelands Avenue	Harbor Drive to West 19th Street	2-Lane Collector	10,000	A	0.000	N	A	0.000	N	D	0.674	N	A	0.000	N		A	0.000	N	**F**	0.962	**Y**	A	0.000	N		B	0.000	N	**F**	1.068	**Y**	B	0.000	N	
	West 19th Street to Bay Marina Drive	2-Lane Collector	10,000	A	0.000	N	A	0.000	N	**E**	0.697	**Y**	A	0.000	N		B	0.000	N	**F**	0.983	**Y**	B	0.000	N		B	0.000	N	**F**	1.090	**Y**	B	0.000	N	
	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	A	0.000	N	Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed				Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed				Roadway Segment Closed			Roadway Segment Closed			Roadway Segment Closed			
McKinley Avenue	West 14th Street to West 18th Street	2-Lane Collector	10,000	A	0.000	N	A	0.123	N	A	0.061	N	A	0.123	N		A	0.140	N	A	0.050	N	A	0.140	N		A	0.160	N	A	0.040	N	A	0.160	N	
	West 18th Street to West 19th Street	2-Lane Collector	10,000	A	0.000	N	A	0.063	N	A	0.065	N	A	0.063	N		A	0.070	N	A	0.058	N	A	0.070	N		A	0.080	N	A	0.048	N	A	0.080	N	
	West 19th Street to Cleveland Avenue	2-Lane Collector	10,000	A	0.000	N	A	0.047	N	A	0.049	N	A	0.047	N		A	0.060	N	A	0.036	N	A	0.060	N		A	0.060	N	A	0.036	N	A	0.060	N	
Cleveland Avenue	Civic Center Drive to West 14th Street	2-Lane Collector W/ CLTL	15,000	B	0.023	N	B	0.023	N	B	0.024	N	B	0.023	N		B	0.023	N	B	-0.001	N	B	0.023	N		B	0.023	N	B	-0.048	N	B	0.023	N	
	West 14th Street to West 18th Street	2-Lane Collector W/ CLTL	15,000	B	0.023	N	B	0.064	N	B	0.024	N	B	0.064	N		B	0.070	N	B	-0.001	N	B	0.070	N		B	0.077	N	B	-0.048	N	B	0.077	N	
	West 18th Street to West 19th Street	2-Lane Collector W/ CLTL	15,000	B	0.025	N	B	0.053	N	B	0.032	N	B	0.053	N		B	0.055	N	B	0.007	N	B	0.055	N		C	0.059	N	B	-0.046	N	C	0.059	N	
	West 19th Street to West 23rd Street	2-Lane Collector W/ CLTL	15,000	B	0.026	N	B	0.071	N	B	0.055	N	B	0.071	N		B	0.075	N	B	0.041	N	B	0.075	N		C	0.075	N	B	-0.005	N	C	0.075	N	
	West 23rd Street to Bay Marina Drive	2-Lane Collector W/ CLTL	15,000	B	0.026	N	D	0.479	N	**E**	0.494	**Y**	D	0.479	N		**E**	0.479	**Y**	**F**	0.823	**Y**	**E**	0.479	**Y**		**E**	0.479	**Y**	**E**	0.408	**Y**	**E**	0.479	**Y**	
Bay Marina Drive	Tidelands Avenue to Marina Way	4-Lane Collector	20,000	B	0.000	N	B	0.013	N	Roadway Segment Closed			D	0.404	N		C	0.014	N	Roadway Segment Closed			**F**	0.569	**Y**		C	0.015	N	Roadway Segment Closed			**F**	0.630	**Y**	
	Marina Way to Cleveland Avenue	4-Lane Secondary Arterial	30,000	B	0.075	N	D	0.441	N	B	0.142	N	D	0.441	N		D	0.260	N	B	0.096	N	D	0.260	N		D	0.260	N	B	0.096	N	D	0.260	N	
	Cleveland Avenue to I-5 SB Ramps	4-Lane Secondary Arterial	30,000	C	0.062	N	**E**	0.445	**Y**	D	0.220	N	**E**	0.445	**Y**		**F**	0.445	**Y**	D	0.125	N	**F**	0.445	**Y**		**F**	0.445	**Y**	**E**	0.089	**Y**	**F**	0.445	**Y**	
	I-5 SB Ramps to I-5 NB Ramps	4-Lane Major Arterial	40,000	C	0.031	N	C	0.083	N	B	-0.026	N	C	0.083	N		D	0.083	N	C	-0.073	N	D	0.083	N		**E**	0.083	**Y**	D	-0.090	N	**E**	0.083	**Y**	
West 18th Street	Cleveland Avenue to McKinley Avenue	2-Lane Collector	10,000	A	0.002	N	A	0.043	N	A	0.013	N	A	0.043	N		A	0.048	N	A	-0.002	N	A	0.048	N		A	0.053	N	A	-0.012	N	A	0.053	N	
West 19th Street	Tidelands Avenue to Cleveland Avenue	4-Lane Collector	20,000	A	0.000	N	A	0.011	N	A	0.022	N	A	0.011	N		A	0.011	N	A	0.004	N	A	0.011	N		A	0.011	N	A	-0.022	N	A	0.011	N	
	Cleveland Avenue to McKinley Avenue	4-Lane Collector	20,000	A	0.001	N	A	0.002	N	A	0.007	N	A	0.002	N		A	0.004	N	A	-0.003	N	A	0.004	N		A	0.001	N	A	-0.018	N	A	0.001	N	
Marina Way	Bay Marina Drive to West 32nd Street	2-Lane Collector	10,000	A	0.225	N	**E**	0.765	**Y**	D	0.759	N	**E**	0.765	**Y**		**E**	0.771	**Y**	D	0.748	N	**E**	0.771	**Y**		**E**	0.775	**Y**	D	0.728	N	**E**	0.775	**Y**	
West 32nd Street	Tidelands Avenue to Marina Way	2-Lane Collector W/ CLTL	15,000	A	0.150	N	A	0.154	N	A	0.150	N	A	0.154	N		A	0.155	N	A	0.147	N	A	0.155	N		A	0.151	N	A	0.140	N	A	0.151	N	

Source: Chen Ryan Associates; December 2019

Notes:
Refer to Tables 4.1, 5.1, and 6.1 for the No Project results
CLTL = Center-Left-Turn-Lane

V/C = Volume to Capacity Ratio.
SI? = Significant Impact Notes:

Bold indicates unacceptable LOS E or F

Table 7.4 Peak Hour Intersection LOS Results – Granger Hall Alternative

#	Intersection	EXISTING CONDITIONS WITH GRANGER HALL														NEAR-TERM YEAR 2030 WITH GRANGER HALL										FUTURE YEAR 2050 WITH GRANGER HALL									
		District Public Works				Total Bayfront				Total Bayfront w/ Closure of Bay Marina Dr				Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront				Total Bayfront w/ Closure of Bay Marina Dr				Total Bayfront w/ Partial Closure of Bay Marina Dr				Total Bayfront				Total Bayfront w/ Closure of Bay Marina Dr				Total Bayfront w/ Partial Closure of Bay Marina Dr			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Cleveland Avenue & Civic Center Drive	12.1	B	17.1	C	12.1	B	26.4	D	52.2	**F**	254.2	**F**	12.1	B	26.4	D	15.3	C	178.8	**F**	607.7	**F**	206.2	**F**	15.3	C	178.8	**F**	20.9	C	142.0	**F**	1702.3	**F**	215.3	**F**	20.9	C	142.0	**F**
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	35.2	D	37.4	D	32.2	C	30.8	C	84.3	**F**	82.0	**F**	32.2	C	30.8	C	39.6	D	58.7	**E**	150.5	**F**	152.2	**F**	39.6	D	58.7	**E**	49.5	D	90.1	**F**	237.8	**F**	150.7	**F**	60.3	**E**	90.1	**F**
3	Cleveland Avenue & W 14th Street	11.5	B	10.7	B	11.1	B	10.7	B	12.1	B	10.9	B	11.1	B	10.7	B	12.3	B	10.8	B	13.7	B	11.3	B	12.3	B	10.8	B	13.6	B	13.8	B	15.5	C	11.3	B	13.6	B	13.8	B
4	Cleveland Avenue & West 18th Street	13.3	B	12.6	B	14.2	B	12.9	B	14.2	B	12.9	B	14.2	B	12.9	B	30.7	D	18.9	C	30.7	D	18.9	C	30.7	D	18.9	C	34.1	D	22.9	C	34.6	D	19.2	C	34.1	D	22.9	C
5	McKinley Avenue & West 18th Street	9.7	A	9.7	A	7.8	A	7.7	A	7.8	A	7.7	A	7.8	A	7.7	A	9.8	A	9.1	A	9.8	A	9.1	A	9.8	A	9.1	A	10.6	B	10.0	A	10.6	B	9.3	A	10.6	B	10.0	A
6	Tidelands Avenue & West 19th Street	7.7	A	7.0	A	7.8	A	7.0	A	7.8	A	9.3	A	7.8	A	7.0	A	8.6	A	7.9	A	9.6	A	13.7	B	8.6	A	7.9	A	9.9	A	8.6	A	18.6	B	15.2	B	9.9	A	8.6	A
7	Cleveland Avenue & West 19th Street	20.2	C	21.6	C	22.6	C	24.8	C	23.3	C	26.0	D	22.6	C	24.8	C	39.9	**E**	80.5	**F**	40.9	**E**	91.5	**F**	39.9	**E**	80.5	**F**	120.3	**F**	157.5	**F**	122.7	**F**	134.9	**F**	118.0	**F**	157.5	**F**
8	McKinley Avenue & West 19th Street	9.7	A	10.8	B	7.9	A	9.1	A	8.1	A	9.7	A	7.9	A	9.1	A	8.2	A	10.0	A	8.6	A	11.5	B	8.2	A	10.0	A	8.5	A	10.4	B	9.3	A	11.8	B	8.5	A	10.4	B
9	Cleveland Avenue & McKinley Avenue	14.2	B	14.3	B	13.5	B	13.8	B	17.2	C	15.9	C	13.5	B	13.8	B	14.8	B	14.5	B	18.6	C	17.8	C	15.0	B	14.5	B	18.6	C	17.2	C	32.7	D	18.9	C	19.4	C	17.2	C
10	Tidelands Avenue & Bay Marina Drive	7.2	A	7.4	A	6.7	A	6.4	A	Intersection Removed				7.6	A	7.2	A	7.9	A	7.3	A	Intersection Removed				10.3	B	8.2	A	10.1	B	8.3	A	Intersection Removed				77.5	**E**	9.3	A
11	Marina Way & Bay Marina Drive**	6.1	A	9.6	A	13.6	B	43.8	D	Intersection Removed				15.5	B	35.0	C	20.1	C	57.0	**E**	Intersection Removed				27.2	C	71.9	**E**	31.9	C	77.4	**E**	Intersection Removed				62.3	**E**	110.9	**F**
12	Cleveland Avenue & Bay Marina Drive	11.4	B	15.0	B	20.4	C	25.4	C	15.7	B	22.7	C	20.4	C	25.4	C	28.3	C	30.7	C	20.5	B	24.2	C	28.3	C	30.7	C	45.5	D	38.8	D	29.4	C	24.2	C	45.5	D	38.8	D
13	I-5 SB Ramps & Bay Marina Drive	24.4	C	30.4	C	28.9	C	59.3	**E**	32.6	C	65.2	**E**	28.9	C	59.4	**E**	30.3	C	60.8	**E**	35.5	D	68.9	**E**	30.3	C	61.3	**E**	49.4	D	69.2	**E**	60.3	**E**	68.8	**E**	49.4	D	69.2	**E**
14	I-5 NB Off-Ramps & Bay Marina Drive	31.0	C	17.1	B	51.7	D	24.8	C	35.8	D	23.0	C	51.7	D	25.9	C	86.5	**F**	43.9	D	49.0	D	34.0	C	86.5	**F**	38.3	D	93.3	**F**	91.2	**F**	50.8	D	33.9	C	93.3	**F**	71.5	**E**
15	Tidelands Avenue & West 28th Street*	9.4	A	9.2	A	Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed			
16	Tidelands Avenue & West 32nd Street*	11.2	B	12.7	B	Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed				Intersection Removed			
17	West 32nd St & Marina Way	10.1	B	11.2	B	14.5	B	10.2	B	14.5	B	10.2	B	14.5	B	10.2	14.5	11.2	B	10.4	B	11.2	B	10.4	B	11.2	B	10.4	B	19.7	C	12.5	B	19.7	C	10.8	B	11.2	B	10.4	B

Source: Chen Ryan Associates; December 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 7.5 Peak Hour Intersection Impacts – Granger Hall Alternative

#	Intersection	EXISTING CONDITIONS WITH GRANGER HALL															NEAR-TERM YEAR 2030 WITH GRANGER HALL										FUTURE YEAR 2050 WITH GRANGER HALL									
		District Public Works					Total Bayfront					Total Bayfront w/ Closure of Bay Marina Dr					Total Bayfront w/ Partial Closure of Bay Marina Dr					Total Bayfront					Total Bayfront w/ Closure of Bay Marina Dr					Total Bayfront w/ Partial Closure of Bay Marina Dr				
		AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour		
		LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?	LOS	Δ in Delay	LOS	Δ in Delay	SI?
1	Cleveland Avenue & Civic Center Drive	B	0.1	C	0.9	N	B	0.1	D	10.2	N	**F**	40.2	**F**	238.0	**Y**	B	0.1	D	10.2	N	C	0.7	**F**	9.9	**Y**	**F**	593.1	**F**	37.3	**Y**	C	0.7	**F**	9.9	**Y**	C	0.6	**F**	68.2	**Y**	**F**	1682.0	**F**	5.1	**Y**	C	0.6	**F**	-68.2	N
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive	D	0.3	D	0.3	N	C	-2.7	C	-6.3	N	**F**	49.4	**F**	44.9	**Y**	C	-2.7	C	-6.3	N	D	-2.7	**E**	-12.6	N	**F**	108.2	**F**	80.9	**Y**	D	-2.7	**E**	-12.6	N	D	-3.1	**F**	-18.8	N	**F**	185.2	**F**	41.8	**Y**	**E**	7.7	**F**	-18.8	N
3	Cleveland Avenue & W 14th Street	B	0.2	B	0.1	N	B	-0.2	B	0.1	N	B	0.8	B	0.3	N	B	-0.2	B	0.1	N	B	-0.1	B	0.1	N	B	1.3	B	0.6	N	B	-0.1	B	0.1	N	B	0.0	B	0.4	N	C	1.9	B	-2.1	N	B	0.0	B	0.4	N
4	Cleveland Avenue & West 18th Street	B	0.2	B	0.2	N	B	1.1	B	0.5	N	B	1.1	B	0.5	N	B	1.1	B	0.5	N	D	9.3	C	2.4	N	D	9.3	C	2.4	N	D	9.3	C	2.4	N	D	1.5	C	4.0	N	D	2.1	C	0.3	N	D	1.5	C	4.0	N
5	McKinley Avenue & West 18th Street	A	0.0	A	0.0	N	A	-1.9	A	-2.0	N	A	-1.9	A	-2.0	N	A	-1.9	A	-2.0	N	A	-2.4	A	-2.7	N	A	-2.4	A	-2.7	N	A	-2.4	A	-2.7	N	B	-3.2	A	-3.2	N	B	-3.2	A	-3.9	N	B	-3.2	A	-3.2	N
6	Tidelands Avenue & West 19th Street	A	0.0	A	0.0	N	A	0.1	A	0.0	N	A	0.1	A	2.3	N	A	0.1	A	0.0	N	A	0.1	A	0.1	N	A	1.1	B	5.9	N	A	0.1	A	0.1	N	A	0.1	A	0.1	N	B	8.8	B	6.7	N	A	0.1	A	0.1	N
7	Cleveland Avenue & West 19th Street	C	0.5	C	0.8	N	C	2.9	C	4.0	N	C	3.6	D	5.2	N	C	2.9	C	4.0	N	**E**	11.9	**F**	40.6	**Y**	**E**	12.9	**F**	51.6	**Y**	**E**	11.9	**F**	40.6	**Y**	**F**	69.7	**F**	28.7	**Y**	**F**	72.1	**F**	6.1	**Y**	**F**	67.4	**F**	28.7	**Y**
8	McKinley Avenue & West 19th Street	A	0.0	B	0.0	N	A	-1.8	A	-1.7	N	A	-1.6	A	-1.1	N	A	-1.8	A	-1.7	N	A	-2.5	A	-2.6	N	A	-2.1	B	-1.1	N	A	-2.5	A	-2.6	N	A	-3.3	B	-4.1	N	A	-2.5	B	-2.7	N	A	-3.3	B	-4.1	N
9	Cleveland Avenue & McKinley Avenue	B	0.4	B	0.3	N	B	-0.3	B	-0.2	N	C	3.4	C	1.9	N	B	-0.3	B	-0.2	N	B	-0.6	B	-1.0	N	C	3.2	C	2.3	N	B	-0.4	B	-1.0	N	C	-2.4	C	-3.8	N	D	11.7	C	-2.1	N	C	-1.6	C	-3.8	N
10	Tidelands Avenue & Bay Marina Drive	A	0.0	A	0.0	N	A	-0.5	A	-1.0	N	Intersection Removed					A	0.4	A	-0.2	N	A	-0.2	A	-0.8	N	Intersection Removed					B	2.2	A	0.1	N	B	-0.7	A	-1.4	N	Intersection Removed					**E**	66.7	A	-0.4	**Y**
11	Marina Way & Bay Marina Drive**	A	2.0	A	2.3	N	B	9.5	D	36.5	N	Intersection Removed					B	11.4	C	27.7	N	C	13.5	**E**	47.3	**Y**	Intersection Removed					C	20.6	**E**	62.2	**Y**	C	23.2	**E**	67.0	**Y**	Intersection Removed					**E**	53.6	**F**	100.5	**Y**
12	Cleveland Avenue & Bay Marina Drive	B	0.2	B	0.2	N	C	9.2	C	10.6	N	B	4.5	C	7.9	N	C	9.2	C	10.6	N	C	14.3	C	14.5	N	B	6.5	C	8.0	N	C	14.3	C	14.5	N	D	26.6	D	21.0	N	C	10.5	C	6.4	N	D	26.6	D	21.0	N
13	I-5 SB Ramps & Bay Marina Drive	C	-0.3	C	-0.8	N	C	4.2	**E**	28.1	**Y**	C	7.9	**E**	34.0	**Y**	C	4.2	**E**	28.2	**Y**	C	5.1	**E**	29.1	**Y**	D	10.3	**E**	37.2	**Y**	C	5.1	**E**	29.6	**Y**	D	22.5	**E**	38.6	**Y**	**E**	33.4	**E**	38.2	**Y**	D	22.5	**E**	38.6	**Y**
14	I-5 NB Off-Ramps & Bay Marina Drive	C	2.4	B	0.5	N	D	23.1	C	8.2	N	D	7.2	C	6.4	N	D	23.1	C	9.3	N	**F**	43.2	D	22.9	**Y**	D	5.7	C	13.0	N	**F**	43.2	D	17.3	**Y**	**F**	40.2	**F**	55.8	**Y**	D	-2.3	C	-1.5	N	**F**	40.2	**E**	36.1	**Y**
15	Tidelands Avenue & West 28th Street*	A	0.0	A	0.0	N	Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed			
16	Tidelands Avenue & West 32nd Street*	B	0.0	B	0.0	N	Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed					Intersection Removed			
17	West 32nd St & Marina Way	B	1.0	B	1.3	N	B	5.4	B	0.3	N	B	5.4	B	0.3	N	B	5.4	B	0.3	N	B	2.4	B	-0.5	N	B	2.4	B	0.3	N	B	2.4	B	-0.5	N	C	9.5	B	-0.3	N	C	9.5	B	-2.0	N	C	9.5	B	-0.3	N

Source: Chen Ryan Associates; December 2019

Notes:
Bold indicates unacceptable LOS E or F
*Tidelands Avenue would be closed between 28th Street and 32nd Street, therefore the intersections of Tidelands Avenue & West 28th Street and Tidelands Avenue & West 32nd Street would be removed.
**Bay Marina Drive/Marina Way could experience additional vehicle delays during gate downtimes at the BNSF Crossing. However, BNSF crossings occur outside of the peak periods, so it does not affect the results presented in this table.

Table 7.6 Freeway Segment LOS – Granger Hall Alternative

Freeway	Segment	Dir	EXISTING CONDITIONS WITH GRANGER HALL												NEAR-TERM YEAR 2030 WITH GRANGER HALL									FUTURE YEAR 2050 WITH GRANGER HALL								
			District Public Works			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr		
			Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS
I-5	I-15 and Division Street	NB	11,428	0.94	**E**	11,828	0.97	**E**	11,828	0.97	**E**	11,828	0.97	**E**	12,928	1.06	**F**	12,928	1.06	**F**	12,928	1.06	**F**	13,728	1.12	**F**	13,728	1.12	**F**	13,728	1.12	**F**
		SB	10,737	0.91	**E**	11,137	0.95	**E**	11,137	0.95	**E**	11,137	0.95	**E**	12,137	1.03	**F**	12,137	1.03	**F**	12,137	1.03	**F**	12,937	1.10	**F**	12,937	1.10	**F**	12,937	1.10	**F**
	Division Street and 8th Street	NB	10,628	1.13	**F**	11,028	1.17	**F**	10,928	1.16	**F**	11,028	1.17	**F**	12,228	1.30	**F**	12,228	1.30	**F**	12,228	1.30	**F**	12,928	1.38	**F**	12,928	1.38	**F**	12,928	1.38	**F**
		SB	9,937	0.85	D	10,337	0.88	D	10,337	0.88	D	10,337	0.88	D	11,437	0.97	**E**	11,437	0.97	**E**	11,437	0.97	**E**	12,137	1.03	**F**	12,137	1.03	**F**	12,137	1.03	**F**
	8th Street and Civic Center Drive	NB	8,728	0.93	**E**	9,028	0.96	**E**	9,028	0.96	**E**	9,028	0.96	**E**	10,128	1.08	**F**	10,128	1.08	**F**	10,128	1.08	**F**	10,328	1.10	**F**	10,328	1.10	**F**	10,328	1.10	**F**
		SB	9,337	0.86	D	9,737	0.90	**E**	9,737	0.90	**E**	9,737	0.90	**E**	10,837	1.00	**F**	10,837	1.00	**F**	10,837	1.00	**F**	11,137	1.03	**F**	11,137	1.03	**F**	11,137	1.03	**F**
	Civic Center Drive and Bay Marina Drive	NB	8,728	0.66	C	9,028	0.69	C	9,028	0.69	C	9,028	0.69	C	10,028	0.76	D	10,028	0.76	D	10,028	0.76	D	10,428	0.79	D	10,528	0.80	D	10,428	0.79	D
		SB	9,437	0.80	D	9,737	0.83	D	9,737	0.83	D	9,737	0.83	D	10,837	0.92	**E**	10,837	0.92	**E**	10,837	0.92	**E**	11,237	0.96	**E**	11,337	0.96	**E**	11,237	0.96	**E**
	Bay Marina Drive and SR-54 Junction	NB	8,763	0.67	C	8,863	0.67	C	8,863	0.67	C	8,863	0.67	C	9,863	0.75	D	9,763	0.74	D	9,863	0.75	D	10,363	0.79	D	10,363	0.79	D	10,363	0.79	D
		SB	9,445	0.72	D	9,445	0.72	D	9,445	0.72	D	9,445	0.72	D	10,645	0.81	D	10,545	0.80	D	10,645	0.81	D	11,145	0.85	D	11,145	0.85	D	11,145	0.85	D
	SR-54 Junction and E Street	NB	6,163	0.52	C	6,163	0.52	C	6,163	0.52	C	6,163	0.52	C	6,763	0.58	C	6,763	0.58	C	6,763	0.58	C	7,163	0.61	C	7,163	0.61	C	7,163	0.61	C
		SB	6,545	0.61	C	6,645	0.61	C	6,545	0.61	C	6,645	0.61	C	7,245	0.67	C	7,245	0.67	C	7,245	0.67	C	7,745	0.72	D	7,745	0.72	D	7,745	0.72	D

Source: Chen Ryan Associates; December 2019

Note:
Bold indicates unacceptable LOS E or F

Table 7.7 Freeway Segment Impacts – Granger Hall Alternative

Freeway	Segment	Dir	EXISTING CONDITIONS WITH GRANGER HALL												NEAR-TERM YEAR 2030 WITH GRANGER HALL									FUTURE YEAR 2050 WITH GRANGER HALL								
			District Public Works			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr			Total Bayfront			Total Bayfront w/ Closure of Bay Marina Dr			Total Bayfront w/ Partial Closure of Bay Marina Dr		
			LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?	LOS	Δ in V/C	SI ?
I-5	I-15 and Division Street	NB	**E**	0.00	N	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	Y	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**
		SB	**E**	0.00	N	**E**	0.04	**Y**	**E**	0.04	**Y**	**E**	0.04	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**
	Division Street and 8th Street	NB	**F**	0.01	N	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**	**F**	0.05	**Y**
		SB	**D**	0.00	N	**D**	0.03	N	**D**	0.03	N	**D**	0.03	N	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**
	8th Street and Civic Center Drive	NB	**E**	0.01	**Y**	**E**	0.04	**Y**	**E**	0.04	**Y**	**E**	0.04	**Y**	**F**	0.04	**Y**	**F**	0.04	**Y**	**F**	0.04	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**
		SB	D	0.00	N	**E**	0.04	**Y**	**E**	0.04	**Y**	**E**	0.04	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.03	**Y**	**F**	0.04	**Y**	**F**	0.04	**Y**	**F**	0.04	**Y**
	Civic Center Drive and Bay Marina Drive	NB	C	0.00	N	C	0.03	N	C	0.03	N	C	0.03	N	D	0.02	N	D	0.02	N	D	0.02	N	D	0.02	N	D	0.03	N	D	0.02	N
		SB	D	0.01	N	D	0.04	N	D	0.04	N	D	0.04	N	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**	**E**	0.03	**Y**
	Bay Marina Drive and SR-54 Junction	NB	C	0.00	N	C	0.00	N	C	0.00	N	C	0.00	N	D	0.01	N	D	0.00	N	D	0.01	N	D	0.01	N	D	0.01	N	D	0.01	N
		SB	D	0.01	N	D	0.01	N	D	0.01	N	D	0.01	N	D	0.01	N	D	0.00	N	D	0.01	N	D	0.01	N	D	0.01	N	D	0.01	N
	SR-54 Junction and E Street	NB	C	0.00	N	C	0.00	N	C	0.00	N	C	0.00	N	C	0.01	N	C	0.01	N	C	0.01	N	C	0.00	N	C	0.00	N	C	0.00	N
		SB	C	0.00	N	C	0.00	N	C	0.00	N	C	0.00	N	C	0.01	N	C	0.01	N	C	0.01	N	D	0.01	N	D	0.01	N	D	0.01	N

Source: Chen Ryan Associates; December 2019

Note:
Bold indicates unacceptable LOS E or F

7.3 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of Proposed Project traffic would cause a significant impact to key roadways, intersections, and freeway mainline segments in the study area, as summarized in the following tables.

Table 7.8 summarizes the impacted roadway segments under each of Plus Project Scenarios with the Granger Hall alternative.

Table 7.8 Impacted Roadway Segment Summary – Granger Hall Alternative

Roadway	Segment	Direct Impacts				Cumulative Impacts					
		Existing				Near Term Year 2030			Future Year 2050		
		DPW	TB	TB+Cl of BM	TB+Part Cl of BM	TB	TB+Cl of BM	TB+Part Cl of BM	TB	TB+Cl of BM	TB+ Part Cl of BM
Tidelands Avenue	Harbor Drive to West 19th Street						✓			✓	
	West 19th Street to Bay Marina Drive			✓			✓			✓	
	Bay Marina Drive to West 32nd Street										
McKinley Avenue	West 14th Street to West 18th Street										
	West 18th Street to West 19th Street										
	West 19th Street to Cleveland Avenue										
Cleveland Avenue	Civic Center Drive to West 14th Street										
	West 14th Street to West 18th Street										
	West 18th Street to West 19th Street										
	West 19th Street to West 23rd Street										
	West 23rd Street to Bay Marina Drive			✓		✓	✓	✓	✓	✓	✓
Bay Marina Drive	Tidelands Avenue to Marina Way							✓			✓
	Marina Way to Cleveland Avenue										
	Cleveland Avenue to I-5 SB Ramps		✓		✓	✓		✓	✓	✓	✓
	I-5 SB Ramps to I-5 NB Ramps								✓		✓
West 18th Street	Cleveland Avenue to McKinley Avenue										
West 19th Street	Tidelands Avenue to Cleveland Avenue										
	Cleveland Avenue to McKinley Avenue										
Marina Way	Bay Marina Drive to West 32nd Street		✓		✓	✓		✓	✓		✓
West 32nd Street	Tidelands Avenue to Marina Way										

Source: Chen Ryan Associates; December 2019

Notes:
✓ Indicates a significant impact
DP = Development Projects
DPW = District Public Works
TB = Total Bayfront
Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 7.9 summarizes the impacted study intersections under each of Plus Project Scenarios with the Granger Hall alternative.

Table 7.9 Impacted Intersections Segment Summary – Granger Hall Alternative

#	Intersection	Direct Impacts				Cumulative Impacts					
		Existing				Near Term Year 2030			Future Year 2050		
		DPW	TB	TB+Cl of BM	TB+Part Cl of BM	TB	Cl of BM	TB+Part Cl of BM	TB	TB+Cl of BM	TB+Part Cl of BM
1	Cleveland Avenue & Civic Center Drive			✓		✓	✓	✓	✓	✓	✓
2	I-5 NB Off-Ramp/East Harbor Drive & Civic Center Drive			✓			✓			✓	
3	Cleveland Avenue & W 14th Street										
4	Cleveland Avenue & West 18th Street										
5	McKinley Avenue & West 18th Street										
6	Tidelands Avenue & West 19th Street										
7	Cleveland Avenue & West 19th Street					✓	✓	✓	✓	✓	✓
8	McKinley Avenue & West 19th Street										
9	Cleveland Avenue & McKinley Avenue										
10	Tidelands Avenue & Bay Marina Drive										✓
11	Marina Way & Bay Marina Drive					✓		✓	✓		✓
12	Cleveland Avenue & Bay Marina Drive										
13	I-5 SB Ramps & Bay Marina Drive	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14	I-5 NB Off-Ramps & Bay Marina Drive					✓		✓	✓		✓
15	Tidelands Avenue & West 28th Street*										
16	Tidelands Avenue & West 32nd Street*										
17	West 32nd Street & Marina Way										

Source: Chen Ryan Associates; December 2019

Notes:

✓ Indicates a significant impact
DPW = District Public Works
TB = Total Bayfront
Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 7.10 summarizes the impacted freeway mainline segments under each of Plus Project Scenarios with the Granger Hall alternative.

Table 7.10 Impacted Intersections Segment Summary – Granger Hall Alternative

Freeway	Intersection		Existing				Near Term Year 2030			Future Year 2050		
			DPW	TB	TB+Cl of BM	TB+Part Cl of BM	TB	TB+Cl of BM	TB+Part Cl of BM	TB	TB+Cl of BM	TB+Part Cl of BM
I-5	I-15 and Division Street	NB		✓	✓	✓	✓	✓	✓	✓	✓	✓
		SB		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Division Street and 8th Street	NB		✓	✓	✓	✓	✓	✓	✓	✓	✓
		SB					✓	✓	✓	✓	✓	✓
	8th Street and Civic Center Drive	NB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		SB		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Civic Center Drive and Bay Marina Drive	NB										
		SB					✓	✓	✓	✓	✓	✓
	Bay Marina Drive and SR-54 Junction	NB										
		SB										
	SR-54 Junction and E Street	NB										
		SB										

Source: Chen Ryan Associates; December 2019

Notes:
✓ Indicates a significant impact
DPW = District Public Works
TB = Total Bayfront
Cl of BM = Closure of Bay Marina
Part Cl of BM = Partial Closure of Bay Marina
TB w/ Cl of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part Cl of BM = Total Bayfront with Partial Closure of Bay Marina

Table 7.11 summarizes the mitigation measures required to mitigate the Proposed Project impact to less than significant. Since some of the impacts are considered cumulative impacts, the fair share calculations are also presented for each feasible mitigation.

Table 7.11 Impacted Study Facilities and Proposed Mitigations – Granger Hall Alternative

Study Facility		Existing				Near Term Year 2030			Future Year 2050			Mitigation	Feasible?	Fair Share & Responsibility Split	Impact Mitigated?
		DPW	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM				
ROADWAY SEGMENTS															
Tidelands Ave	Harbor Drive to West 19th Street						✓			✓		Widen roadway and reclassify as a 4-Lane Collector	NO	Direct Impact: 100% Responsibility Split: 9% District Public Works (Pepper Park & Granger Hall) 91% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	West 19th Street to Bay Marina Drive			✓			✓			✓		Reclassify roadway as a 2-Lane Collector with Center-Left-Turn Lane	YES	Direct Impact: 100% Project Responsibility: 9% District Public Works (Pepper Park & Granger Hall) 91% Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, parking would need to be removed on both sides of the roadway to implement this measure. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
Cleveland Ave	West 23rd Street to Bay Marina Drive			✓		✓	✓	✓	✓	✓	✓	Reclassify roadway to a 4-Lane Collector	NO	Direct Impact: 100% Project Responsibility: 4% District Public Works (Pepper Park & Granger Hall) 46% Development Projects (City Program) 50% Development Projects (Bayshore Bikeway)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
Bay Marina Dr	Tidelands Avenue to Marina Way							✓			✓	Reclassify roadway to a 2-Lane Collector with Center-Left-Turn Lane	YES	Project Fair Share: 100% Project Responsibility: 9% District Public Works (Pepper Park & Granger Hall) 91% Partial Closure of Bay Marina	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. Based on the current roadway cross-section, this improvement could be done within the existing right-of-way. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
	Cleveland Avenue to I-5 SB Ramps		✓		✓	✓		✓	✓	✓	✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 49% Development Projects (City Program) 43% Development Projects (GB Capital) 8% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*
	I-5 SB Ramps to I-5 NB Ramps							✓			✓	Widen roadway and reclassify as a 6-Lane Major	NO	Direct Impact: 100% Project Responsibility 56% Development Projects (City Program) 42% Development Projects (GB Capital) 2% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would improve operations to acceptable LOS D, and would mitigate the impact to less than significant. However, this roadway is built to its ultimate classification per the City of National City's General Plan, and based on the current roadway cross-section, significant additional right-of-way (such as widening below the I-5 overpass bridge) would be required to implement this measure. Therefore, this impact is considered *significant and unavoidable.*

Table 7.11 Impacted Study Facilities and Proposed Mitigations – Granger Hall Alternative

Study Facility		Existing				Near Term Year 2030			Future Year 2050			Mitigation	Feasible?	Fair Share & Responsibility Split	Impact Mitigated?
		DPW	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM				
ROADWAY SEGMENTS															
Marina Way	Bay Marina Dr to W 32nd St		✓		✓	✓		✓	✓		✓	Widen roadway to a 2-Lane Collector with Center-Left-Turn Lane	NO	Direct Impact: 100% Project Responsibility 40% Development Projects (City Program) 58% Development Projects (GB Capital) 2% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would improve operations to acceptable LOS C, and would mitigate the impact to less than significant. However, given that this roadway is outside of The District's jurisdiction and does not have control over timing and implementation of this improvement, this impact is considered *significant and unavoidable.*
INTERSECTIONS															
1	Cleveland Avenue & Civic Center Drive			✓		✓	✓	✓	✓	✓	✓	Add a separate westbound left-turn and install a traffic signal	NO	Direct Impact: 100% Project Responsibility: 9% District Public Works (Pepper Park & Granger Hall) 91% Closure of Bay Marina	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, the intersection is located too close to the E Harbor Drive/Civic Center Drive signal to install an adjacent traffic signal. Additionally, right-of-way constraints on Civic Center Drive restricts the implementation of a separate westbound left-turn lane. Therefore, this impact is considered *significant and unavoidable.*
2	I-5 Northbound Off-Ramp/East Harbor Drive & Civic Center Dr			✓			✓			✓		Construct a second northbound left-turn lane on the I-5 Northbound Off-Ramp	NO	Direct Impact: 100% Project Responsibility: 9% District Public Works (Pepper Park & Granger Hall) 91% Closure of Bay Marina	Implementing this improvement would improve the overall intersection delay; however, the delay would still be higher than pre-project conditions, so the improvement would only partially mitigate the impact. Widening the northbound off-ramp could be achieved by encroaching into the existing southbound on-ramp. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
7	Cleveland Ave & West 19th St					✓	✓	✓	✓	✓	✓	Restripe the eastbound left/through to an exclusive left-turn lane, and restripe the eastbound right-turn lane to a through/right	YES	Fair Share: 45.5% Project Responsibility: 4% District Public Works (Pepper Park & Granger Hall) 46% Development Projects (City Program) 50% Development Projects (Bayshore Bikeway)	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. This improvement can be achieved within the existing right-or-way and would reduce the impact to less-than-significant conditions. However, since this intersection is under the City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
10	Tidelands Ave & Bay Marina Dr										✓	Add a separate westbound right-turn lane	YES	Project Fair Share: 50.5% Project Responsibility: 100% Closure of Bay Marina Drive	Implementing this improvement would reduce the overall intersection delay to better than pre-project conditions, and would mitigate the impact to less than significant. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
11	Marina Way & Bay Marina Dr					✓		✓	✓		✓	Add a second westbound left-turn lane	YES	Project Fair Share: 51% Project Responsibility: 58% Closure of Bay Marina Drive 28% Development Projects (GB Capital) 1% Development Projects (City Program) 13% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would reduce the overall intersection delay overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. Since the Partial Closure of Bay Marina Drive would be reducing the through lanes to one lane in each direction, that would leave adequate right-of-way to construct this improvement. However, since this intersection is under City of National City's jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*

Table 7.11 Impacted Study Facilities and Proposed Mitigations – Granger Hall Alternative

Study Facility		Existing				Near Term Year 2030			Future Year 2050			Mitigation	Feasible?	Fair Share & Responsibility Split	Impact Mitigated?
		DPW	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM	TB	TB+CI of BM	TB+ Part CI of BM				
ROADWAY SEGMENTS															
13	I-5 Southbound Ramps & Bay Marina Dr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Restripe the southbound through/left lane to a left/through/right and add a No Right-Turn On-Red for the southbound right-turn	YES	Direct Impact: 100% Project Responsibility 53% Development Projects (City Program) 38% Development Projects (GB Capital) 9% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, since this intersection is under Caltrans' jurisdiction, The District does not have control over timing and implementation of this improvement, and therefore, this impact is considered *significant and unavoidable.*
14	I-5 Northbound Ramps & Bay Marina Dr					✓		✓	✓		✓	Restripe the northbound left/through/right lane to a northbound left/through lane, and add widen the ramp to construct a second northbound right-turn lane	NO	Direct Impact: 100% Responsibility Split: 59% Development Projects (City Program) 31% Development Projects (GB Capital) 10% District Public Works (Pepper Park & Granger Hall)	Implementing this improvement would reduce the overall intersection delay to LOS D operations, and would mitigate the impact to less than significant. However, while there is adequate right-of-way to add a second northbound right-turn lane, constructing this improvement would require substantial relocation of existing utility lines and large electrical power towers. Therefore, due to the close proximity of the ramp to the existing utility lines, the construction of this improvement is considered infeasible. Therefore, this impact is considered *significant and unavoidable.*
FREEWAY MAINLINE															
I-5	I-15 and Division St	NB										SANDAG's Regional Transportation Plan (RTP) has identified improvements on these segments of I-5 to be widened to 10 lanes. However, while the RTP includes this improvement in their constrained project list, the long timeline and funding of these improvements are uncertain, making them unreasonably foreseeable.	NO	Fair Share: 18.4% Responsibility Split: 23% Development Projects (City Program) 62% Development Projects (GB Capital) 6% District Public Works (Pepper Park & Granger Hall) 9% Closure of Bay Marina	Implementation of this improvement would improve freeway operations to better than pre-project conditions. However, these improvements are not scheduled until Year 2050 and are also subject to budget availability and coordination with Caltrans. At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and would remain *significant and unavoidable*.
		SB													
	Division St and 8th St	NB													
		SB				✓	✓	✓	✓	✓	✓				
	8th St and Civic Center Dr	NB													
		SB													
	Civic Center Dr and Bay Marina Dr	SB				✓	✓	✓	✓	✓	✓				

Source: Chen Ryan Associates; October 2019

Notes:
✓ Indicates a significant impact | ✓ = new facility impact under the Granger Hall alternative
DPW = District Public Works
TB = Total Bayfront
CI of BM = Closure of Bay Marina
Part CI of BM = Partial Closure of Bay Marina
TB w/ CI of BM = Total Bayfront with Closure of Bay Marina
TB w/ Part CI of BM = Total Bayfront with Partial Closure of Bay Marina

8.0 Pedestrian, Bicycle and Transit Assessment / Transportation Demand Management

This chapter discusses the project's potential impacts to active transportation modes (bicycling and walking) and transit.

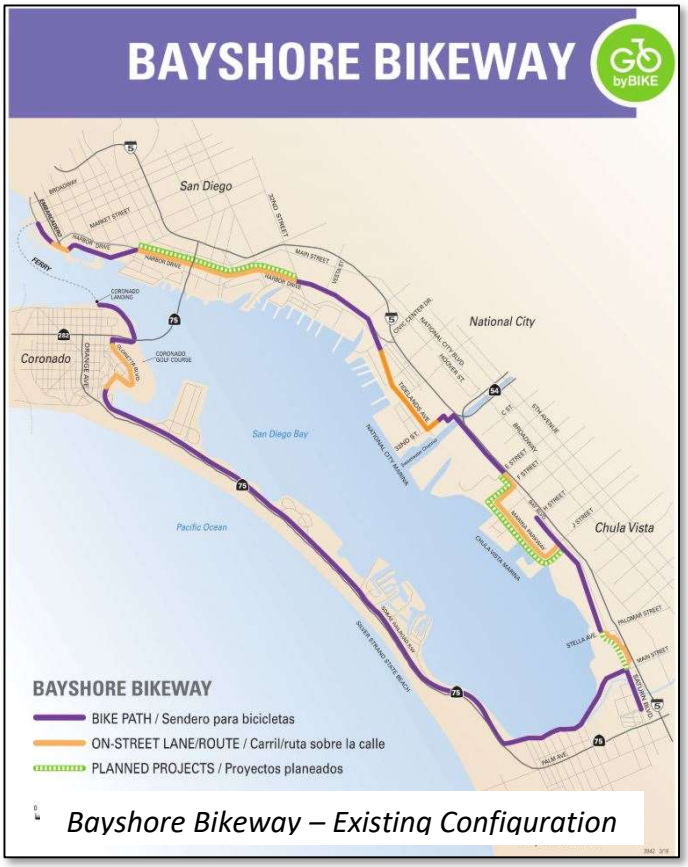
8.1 Active Transportation Facilities and Connectivity

Pedestrians

As noted in the roadway facility descriptions contained in Section 4.1, Tidelands Avenue, Bay Marina Drive, and Cleveland Avenue all currently have sidewalk facilities on both sides of the roadway within the project study area. Marina Way also has a sidewalk, but only on the east side of the roadway.

Bicyclists

As shown in the diagram to the right, Tidelands Avenue and West 32nd Street currently provides bicycle lanes on both sides of the roadway, which were recently completed in February 2018. The Bayshore Bikeway is a 24-mile bicycle facility around the San Diego Bay. In addition to these recently implemented bike lanes, the project would construct Segment 5 of the Bayshore Bikeway that would provide a bicycle facility along McKinley Avenue, the southern border of the City Program parcels, and Marina Way and the former railroad right-of-way. The bikeway would convert McKinley Way to a one-way southbound roadway to accommodate the proposed bicycle facility, and also modify the East Harbor Drive/Civic Center Drive intersection to remove the southbound free right-turn movement.



Bayshore Bikeway – Existing Configuration

Transit

There are currently no transit facilities within the project study area. The closest transit station is the 24th Street Transit Station located immediately east of I-5 on the corner of West 22nd Street and Wilson Avenue. This transit stop is served by MTS Route 961 and the Trolley Blue Line.

Project Impacts

Potential impacts relating to pedestrian, bicycle and transit circulation would be considered significant if the Proposed Project would substantially increase hazards due to a design feature, or would conflict with the adopted policies, plans, or programs supporting alternative transportation, as outlined in Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*. Based on an initial review of the project site plan and field visit, the Proposed Project would not conflict with any existing or proposed pedestrian, bicycle, or transit facilities. The driveways for the development projects would not conflict with current sidewalks or bike facilities, and the project components that are altering the roadway network (i.e. Pasha Road Closures, Pasha Rail Improvement, Marina Way Realignment, and Bay Marina Drive Closure) would still provide access for pedestrian and bicyclists. Therefore, no impacts related to pedestrian, bicycle, or transit facilities are expected to occur with the Proposed Project.

Furthermore, the project proposes to improve bicycle facilities by implementing Segment 5 of the Bayshore Bikeway that would provide a separated bicycle facility on McKinley Avenue and Marina Way. Segment 5 of the Bayshore Bikeway would create a safer environment for bicyclists and provide connection to the regional bikeway system.

8.2 Transportation Demand Management

Implementation of a Transportation Demand Management (TDM) plan could lead to vehicle trip reduction, increased use of alternative modes, and better traffic management in the vicinity of the project area. Based upon review of the project components and the project's location in relation to near-by land uses and non-auto facilities, the following TDM measures are recommended:

1. Provide wayfinding signage to guide hotel/retail patrons and employees to/from the 24th Street Transit Station. Exact signage location and type to be determine in coordination with City staff.

2. Provide secure bicycle parking within the City Program, GB Capital, and Pepper Park Expansion developments. Parking racks should accommodate U-locks.

3. Designate a Transportation Coordinator (such as a board member of the homeowner's association, a consultant, or a property management company representative) to monitor the TDM Program. The Transportation Coordinator will be responsible for developing, marketing, implementing, and evaluating the proposed TDM measures included in this Plan. The Transportation Coordinator's duties would include providing information and resources regarding transit options and SANDAG's iCommute program on a yearly basis.

The Transportation Coordinator will coordinate with the employers to provide biking, walking, and transit information to their employees and visitors.

A final TDM plan will be developed in coordination with the City of National City and SANDAG.

9.0 Parking

This chapter addresses the required parking supply of the proposed parking.

The project's parking supply was derived using the following sources:

- *National City's Municipal Code – Title 18 Land Use Code (Section 18.24.080 and Section 18.45.050)* for the City Program development
- *Tidelands Parking Guidelines, San Diego Unified Port District (*January 5, 2001) for the GB Capital development
- *Institute of Transportation Engineers Parking Generation* (4th Edition, 2010) for the Pepper Park Expansion

Additionally, the loss of parking associated with the Tidelands Avenue closure was derived based on field surveys of the existing parking supply and demand. The parking supply requirement for each of the Total Bayfront development components are further described below.

DEVELOPMENT PROJECTS

City Program

The City Program development proposes to develop with a FAR of 2.0, which equates to approximately 254,782 square feet of floor area. **Table 9.1** displays the parking supply requirement for the City Program component based on the City's Municipal Code, which is included in **Appendix N**. As shown, the City Program is required to provide a minimum of 354 parking spaces.

Table 9.1 City Program Parking Supply Requirements

Land Use	Size	City of National City Rate	Minimum Parking Requirement
City Program *15.5 ksf of restaurant* *12 ksf specialty retail* *150 hotel rooms*	254.8 ksf	*Restaurant:* 10 spaces / ksf *Specialty Retail:* 4 spaces / 1 ksf *Hotel:* 1 space / room + 1 space for manager	**354**

Source: Chen Ryan Associates; October 2019

GB Capital

Table 9.2 shows the minimum parking supply requirement for the GB Capital based on the *Tidelands Parking Guidelines, San Diego Unified Port District (*January 5, 2001) for the South Bay District. These rates are the unadjusted rates for the project. As shown, per the unadjusted parking rates, the GB Capital is required to provide a minimum of 974 parking spaces.

Table 9.2 GB Capital Parking Supply Requirements

Land Use	Units	Parking Supply Rate	Minimum # of Auto Spaces
Recreation Vehicle Campground	70 RV Sites	1 / site	70
Resort Hotel	463 rooms	1.1 / room	511
Specialty Retail (Hotel)*	16.5 ksf	0 / ksf	0
Campground	60 Campsites	1 / site	60
Marinas[1]	305 slips	1 / slip	305
Single Tenant Office	10 ksf	2.8 / ksf	28
		TOTAL	**974**

Source: Chen Ryan Associates; October 2019

Note:
[1]Includes the dry boat storage (210 storage units) plus the boat slips (95 slips).

Further adjustment factors were applied to the parking demand rate for the GB Capital based on Tables 1 and 2 of the *Tidelands Parking Guidelines – San Diego Unified Port District January 5, 2001*. **Table 9.3** displays the total unadjusted demand rate for the GB Capital, as well as the assumed adjustment factors used to develop the final adjusted parking demand rate. The adjustment factors are based on the project features as well as the project's location.

Table 9.3 GB Capital Parking Supply Adjustments

Adjustment	Adjustment Reason	Percent	Change (Spaces)
Parking Rate (Unadjusted)	Per Table 1 of the Tidelands Parking Guidelines	100%	974
Proximity to Transit	The Proposed Project is not located within 0.25 miles of a transit station	0%	0
Access to Airport	GB Capital does not have access the airport.	0%	0.0
Shared Parking Potential	GB Capital does not intend to rely on outside parking options.	0%	0.0
Proximity to Public Waterfront Amenities for Public Access	GB Capital is located along the waterfront and has direct access to the Pier 32.	3%	26.0
Displacement of Existing Parking	GB Capital will not displace any existing parking.	0%	0.0
Existing Parking Shortfall/Surplus	This will be determined via this parking analysis.	0%	0.0
Employee Trip Reduction Programs	The project proposed to park all employees off site.	0%	0.0
Dedicated Airport Shuttle Service	An airport shuttle is not proposed.	0%	0.0
Dedicated Water Transportation Service	305 additional boat storages/slips will be added as a project feature.	-10%	-97.0
		Total Adjusted Rate	**903**

Source: Tidelands Parking Guidelines – San Diego Unified Port District January 5, 2001

As shown, based on the project location and proposed features, the parking demand rate reduced by 71 spaces to 903 spaces required.

Table 9.4 summarizes the GB Capital's proposed parking supply to be provided and the required spaces after the adjustment factors. As shown, GB Capital is proposing to provide up to 880 parking spaces (including 820 spaces in Phase 2 and 60 spaces on the SDG&E parcel east of the site), but the required spaces are 903, resulting in a deficit of 23 parking spaces. Therefore, during peak times when parking demand exceeds the available capacity, parking could be displaced onto nearby roadways or adjacent uses.

Table 9.4 Pepper Park and Pier 32 Existing Parking Demand

Land Use	Provided Parking Spaces[1]	Required Parking Spaces[2]	Net Spaces
GB Capital	880	903	-23

Source: Chen Ryan Associates; October 2019

[1]Includes 820 spaces from Phase 2 and 60 spaces of the SDG&E parcel.
[2]Total Adjusted Parking Supply

In addition to the parking supply of GB Capital, the parking demand and supply of Pier 32 is also important to note due to its close proximity. **Table 9.5** displays the current parking supply and demand in these areas during peak times (Mid-Day) for both typical weekdays and weekends. Parking occupancy worksheets are provided in Appendix L.

Table 9.5 Pier 32 Existing Parking Demand

Land Use	Supply (Spaces)	Weekday		Weekend	
		Existing Demand	Excess Capacity	Existing Demand	Excess Capacity
Pier 32	218	140	78	137	81

Source: Chen Ryan Associates; September 2015 & April 2017

As shown, Pier 32 currently has ample parking and does not need to rely on on-street parking to serve its patrons. Therefore, if GB Capital's parking demand were to exceed the supply, Pier 32 could absorb the excess and provide parking for the GB Capital patrons.

Pasha Road Closures

With the closure of Tidelands Avenue and 28th Street, the 249 on-street parking spaces would no longer be available. **Table 9.6** displays the current parking supply and demand of Tidelands Avenue during the peak times (AM peak hour) of a typical work day. As shown, the parking on Tidelands Avenue and 28th Street is approximately 35 percent occupied during the peak times. Parking occupancy worksheets are provided in **Appendix O**.

Table 9.6 Pasha Road Closures Existing On-Street Parking Demand

Roadway	Segment	Supply (Spaces)	Existing Demand (Occupied Spaces)	Excess Capacity
Tidelands Avenue	Bay Marina Drive to 28th Street	98	42	56
	28th Street to 32nd Street	118	38	80
28th Street	Quay Avenue to Tidelands Avenue	33	7	26
	Total	**249**	**87**	**162**

Source: National City Marine Terminal Tank Farm Paving and Street Closures Project & Port Master Plan Amendment Transportation Impact Study (Chen Ryan Associates, September 2015)

Based on observations, it is appears that a majority of these parking spaces are utilized by NCMT employees. With this project, parking would need to be provided elsewhere for NCMT employees. Pasha is planning to restripe Parking Lot Q to provide more parking spaces for their employees. There would be 590 parking spaces in Lot Q, which is adequate to accommodate the 574 Pasha employees[1].

DISTRICT PUBLIC WORKS

Pepper Park is currently 5.22 acres and provides 93 parking spaces, including 22 extra-long spaces for vehicles with attached boats. However, with the park expansion by approximately 2.54 acres, the parking supply must also increase to accommodate the larger use. The City of National City and The District currently does not provide parking rates for park uses. Consequently, the parking supply was calculated based on rates from the *Institute of Transportation Engineers Parking Generation* (4th Edition, 2010). **Table 9.7** displays the existing parking supply and the net parking supply requirement for the Pepper Park Expansion.

Table 9.7 Pepper Parking Expansion Parking Supply Requirement

Land Use	Scenario	Units	Existing Parking Supply	Parking Supply Rate	Parking Supply Requirement
City Park	Existing	5.22 acres	93 spaces	15 spaces / acre	78
	Proposed Project	2.54 acres	-		38
	TOTAL	7.76 acres	-		**116**

Source: Institute of Transportation Engineers Parking Generation (4th Edition)

As shown, the additional parking supply required for the Pepper Parking Expansion is 38 spaces, which increases the total parking requirement to 116. Given that there are already 93 spaces provided, an additional 23 parking spaces (116 – 93 = 23 spaces) are required for the Pepper Park Expansion.

Total Bayfront Parking

The Total Bayfront parking supply requirement includes parking demand from the Development Projects and the District Public Works projects. **Table 9.7** summarizes the total net new parking spaces required of the Proposed Project. As shown, the Total Bayfront project would require 1,373 parking spaces in the study area.

[1] Chen Ryan Associates, *National City Marina Terminal Tank Farm Paving and Street Closures Project & Port Master Plan Amendment*, August 18, 2016.

Table 9.7 Total Bayfront Parking Supply Requirement

Project Component	Existing/Proposed Parking Supply	Parking Supply Requirement
City Program*	**0**	**354**
GB Capital	**880**	**903**
Pepper Park Expansion	**93**	**116**
TOTAL NET NEW PARKING SUPPLY		**1,373**

Source: Chen Ryan Associates; October 2019

Notes:
*Proposed parking supply is currently unknown at this time. National City Municipal Code provides a minimum and maximum parking rate for mixed-use commercial. Both are shown as "Minimum Parking Supply / Maximum Parking Supply"

Though the Pasha Road Closures Component would result in a net decrease in parking supply of 249 on-street spaces, Pasha is planning to increase their employee parking at Lot Q by 590 spaces. Therefore, the parking demand on Tidelands Avenue would no longer exist as Pasha would provide the appropriate number of spaces to accommodate their employees.

Appendix A
Signal Timing Plans and Count Data

LOCATION: **RTE 5 @ Civic Ctr. / Harbor Dr.**

CALTRANS C8.3E EXCLUSIVE 7 PROM ONLY DATE: 3/16/15 PAGE 1

F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9	PRE-EMPTION E		F FLAGS	1	2	3	4	5	6	7	8	
0	WALK	1	7	1	7	1	1	7	1	CLK RST	EV SEL	0	PERMIT	1	2	3	4	5	6	7		0
1	DONT WALK	1	23	1	19	1	1	33	1		RR1 CLR	5	RED LOCK			3						1
2	MIN GREEN	5	5	5	5	5	5	5	1		EVA DLY	0	YEL LOCK									2
3	TYPE 3 DET	0	0	0	0	0	0	0	0		EVA CLR	5	V RECALL		2				6			3
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		EVB DLY	0	P RECALL									4
5	PASSAGE	2.0	5.0	2.0	2.0	2.0	5.0	2.0	0.9		EVB CLR	5	PED PHASES		2		4			7		5
6	MAX GAP	2.0	7.0	2.0	2.0	2.0	7.0	2.0	0.9		EVC DLY	0	RT OLA									6
7	MIN GAP	2.0	3.0	2.0	2.0	2.0	3.0	2.0	0.9		EVC CLR	5	RT OLB									7
8	MAX EXT	20	35	25	30	20	35	35	9		EVD DLY	0	DBL ENTRY									8
9	MAX 2									YR	EVD CLR	5	MAX 2 PHASES									9
A	MAX 3									MO	MAX EV	255	LAG PHASES	READ ONLY								A
B										DAY	RR2 CLR	5	RED REST									B
C	REDUCE BY	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	DOW			REST-IN-WALK									C
D	EVERY	1.0	0.6	1.0	1.0	1.0	0.6	1.0	1.0	HR			MAX 3 PHASES									D
E	YELLOW	3.7	4.5	4.1	4.1	3.7	4.5	4.1	3.0	MIN			YEL START UP		2				6			E
F	RED	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	SEC			FIRST PHASE							7		F
3.5'	PED XING FT		80'		65'			116'						1	2	3	4	5	6	7	8	
								54'														

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	0
FOF	5

FCO	3
FC1	3
FC2	10
FCA	3.0
FCB	3.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	1
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

NOTES:

MPH = 30

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY

LOCATION: RTE 5 @ Civic Ctr. / Harbor Dr.

CALTRANS C8.3E EXCLUSIVE 7 PROM ONLY DATE: 11/14/11

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE	FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E	F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH														LAG FZ FREE		2	3			6		8	0
1	FZ1 GRN FCTR													GAPOUT CP1	LAG FZ CP 1									1
2														GAPOUT CP2	LAG FZ CP 2									2
3	FZ3 GRN FCTR													GAPOUT CP3	LAG FZ CP 3									3
4	FZ4 GRN FCTR										PERM TIME			GAPOUT CP4	LAG FZ CP 4									4
5	FZ5 GRN FCTR										LAG OFFSET			GAPOUT CP5	LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6	LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7	LAG FZ CP 7									7
8	FZ8 GRN FCTR										NO GREEN			GAPOUT CP8	LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9	LAG FZ CP 9									9
A	OFFSET A										OFFSET				LAG C COORD									A
B	OFFSET B														LAG D COORD									B
C	OFFSET C														COORD FAZES		2				6			C
D	FZ 3 EXT																							D
E	FZ 7 EXT																							E
F	OFFSET INTRPT																							F
																1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		1
2		
3		
4		
5		
6		
7		
8		

COO = 1

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

D PAGE

	D	FLAGS								E	FLAGS								F	FLAGS							
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1									CP 1									CP 1								
2	CP 2									CP 2									CP 2								
3	CP 3									CP 3									CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
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F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E	FLAGS								F	FLAGS								
	FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE							7		4
5										2 PED		2							5
6										6 PED				4					6
7										4 PED							7		7
8										8 PED								8	8
9																			9
A	OLA NOT	1	2		4	5	6	7		OLA ON			3						A
B	OLB NOT	1	2	3		5	6			OLB ON				4			7		B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E
MINUTE = D-B-E
DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES
(CALL ACTIVE LIGHTS)
RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES
(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F
MINUTE = D-B-F
DAY = D-C-F

D-E-E = C8 VERSION NUMBER
D-E-F = LITHIUM BATTERY CONDITION
84 = BAD
85 = GOOD

CALTRANS C8.3E EXCLUSIVE 7 PROM ONLY

7 PAGE

TIME OF DAY ACTIVITY TABLE											
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS											
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED
7 ENERGIZE AUX OUTPUT-GREEN
8 ENERGIZE AUX OUTPUT-YELLOW
9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

9 PAGE C09 = 0 or 1

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE C09 = 2

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
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D											
E											
F											

LOCATION: **RTE 5 @ Civic Ctr. / Harbor Dr.**

CALTRANS C8.3E EXCLUSIVE 7 PROM ONLY DATE: 6/25/13 PAGE 5

E PAGE D PAGE

F+C+F+1+2+3+E+B+ E+PHASES or TYPE+EVENT NO.										
		PHASES		TYPE			PHASES		TYPE	
		C		D			E		F	
0	I1	1		5,6		J1	5		5,6	
1	I2U	2		5,6		J2U	6		5,6	
2	I2L	2		5,6		J2L	6		5,6	
3	I3U	2		5,6		J3U	6		5,6	
4	I3L	2		5		J3L	6		5	
5	I4	2	3	7,8	5,6	J4	6		7,8	5,6
6	I5	3		5,6		J5	7		5,6	
7	I6U	4		5,6		J6U	8	7	5,6	
8	I6L	4		5,6		J6L	8	7	5,6	
9	I7U	4		5,6		J7U	8	4	5,6	
A	I7L	4		5		J7L	8	4	5	5,6
B	I8	4	7	7,8	5,6	J8	8	4	7,8	5,6
C	I9U	1		5,6		J9U	5		5,6	
D	I9L	3		5,6		J9L	7		5,6	

DETECTOR TYPE

1 RED LOCK
2 YELLOW LOCK
5 EXTENSION
6 COUNT
7 CALLING
8 TYPE 3 DISCONNECT

DETECTOR SETTINGS									
I FILE					J FILE				
	DELAY		CARRYOVER			DELAY		CARRYOVER	
I1	D10		D30		J1	D20		D40	
I2U	D11		D31		J2U	D21		D41	
I2L	D12		D32		J2L	D22		D42	
I3U	D13		D33		J3U	D23		D43	
I3L	D14		D34		J3L	D24		D44	
I4	D15	2.0	D35		J4	D25		D45	
I5	D16	2.0	D36		J5	D26		D46	
I6U	D17		D37		J6U	D27		D47	
I6L	D18		D38		J6L	D28		D48	
I7U	D19		D39		J7U	D29		D49	
I7L	D1A		D3A		J7L	D2A		D4A	
I8	D1B		D3B		J8	D2B		D4B	
I9U	D1C		D3C		J9U	D2C		D4C	
I9L	D1D		D3D		J9L	D2D		D4D	

REASSIGNS DETECTORS TO VARIOUS PHASES / FUNCTIONS

F-C-F MUST EQUAL ZERO WHEN FINISHED

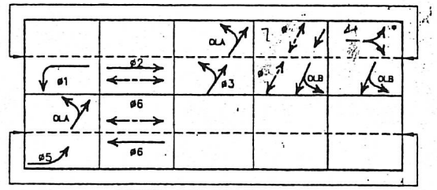
LOWER CASE NUMBERS ARE DEFAULT VALUES

BLANK SPACES CONTAIN DEFAULTS (DO NOT ZERO OUT)

POLE SCHEDULE

POLE DATA		SIG. M.A.	HPS SOD VAP		SIGNAL MOUNTING			12 PED PUSH BUTTON		I.S.N.S.	REG.	REMARKS	LOCATION	
TYPE	HEIGHT		MA	WATTS	VEH	MA	PED	PHASE	POLE QUAD	MESSAGE	SIGN		A	B
26-4-129	30'	45'	15'	250	SV-1-T	MAT MAS(2)	–	–	–	CIVIC CENTER DR.	R73-3(CA)	SEE CONS'T. NOTE 2	–	–
1A	10'	–	–	–	TV-1-T(N)	–	SP-1-T	4	N	–	–	SEE CONS'T. NOTES 3	–	–
)18-7	17'	25'	–	–	SV-2-TD(N)	MAS(N)	–	–	–	CIVIC CENTER DR.(N)		SEE CONS'T. NOTES 4 16	25'	6'
)-4-1.	30'	40'	15'	250	SV-1-T	MAT MAS(2)	SP-1-T	–	–	CIVIC CENTER DR.	R73-3(CA)	SEE CONS'T. NOTE 5	–	–
1A	10'	–	–	–	TV-2-T PV(N)	–	–	2	E	–	–	SEE CONS'T. NOTE 6	–	–
19-4-129	30'	30'	15'	250	SV-2-TD	MAT(N) MAS(N) MAS(R)	SP-2-T	2 & 4	E & S	HARBOR DR.	R3-4	SEE CONS'T. NOTE 7	–	–
(N)29-5-129	30'	45'	15'	250	SV-2-TB	MAS-4B(N) MAS-4B(N)	SP-1-T	4	N	HARBOR DR.	R3-4	SEE CONS'T. NOTE 8	10'	4'
(N)17-2-129	30'	20'	15'	250	SV-1-T	MAS	SP-2-T	4 & 6	S & W	–	–	SEE CONS'T. NOTE 8	1'	4'
(N)17-2-129	30'	20'	15'	250	SV-2-TD	MAS-4B(N)	SP-1-T	6	W	Mc KINLEY AV.(N)		SEE CONS'T. NOTES 8 16	1'	4'

(N) – NEW
(R) – RELOCATED



FLASHING OPERATION SHALL BE ALL RED
* ø7 – EXCLUSIVE PHASE

PHASE DIAGRAM

DETAIL "A"
NO SCALE

WORK TO BE DONE

MODIFY TRAFFIC SIGNAL AND STREET LIGHTING SYSTEMS AS SHOWN AND NOTED IN ACCORDANCE WITH THE LATEST OF:

CALTRANS STANDARD SPECIFICATIONS DATED JULY 2004.

CALTRANS STANDARD PLANS DATED JULY 1999.

CALTRANS "TRAFFIC SIGNAL CONTROL EQUIPMENT SPECIFICATIONS" MUTCD PART 6 DATED 2003 AND CALTRANS SUPPLEMENT.

STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK), INCLUDING SUPPLEMENTS THERETO (FOR NON-TRAFFIC SIGNAL RELATED WORK).

SAN DIEGO AREA REGIONAL STANDARD DRAWINGS.

CONSTRUCTION NOTES

1 – INSTALL 6 ft. dia. TYPE "E" DETECTOR AS FOLLOWS:
1 – PHASE 4 LOOP DETECTOR ON EAST LEG OF CIVIC CENTER DR.
CONNECT NEW LOOP DETECTOR TO ADJACENT DETECTOR LEAD-IN CABLE. PULL ONE ADDITIONAL DETECTOR LEAD-IN CABLE TO CONTROLLER BOX FOR #2 ADVANCE LOOPS. FURNISH AND INSTALL 2" CONDUIT AND PULLBOXES BETWEEN #6 ADVANCE LOOPS AND PULLBOXES AT LOCATION (C) AS SHOWN ON PLANS. PULL TWO DETECTOR LEAD-IN CABLES TO CONTROLLER CABINET FOR #6 ADVANCE LOOPS.

2 – AT POLE LOCATION (A), REMOVE EXISTING PHASE 6 PEDESTRIAN HEAD.

3 – AT LOCATION (B), REMOVE EXISTING PHASE 4 VEHICLE HEAD. CHANGE PHASE 3 VEHICLE HEAD INDICATIONS TO ALL ARROWS. REMOVE EXISTING PHASE 6 PEDESTRIAN PUSHBUTTON.

4 – AT POLE LOCATION (C), REMOVE EXISTING TYPE 19-4-80 STANDARD COMPLETE. AT LOCATION (C'), FURNISH AND INSTALL A TYPE 18-3-129 STANDARD. POLE MOUNTED SIGNAL HEADS ARE RELOCATED FROM LOCATION (C).

5 – AT POLE LOCATION (D), REMOVE EXISTING PHASE 8 PEDESTRIAN PUSHBUTTON.

6 – AT POLE LOCATION (E), REMOVE EXISTING PHASE 8 PEDESTRIAN HEAD. REMOVE EXISTING PHASE 4 VEHICLE HEAD AND REPLACE WITH PHASE OLB PROGRAMMED VISIBILITY HEAD WITH ALL ARROWS.

7 – AT POLE LOCATION (F), REMOVE EXISTING PHASE 4 VEHICLE HEADS (3) AND REPLACE WITH PHASE OLB PROGRAMMED VISIBILITY HEADS (INDICATIONS ON MAT MOUNTED HEAD SHALL BE ALL ARROWS). FURNISH AND INSTALL R3-4 SIGN.

8 – AT POLE LOCATION (G), (H) AND (I), FURNISH AND INSTALL STANDARDS WITH ALL ASSOCIATED SIGNAL AND LIGHTING EQUIPMENT AS INDICATED ON THESE PLANS AND POLE SCHEDULE. PHASE OLB SIGNAL HEADS ARE PROGRAMMED VISIBILITY.
SPECIAL 45 FT. MAST ARM AT LOCATION (G) AS SHOWN WITH PHASE 3 SIGNAL HEADS, EVP DETECTOR, REGULATORY AND STREET NAME SIGNS RELOCATED FROM LOCATION (C).

9 – 4-SECTION SIGNAL HEADS. SEE DETAIL "A".

10 – FURNISH AND INSTALL ALL NEW CONDUCTORS/ CABLES, CONDUITS AND PULLBOXES AS INDICATED ON THESE PLANS AND CONDUCTOR SCHEDULE. MAKE CONNECTIONS IN CONTROLLER CABINET TO PROVIDE OPERATION AS INDICATED ON THESE PLANS.

APPROVED ENCROACHMENT PERMIT PERMIT # 06ENC0508 DATE MAR 07 2006

11 – FURNISH AND INSTALL R9-3A AND R9-3B SIGN.

12 – REPLACE ALL PEDESTRIAN PUSHBUTTONS WITH TYPE "B". SEE STD. PLAN E-S-5C.

13 – PEDESTRIAN RAMP TO BE REMOVED. SEE STREET IMPROVEMENT SHEET.

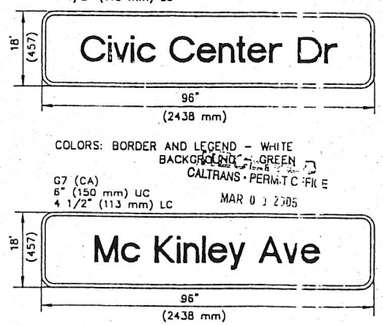
14 – EXISTING CONTROLLER, CONTROLLER CABINET AND SERVICE CABINET TO REMAIN.

15 – FURNISH AND INSTALL R13A(CA).

16 – FURNISH AND INSTALL INTERNALLY ILLUMINATED STREET NAME SIGN PER ES-33 AND POLE SCHEDULE. SEE DETAIL

17 – FURNISH AND INSTALL VDU IN CONTROLLER CABINET, VIDEO CAMERAS AT LOCATION (A), (C'), (I) AND PULL VIDEO CABLE TO CONTROLLER CABINET AS INDICATED IN CONDUCTOR SCHEDULE. [- - -] INDICATES VEHICLE DETECTION AREA.

G7 (CA)
6" (150 mm) UC
4 1/2" (113 mm) LC



INTERNALLY ILLUMINATED STREET NAME SIGNS

△ CONDUCTOR SCHEDULE

AWG SIZE OR CABLE TYPE	PHASE	POLE OR CIRCUIT	CONDUIT SIZE & RUN: 2-3-1/2" 1	2-3-1/2" 2	3" 3	AB 4	3"(N) 5	AB 6	2-3-1/2" 7	2-3-1/2" 8	2-3-1/2" 9	2" 10	3" 11	3"(N) 12	3"(N) 13	3"(N) 14
CONDUCTORS 3/12		POLE – A	–	1	–	1										
		POLE – B	1	1	1	1										
		POLE – C'	–	1	–	1										
		POLE – D	–	1			–	1								
		POLE – E	1	1												
		POLE – F	2	2					2	2	2					
		POLE – G	1	2	1	2										1 2
		POLE – H	2	1	2	1									2	1 2
CONDUCTORS		POLE – I	1	1	1	1								1	1	1 1
TOTAL CABLES		3 CONDUCT./12 CONDUCT.	8 11	5 7	5 6	– –	– 1	–	3 4	3 4	1 2	1 1	– 1	1 2	3 3	4 5
14		PEU			3											
10		ISNS	2	2	2		2		2	2	2	–	2	2	2	2
		LIGHTING		2			–		2	2	2	–	2	2	2	2
6		SERVICE (SIGNAL)	2	2	2		–		–	–	–	–	–	–	–	–
TYPE "B" DLC	2	LOOP DETECTOR	4	–	–		–		4	4	–	–	–	–	–	–
	3		1	–	–		–		1	1	1	1	–	–	–	–
	4		1	1	1		–		–	–	–	–	–	–	–	–
	5		2	–	–		–		2	–	–	–	–	–	–	–
	6		2	2	2		2		–	–	–	–	2	2	2	
VIDEO CABLE	1/6	VIDEO DETECTION	1	1	–		–		–	–	–	–	–	–	–	–
	3		1	1	1		–		–	–	–	–	–	–	–	1
	4		1	1	1		–		–	–	–	–	–	–	–	1
	–		–	–	–		–		–	–	–	–	–	–	–	–
	7		1	1	1		1		–	–	–	–	1	1	1	
EMERGENCY VEHICLE DETECTOR (EV-DLC)			4	3	2		–		1	1	–	–	–	–	–	2
TOTAL CONDUCTORS / CABLES			39	28	26	–	6	–	19	17	8	3	5	10	13	20

(N) NEW CONDUIT: ALL CONDUCTORS AND CABLES TO BE NEW

REGISTERED PROFESSIONAL ENGINEER RALPH EVERETT DILLS No. 39504 Exp. 12/31/ CIVIL STATE OF CALIFORNIA
Ralph E. Dills 2-28-06

PLANS FOR THE MODIFICATION OF TRAFFIC SIGNAL AND STREET LIGHTING SYSTEMS AT:

CIVIC CENTER DR. & HARBOR DR. & McKINLEY AV.

CITY OF NATIONAL CITY

	CITY ENGINEER RCE			DATE
	INITIAL	DATE	PROJECT NO.	
DESIGN BY:				SPEC. NO.
CHECK BY:			SHT. 4 OF 6 SHT.(S)	-D

INTERSECTION: NC_Bay Marina Dr & Cleveland Ave

Group Assignment: **NONE**
Field Master Assignment: **NONE**
System Reference Number: **237**

N/S Street Name: **Cleveland Ave**
E/W Street Name: **Bay Maria Dr**

Last Database Change: **11/5/2015 11:56**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Drop Number	**32**	<C/0+0+0>
Zone Number	**1**	<C/0+0+1>
Area Number	**2**	<C/0+0+2>
Area Address	**237**	<C/0+0+3>
QuicNet Channel	**COM1:**	(QuicNet)

Communication Addresses

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Manual Selection

Flash Start	**0**	<F/1+0+E>
Red Revert	**5.0**	<F/1+0+F>
All Red Start	**5.0**	<F/1+C+0>

Start / Revert Times

Exclusive Walk	**0**	<F/1+0+0>
Exclusive FDW	**0**	<F/1+0+1>
All Red Clear	**0.0**	<F/1+0+2>

Exclusive Ped Phase
(Outputs specified in Assignable Outputs at E/127+A+E & F)

	Phase								
Column Numbers ---->	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Row *Phase Names ---->*									Row
0 Ped Walk	**0**	**0**	**0**	**7**	**0**	**7**	**0**	**0**	**0**
1 Ped FDW	**0**	**0**	**0**	**26**	**0**	**22**	**0**	**0**	**1**
2 Min Green	**4**	**6**	**4**	**4**	**4**	**6**	**0**	**0**	**2**
3 Type 3 Disconnect	**0**	**20**	**0**	**0**	**0**	**20**	**0**	**0**	**3**
4 Added per Vehicle	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4**
5 Veh Extension	**2.0**	**3.5**	**3.0**	**3.0**	**2.0**	**3.5**	**0.0**	**0.0**	**5**
6 Max Gap	**2.0**	**3.5**	**3.0**	**3.0**	**2.0**	**3.5**	**0.0**	**0.0**	**6**
7 Min Gap	**2.0**	**3.5**	**3.0**	**3.0**	**2.0**	**3.5**	**0.0**	**0.0**	**7**
8 Max Limit	**20**	**50**	**25**	**35**	**20**	**50**	**0**	**0**	**8**
9 Max Limit 2	**30**	**50**	**30**	**40**	**30**	**50**	**0**	**0**	**9**
A Adv. / Delay Walk	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**A**
B PE Min Ped FDW	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**B**
C Cond Serv Check	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**C**
D Reduce Every	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**D**
E Yellow Change	**3.2**	**3.6**	**3.2**	**3.2**	**3.2**	**3.6**	**0.0**	**0.0**	**E**
F Red Clear	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**0.0**	**0.0**	**F**

Phase Timing - Bank 1 <C+0+F=1>

	9	**A**	**B**	**C**	**D**
	- - -	- - -	- - -	- - -	- - -
Phase 1	**0**	**0**	**0**	**0**	**0.0**
Phase 2	**20**	**0**	**0**	**0**	**0.0**
Phase 3	**0**	**0**	**0**	**0**	**0.0**
Phase 4	**20**	**0**	**0**	**0**	**0.0**
Phase 5	**0**	**0**	**0**	**0**	**0.0**
Phase 6	**20**	**0**	**0**	**0**	**0.0**
Phase 7	**0**	**0**	**0**	**0**	**0.0**
Phase 8	**20**	**0**	**0**	**0**	**0.0**
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing <C+0+F=1>

	E
RR-1 Delay	**0**
RR-1 Clear	**0**
EV-A Delay	**0**
EV-A Clear	**0**
EV-B Delay	**0**
EV-B Clear	**0**
EV-C Delay	**0**
EV-C Clear	**0**
EV-D Delay	**0**
EV-D Clear	**0**
RR-2 Delay	**0**
RR-2 Clear	**0**
View EV Delay	- - -
View EV Clear	- - -
View RR Delay	- - -
View RR Clear	- - -

Preempt Timing

	F	Row
Permit	**123456__**	**0**
Red Lock	**1___5___**	**1**
Yellow Lock	_____	**2**
Min Recall	**_2___6__**	**3**
Ped Recall	_____	**4**
View Set Peds	**- - - - -**	**5**
Rest In Walk	_____	**6**
Red Rest	_____	**7**
Dual Entry	_____	**8**
Max Recall	_____	**9**
Soft Recall	_____	**A**
Max 2	_____	**B**
Cond. Service	_____	**C**
Man Cntrl Calls	_____	**D**
Yellow Start	_____	**E**
First Phases	**_2___6__**	**F**

Phase Functions <C+0+F=1>

Row	Column Numbers ----> / Overlap Name ---->	Overlap 1	2	3	4	5	6	7	8	Row
0	Load Switch Number	0	0	0	0	0	0	0	0	0
1	Veh Set 1 - Phases									1
2	Veh Set 2 - Phases									2
3	Veh Set 3 - Phases									3
4	Neg Veh Phases									4
5	Neg Ped Phases									5
6	Green Omit Phases									6
7	Green Clear Omit Phs.									7
8										8
9										9
A										A
B										B
C										C
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	D
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	E
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	F

Overlap Assignments <C+0+E=29>

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = Solid FDW on EV
5 = Extended Status
6 = International Ped
7 = Flash - Clear Outputs
8 = Split Ring

Extra 2 Flags
1 = AWB During Initial
2 = LMU Installed
3 = Disable Min Walk
4 = QuicNet/4 System
5 = Ignore P/P on EV
6 =
7 = Reserved
8 =

Row		C	Row
0	EV-A	0	0
1	EV-B	0	1
2	EV-C	0	2
3	EV-D	0	3
4	RR-1 *	- - -	4
5	RR-2 *	- - -	5
6	SE-1	0	6
7	SE-2	0	7

Preempt Priority
<C+0+E=125>
(* RR-1 is always Highest, and RR-2 is always Second Highest)

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	2 5
B	EV-B Phases	4
C	EV-C Phases	1 6
D	EV-D Phases	3
E	Extra 1 Config. Bits	1 3
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>

	F
Ext. Permit 1 Phases	
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Preempt Non-Lock	12345678
Ped for 2P Output	2
Ped for 6P Output	6
Ped for 4P Output	4
Ped for 8P Output	8
Yellow Flash Phases	
Low Priority A Phases	
Low Priority B Phases	
Low Priority C Phases	
Low Priority D Phases	
Restricted Phases	
Extra 2 Config. Bits	

Configuration <C+0+E=125>

	F
Fast Green Flash Phase	
Green Flash Phases	
Flashing Walk Phases	
Guaranteed Passage	
Simultaneous Gap Term	12345678
Sequential Timing	
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Start-up Overlap Green	
Max Extension	
Inhibit Ped Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	123456
Start-up Ped Calls	4 6

Specials <C+0+F=2>

Flash to PE & PE Non-Lock
1 = EV A 5 = RR 1
2 = EV B 6 = RR 2
3 = EV C 7 = SE 1
4 = EV D 8 = SE 2

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Row		2	Row
0			0
1	Phase 1	10	1
2	Phase 2	10	2
3	Phase 3	10	3
4	Phase 4	10	4
5	Phase 5	10	5
6	Phase 6	10	6
7	Phase 7	10	7
8	Phase 8	10	8
9			9
A			A
B			B
C			C
D			D
E			E
F			F

Coordination Transition Minimums
<C+0+C=5>

Coord Extra
1 = Programmed WALK Time for Sync Phases
2 = Always Terminate Sync Phase Peds

Row	Column Numbers ---->	Plan 1	2	3	4	5	6	7	8	9	Row
	Plan Name ----->										
0	Cycle Length	100	100	100	100	100	100	100	100	100	0
1	Phase 1 - ForceOff	55	55	55	55	55	55	55	55	55	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	20	20	20	20	20	20	20	20	20	3
4	Phase 4 - ForceOff	40	40	40	40	40	40	40	40	40	4
5	Phase 5 - ForceOff	55	55	55	55	55	55	55	55	55	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	20	20	20	20	20	20	20	20	20	7
8	Phase 8 - ForceOff	40	40	40	40	40	40	40	40	40	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset 1	0	0	0	0	0	0	0	0	0	A
B	Offset 2	0	0	0	0	0	0	0	0	0	B
C	Offset 3	0	0	0	0	0	0	0	0	0	C
D	Perm 1 - End	15	15	15	15	15	15	15	15	15	D
E	Hold Release	255	255	255	255	255	255	255	255	255	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

Coordination - Bank 1 <C+0+C=1>

Row		E	Row
1	Plan 1 - Sync	_2___6__	1
2	Plan 2 - Sync	_2___6__	2
3	Plan 3 - Sync	_2___6__	3
4	Plan 4 - Sync	_2___6__	4
5	Plan 5 - Sync	_2___6__	5
6	Plan 6 - Sync	_2___6__	6
7	Plan 7 - Sync	_2___6__	7
8	Plan 8 - Sync	_2___6__	8
9	Plan 9 - Sync	_2___6__	9
A	NEMA Sync	_____	A
B	NEMA Hold	_____	B
C			C
D			D
E	Coord Extra	_____	E
F			F

Sync Phases <C+0+C=1>

Row		1	2	3	4	5	6	7	8	9	Row
0	Ped Adjustment	0	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0	1
2	Perm 2 - End	0	0	0	0	0	0	0	0	0	2
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0	3
4	Perm 3 - End	0	0	0	0	0	0	0	0	0	4
5	Reservice Time	0	0	0	0	0	0	0	0	0	5
6	Reservice Phases										6
7											7
8	Pretimed Phases										8
9	Max Recall										9
A	Perm 1 Veh Phase	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	A
B	Perm 1 Ped Phase	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	B
C	Perm 2 Veh Phase										C
D	Perm 2 Ped Phase										D
E	Perm 3 Veh Phase										E
F	Perm 3 Ped Phase										F

Coordination - Bank 2 <C+0+C=2>

Row		F	Row
1	Free Lag	_2_4_6_8	1
2	Plan 1 - Lag	_2_4_6_8	2
3	Plan 2 - Lag	_2_4_6_8	3
4	Plan 3 - Lag	_2_4_6_8	4
5	Plan 4 - Lag	_2_4_6_8	5
6	Plan 5 - Lag	_2_4_6_8	6
7	Plan 6 - Lag	_2_4_6_8	7
8	Plan 7 - Lag	_2_4_6_8	8
9	Plan 8 - Lag	_2_4_6_8	9
A	Plan 9 - Lag	_2_4_6_8	A
B	External Lag	_____	B
C			C
D			D
E			E
F			F

Lag Phases <C+0+C=1>

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set Monday	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	0	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	0	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	0	Plan 3	0	Reserved	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	0	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	51	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	0	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	0	NOT-1	0	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	0	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	0	OR-1 (b)	0	AND-1 (b)	0	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	0	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs <C+0+E=126>

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	0	NOT-1	0	TOD Out 1	0	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	0	OR-1	0	TOD Out 2	0	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	0	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	0	OR-2	0	TOD Out 3	0	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	0	OR-3	0	TOD Out 4	0	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	0	AND-1	0	TOD Out 5	0	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	0	AND-2	0	TOD Out 6	0	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	0	AND-3	0	TOD Out 7	0	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	0	NOT-2	0	TOD Out 8	0	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	0	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	0	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	0	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs <C+0+E=127>

Row	Column Numbers ----> / Phase Names ---->	Phase 1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	7	0	7	0	0
1	Ped FDW	0	0	0	26	0	22	0	0
2	Min Green	4	6	4	4	4	6	0	0
3	Type 3 Disconnect	0	20	0	0	0	20	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
6	Max Gap	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
7	Min Gap	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
8	Max Limit	20	50	25	35	20	50	0	0
9	Max Limit 2	30	50	30	40	30	50	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Check	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.2	3.6	3.2	3.2	3.2	3.6	0.0	0.0
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0

Phase Timing - Bank 2 <C+0+F=2>

	9	A	B	C	D
	- - -	- - -	- - -	- - -	- - -
Phase 1	0	0	0	0	0.0
Phase 2	20	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	20	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	20	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	20	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

Transition Type
0.X = Shortway
1.X = Lengthen
X.1 thru X.4 = Number of cycles when lengthing

Transition Type	0.3	<C/5+1+9>

TBC Transition

Lag Hold Phases	_____	<C/5+1+A>

Coordinated Lag Hold Phases

Sync Output Time	0.0	<C/5+1+C>

7-Wire Master

Daylight Savings Date
If set to all zeros, standard dates will be used.

Begin Month	4	<C/5+2+A>
Begin Week	1	<C/5+2+B>
End Month	10	<C/5+2+C>
End Week	5	<C/5+2+D>

Daylight Savings Time

Time B4 Yellow	0.0	<F/1+C+E>
Phase Number	0	<F/1+C+F>

Advance Warning Beacon - Sign 1

Time B4 Yellow	0.0	<F/1+D+E>
Phase Number	0	<F/1+D+F>

Advance Warning Beacon - Sign 2

Long Failure	0.7	<F/1+0+6>
Short Failure	0.7	<F/1+0+7>

Power Cycle Correction (Default = 0.7)

Row		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	7	0	7	0	0
1	Ped FDW	0	0	0	26	0	22	0	0
2	Min Green	4	6	4	4	4	6	0	0
3	Type 3 Disconnect	0	20	0	0	0	20	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
6	Max Gap	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
7	Min Gap	2.0	3.5	3.0	3.0	2.0	3.5	0.0	0.0
8	Max Limit	20	50	25	35	20	50	0	0
9	Max Limit 2	30	50	30	40	30	50	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Check	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.2	3.6	3.2	3.2	3.2	3.6	0.0	0.0
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0

Phase Timing - Bank 3 <C+0+F=3>

	9	A	B	C	D
	- - -	- - -	- - -	- - -	- - -
Phase 1	0	0	0	0	0.0
Phase 2	20	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	20	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	20	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	20	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

Column Numbers ----->		0	1	2	3	1	3	
Row	*Detector Name*	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over	Row
0		39	___45_7_	_2_____	123___8	0.0	0.0	0
1		40	___45_7_	_____6__	123___8	0.0	0.0	1
2		41	___45_7_	___4____	123___8	0.0	0.0	2
3		42	___45_7_	__3_____	123___8	0.0	0.0	3
4		43	___45_7_	_2_____	123___8	0.0	0.0	4
5		44	___45_7_	_____6__	123___8	0.0	0.0	5
6		45	___45_7_	___4____	123___8	0.0	0.0	6
7		46	___45_7_	__3_____	123___8	0.0	0.0	7
8		47	_____67_	_2_____	123___8	0.0	0.0	8
9		48	_____67_	_____6__	123___8	0.0	0.0	9
A		49	_____67_	___4____	123___8	0.0	0.0	A
B		50	_____67_	_______8	123___8	0.0	0.0	B
C		55	___45_7_	____5___	123___8	0.0	0.0	C
D		56	___45_7_	1_______	123___8	0.0	0.0	D
E		57	___45_7_	_____7_	123___8	0.0	0.0	E
F		58	___45_7_	__3_____	123___8	0.0	0.0	F

		4	5	6	7	2	4	
Row	*Detector Name*	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over	Row
0		59	___45_7_	____5___	123___8	0.0	0.0	0
1		60	___45_7_	1_______	123___8	0.0	0.0	1
2		61	___45_7_	_____7_	123___8	0.0	0.0	2
3		62	___45_7_	__3_____	123___8	0.0	0.0	3
4		63	___45_7_	_2_____	123___8	0.0	0.0	4
5		64	___45_7_	_____6__	123___8	0.0	0.0	5
6		65	___45_7_	___4____	123___8	0.0	0.0	6
7		66	___45_7_	__3_____	123___8	0.0	0.0	7
8		67	_2_____	_2_____	123___8	0.0	0.0	8
9		68	_2_____	_____6__	123___8	0.0	0.0	9
A		69	_2_____	___4____	123___8	0.0	0.0	A
B		70	_2_____	_______8	123___8	0.0	0.0	B
C		76	___45_7_	_2_____	123___8	0.0	0.0	C
D		77	___45_7_	_____6__	123___8	0.0	0.0	D
E		78	___45_7_	___4____	123___8	0.0	0.0	E
F		79	___45_7_	__3_____	123___8	0.0	0.0	F

Detector Assignments <C+0+E=126> <C+0+D=0>

Detector Attributes
1 = Full Time Delay
2 = Ped Call
3 =
4 = Count
5 = Extension
6 = Type 3
7 = Calling
8 = Alternate

Det. Assignments
1 = Det. Set 1
2 = Det. Set 2
3 = Det. Set 3
4 =
5 =
6 = Failure - Min Recall
7 = Failure - Max Recall
8 = Report on Failure

	Ped / Phase / Overlap								
Column Numbers ----->	1	2	3	4	5	6	7	8	Row
Walk	0	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0	1
Phase Green	0	0	0	0	0	0	0	0	2
Phase Yellow	0	0	0	0	0	0	0	0	3
Phase Red	0	0	0	0	0	0	0	0	4
Overlap Green	0	0	0	0	0	0	0	0	5
Overlap Yellow	0	0	0	0	0	0	0	0	6
Overlap Red	0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

Cabinet Type	0	<E/125+D+0>

Enable Redirection
(Enable Redirection = 30)

Max OFF (minutes)	20	<D/0+0+1>
Max ON (minutes)	7	<D/0+0+2>

Detector Failure Monitor

	D	Row
		0
Output Port 1	_____	1
Output Port 2	_____	2
Output Port 3	_____	3
Output Port 4	_____	4
Output Port 5	_____	5
Output Port 6	_____	6
Output Port 7	_____	7

Dimming <C+0+E=125>

	D
Number of Digits	0
1 st Digit	0
2 ed Digit	0
3 ed Digit	0
4 th Digit	0
5 th Digit	0
6 th Digit	0
7 th Digit	0
8 th Digit	0
9 th Digit	0
10 th Digit	0
11 th Digit	0
12 th Digit	0
13 th Digit	0
14 th Digit	0
15 th Digit	0

<C+0+C=5>

Dial-Back Telephone Number

Disable Alarms
1 = Stop Time
2 = Flash Sense
3 = Keyboard Entry
4 = Manual Plan
5 = Police Control
6 = External Alarm
7 = Detector Failure
8 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

Delay Logic Times
<C+0+D=0> (seconds)

Omit Alarm	_____	<C/5+F+0>

Disable Alarm Reporting

Time	10	<C/5+C+0>

Redial Time (minutes)
(View Redial Timer at E/2+D+6)

Row	Time	Plan	Offset	Day of Week
0	00 : 00	0	0	
1	00 : 00	0	0	
2	00 : 00	0	0	
3	00 : 00	0	0	
4	00 : 00	0	0	
5	00 : 00	0	0	
6	00 : 00	0	0	
7	00 : 00	0	0	
8	00 : 00	0	0	
9	00 : 00	0	0	
A	00 : 00	0	0	
B	00 : 00	0	0	
C	00 : 00	0	0	
D	00 : 00	0	0	
E	00 : 00	0	0	
F	00 : 00	0	0	

TOD Coordination <C+0+9=0.1>
(Bank 1)

Time	Funct.	Day of Week
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	

TOD Function <C+0+7=0.1>

Column 4 Phases/Bits

<C+0+E=27>

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.1>
(Bank 1)

Time	Plan	Offset	Holiday Type
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	

Holiday Events <C+0+9=1.1>
(Bank 1)

T.O.D. Functions
0 =
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 4 - Disable Detector OFF Monitor
Bit 5 - Disable Low Priority Preempt
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 8

Row	Time	Plan	Offset	Day of Week
0	00 : 00	0	0	
1	00 : 00	0	0	
2	00 : 00	0	0	
3	00 : 00	0	0	
4	00 : 00	0	0	
5	00 : 00	0	0	
6	00 : 00	0	0	
7	00 : 00	0	0	
8	00 : 00	0	0	
9	00 : 00	0	0	
A	00 : 00	0	0	
B	00 : 00	0	0	
C	00 : 00	0	0	
D	00 : 00	0	0	
E	00 : 00	0	0	
F	00 : 00	0	0	

TOD Coordination <C+0+9=0.2>
(Bank 2)

Time	Funct.	Holiday Type
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	
00 : 00	0	

Holiday TOD Function <C+0+7=0.2>

Column 4 Phases/Bits

<C+0+E=28>

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.2>
(Bank 2)

Time	Plan	Offset	Holiday Type
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	
00 : 00	0	0	

Holiday Events <C+0+9=1.2>
(Bank 2)

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Offset Select
A = Offset A
B = Offset B
C = Offset C

Month Select
1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Output
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Notes:

0 <E/27+5+F>
Limited Service Interval

Special Event Schedule -- Table 1 <C+0+E=27>

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Output
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Notes:

0 <E/28+5+F>
Limited Service Interval

Special Event Schedule -- Table 2 <C+0+E=28>

Min Time (seconds) **0** <F/1+0+8>
Min Green Before PE Force Off

Max Time (minutes) **255** <F/1+0+9>
Max Preempt Time Before Failure

Min Time (seconds) **0** <F/1+0+A>
Min Time Between Same Preempts
(Does Not Apply To Railroad Preempt)

Low Pri. Channel _____ <E/125+C+8>
Disable Low Priority Channel

Low Priority
1 = Channel A
2 = Channel B
3 = Channel C
4 = Channel D

Delay Time (seconds) **0** <F/1+A+D>
Bus Delay

Max Time (seconds) **0** <F/1+A+E>
Max Early Green

Max Time (seconds) **0** <F/1+A+F>
Max Green Extension

Row	Time	Headway	Direction	Day of Week
0	00 : 00	0	0	_____
1	00 : 00	0	0	_____
2	00 : 00	0	0	_____
3	00 : 00	0	0	_____
4	00 : 00	0	0	_____
5	00 : 00	0	0	_____
6	00 : 00	0	0	_____
7	00 : 00	0	0	_____
8	00 : 00	0	0	_____
9	00 : 00	0	0	_____
A	00 : 00	0	0	_____
B	00 : 00	0	0	_____
C	00 : 00	0	0	_____
D	00 : 00	0	0	_____
E	00 : 00	0	0	_2____
F	00 : 00	0	0	_2345__

Headway <C+0+9=2.1>

Headway Time
(minutes)
1 thru 9 = 1 thru 9
A = 10
B = 11
C = 12
D = 13
E = 14
F = 15

Low Priority Preemption (Bus Priority)

Only available with *Program 233RV2.B* (and above)
Note: Also see "Time of Day Functions", Function E, Bit 5 (Disable Low Priority)

INTERSECTION: NC Bay Marina Dr & Marina Way

Group Assignment: **NONE**
Field Master Assignment: **NONE**
System Reference Number: **236**

N/S Street Name: **Marina Way**
E/W Street Name: **Bay Marina Dr**

Last Database Change: **11/5/2015 11:56**

Change Record					
Change	By	Date	Change	By	Date

Notes: ***Signal Timing Plan for Temporary Construction***
1) Pull detector cards for all phases

Drop Number	**32**	<C+0+0>
Zone Number		<C+0+1>
Area Number	**2**	<C+0+2>
Area Address	**236**	<C+0+3>
QuicNet Channel	**COM1:**	(QuicNet)

Communication Addresses

Manual Plan		<C+A+1>
Manual Offset		<C+B+1>

Manual Selection

Max Initial	**20**	<F+0+E>
Red Revert	**5.0**	<F+0+F>
All Red Start	**5.0**	<F+C+0>

Start / Revert Times

Row	Column Numbers ----> / Phase Names ---->	Phase 1	2	3	4	5	6	7	8
0	Ped Walk	0	5	0	0	0	0	0	5
1	Ped FDW	0	12	0	0	0	0	0	22
2	Min Green	8	8	0	0	0	8	0	8
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	0.0	0.0	0.0	3.0	0.0	1.5
6	Max Gap	2.0	3.0	0.0	0.0	0.0	3.0	0.0	1.5
7	Min Gap	2.0	3.0	0.0	0.0	0.0	3.0	0.0	1.5
8	Max Limit	23	23	0	0	0	23	0	31
9	Max Limit 2	0	0	0	0	0	0	0	0
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.0	3.6	0.0	0.0	0.0	3.6	0.0	3.6
F	Red Clear	1.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0

Phase Timing - Bank 1 <F Page>

	E
RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	1
EV-B Delay	0
EV-B Clear	1
EV-C Delay	0
EV-C Clear	1
EV-D Delay	0
EV-D Clear	1
RR-2 Delay	0
RR-2 Clear	23
View EV Delay	- - -
View EV Clear	- - -
View RR Delay	- - -
View RR Clear	- - -

Preempt Timing

Row		F
0	Permit	12___6_8
1	Red Lock	_____
2	Yellow Lock	_____8
3	Min Recall	_2___6__
4	Ped Recall	_____
5	*View Set Peds*	- - - - -
6	Rest In Walk	_____
7	Red Rest	_____
8	Dual Entry	_____
9	Max Recall	_____
A	Soft Recall	_2___6__
B	Max 2	_____
C	Cond. Service	_____
D	Man Cntrl Calls	_____
E	Yellow Start	_____8
F	First Phases	_2___6__

Phase Functions <F Page>

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Coordination

Row	Column Numbers ---->	Plan 1	2	3	4	5	6	7	8	9	Row
	Plan Name ---->										
0	Cycle Length	100	100	100	100	100	100	100	100	100	0
1	Phase 1 - ForceOff	65	65	65	65	65	65	65	65	65	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	25	25	25	25	25	25	25	25	25	3
4	Phase 4 - ForceOff	40	40	40	40	40	40	40	40	40	4
5	Phase 5 - ForceOff	65	65	65	65	65	65	65	65	65	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	25	25	25	25	25	25	25	25	25	7
8	Phase 8 - ForceOff	40	40	40	40	40	40	40	40	40	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset 1	0	0	0	0	0	0	0	0	0	A
B	Offset 2	0	0	0	0	0	0	0	0	0	B
C	Offset 3	0	0	0	0	0	0	0	0	0	C
D	Permissive	12	12	12	12	12	12	12	12	0	D
E	Hold Release	255	255	255	255	255	255	255	255	0	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

Coordination <C Page>

(* = Coordination Recall)

Sync Phases

Row		E	Row
0			0
1	Plan 1 - Sync	_2___6__	1
2	Plan 2 - Sync	_2___6__	2
3	Plan 3 - Sync	_2___6__	3
4	Plan 4 - Sync	_2___6__	4
5	Plan 5 - Sync	_2___6__	5
6	Plan 6 - Sync	_2___6__	6
7	Plan 7 - Sync	_2___6__	7
8	Plan 8 - Sync	_2___6__	8
9	Plan 9 - Sync	_2___6__	9
A	Coord Ped *	_____	A
B	NEMA Hold	_____	B
C			C
D			D
E			E
F			F

Sync Phases <C Page>

Configuration

Row	Column Numbers ---->	E
0	Exclusive Phases	_____
1	RR-1 Clear Phases	_____
2	RR-2 Clear Phases	_2_____
3	RR-2 Limited Service	1_____
4	Prot / Perm Phases	_____
5	Overlap A - Green Omit	_____
6	Overlap B - Green Omit	_____
7	Overlap C - Green Omit	_____
8	Overlap D - Green Omit	_____
9	Overlap Yellow Flash	_____
A	EV-A Phases	_2_____
B	EV-B Phases	_____
C	EV-C Phases	1___6__
D	EV-D Phases	_____8
E	Extra 1 Config. Bits	1_____
F	IC Select (Interconnect)	_2_____

Configuration <E Page>

Configuration

	F
RR Overlap A - Phases	_____
RR Overlap B - Phases	_____
RR Overlap C - Phases	_____
RR Overlap D - Phases	_____
Ped 2P	_2_____
Ped 6P	_____
Ped 4P	_____
Ped 8P	_____8
Yellow Flash Phases	_____
Overlap A - Phases	_____
Overlap B - Phases	_____
Overlap C - Phases	_____
Overlap D - Phases	_____
Restricted Phases	_____
Assign 5 Outputs	_____

Configuration <E Page>

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 =
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

Assign 5 Outputs
(Ped Loadswitch Yellows)
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Force-Off Adjust	0

Coord Force-Off Adjust for Ped Service <C+D+F>

Transition Type	0

TBC Transition <C+D+D>

Transition Type
0 = Shortway
Non-zero = Lengthen

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Lag Phases

Row		F	Row
0	Free Lag	_2_4_6_8	0
1	Plan 1 - Lag	_2_4_6_8	1
2	Plan 2 - Lag	_2_4_6_8	2
3	Plan 3 - Lag	_2_4_6_8	3
4	Plan 4 - Lag	_2_4_6_8	4
5	Plan 5 - Lag	_2_4_6_8	5
6	Plan 6 - Lag	_2_4_6_8	6
7	Plan 7 - Lag	_2_4_6_8	7
8	Plan 8 - Lag	_2_4_6_8	8
9	Plan 9 - Lag	_2_4_6_8	9
A	Coord Max *	_____	A
B	Coord Lag *	_____	B
C			C
D			D
E			E
F			F

Lag Phases <C Page>

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination
<9 Key with C+D+9=0>

Time	Funct.	Day of Week	Column F Phases/Bits
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function
<7 Key>

<D Page>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 1
TOD Coordination
<9 Key with C+D+9=1>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 2
TOD Coordination
<9 Key with C+D+9=2>

Time	Plan	Offset	Day of Week	Row
00:00	0	0		0
00:00	0	0		1
00:00	0	0		2
00:00	0	0		3
00:00	0	0		4
00:00	0	0		5
00:00	0	0		6
00:00	0	0		7
00:00	0	0		8
00:00	0	0		9
00:00	0	0		A
00:00	0	0		B
00:00	0	0		C
00:00	0	0		D
00:00	0	0		E
00:00	0	0		F

Holiday # 3
TOD Coordination
<9 Key with C+D+9=3>

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Offset Select
A = Offset A
B = Offset B
C = Offset C

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Month Select
1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Row		Day	Year	Month	Day of Week
A	Holiday # 1 Date	0	0	0	
B	Holiday # 2 Date	0	0	0	
C	Holiday # 3 Date	0	0	0	

Holiday Dates
<8 Key>

Row	1 Delay	3 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		I-1	14
1	0.0	0.0		I-2U	1
2	0.0	0.0		I-2L	5
3	0.0	0.0		I-3U	21
4	0.0	0.0		I-3L	25
5	0.0	0.0		I-4	9
6	0.0	0.0		I-5	16
7	0.0	0.0		I-6U	3
8	0.0	0.0		I-6L	7
9	0.0	0.0		I-7U	23
A	0.0	0.0		I-7L	27
B	0.0	0.0		I-8	11
C	0.0	0.0		I-9U	18
D	0.0	0.0		I-9L	20
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Row	2 Delay	4 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		J-1	13
1	0.0	0.0		J-2U	2
2	0.0	0.0		J-2L	6
3	0.0	0.0		J-3U	22
4	0.0	0.0		J-3L	26
5	0.0	0.0		J-4	10
6	0.0	0.0		J-5	15
7	0.0	0.0		J-6U	4
8	0.0	0.0		J-6L	8
9	0.0	0.0		J-7U	24
A	0.0	0.0		J-7L	28
B	0.0	0.0		J-8	12
C	0.0	0.0		J-9U	17
D	0.0	0.0		J-9L	19
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Detector Delay & Carryover <D Page>

Row		9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
A	Overlap A	0.0	0.0	0.0	0
B	Overlap B	0.0	0.0	0.0	0
C	Overlap C	0.0	0.0	0.0	0
D	Overlap D	0.0	0.0	0.0	0

Overlap Timing <F Page> <D Page>

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Note: Initialized data is for all detectors to be active (ie, all flag bits set). A Detector which is "not flagged", will not be active as a Phase Detector, and WILL NOT call or extend its associated phase. It will still function as a System Detector.

Row		0 Detector Number
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (minutes)	5	<D+A+E>
Max OFF (minutes)	60	<D+A+F>

Detector Failure Monitor

Phase Number	0	<F+C+1>
Time Before Yellow	0.0	<F+C+3>

Advance Warning Beacon - Sign 1

Phase Number	0	<F+D+1>
Time Before Yellow	0.0	<F+D+3>

Advance Warning Beacon - Sign 2

Long Failure	0.0	<F+0+6>
Short Failure	0.0	<F+0+7>

Power Cycle Correction (Default = 0.5)

Disable Parity	0	<D+B+0>

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	10	0	10	0	10	0	10
2	Min Green	3	7	3	7	3	7	3	7
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	1.2	0.0	1.2	0.0	1.2	0.0	1.2
5	Veh Extension	0.5	3.5	0.5	3.5	0.5	3.5	0.5	3.5
6	Max Gap	0.5	5.0	0.5	5.0	0.5	5.0	0.5	5.0
7	Min Gap	0.5	2.0	0.5	2.0	0.5	2.0	0.5	2.0
8	Max Limit	17	40	17	40	17	40	17	40
9	Max Limit 2	30	70	30	70	30	70	30	70
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
D	Reduce Every	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
E	Yellow Change	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
F	Red Clear	0.0	0.5	0.0	1.0	0.0	0.5	0.0	1.0

Phase Timing - Bank 2 <F Page>

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	10	0	10	0	10	0	10
2	Min Green	3	7	3	7	3	7	3	7
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	1.2	0.0	1.2	0.0	1.2	0.0	1.2
5	Veh Extension	0.5	3.5	0.5	3.5	0.5	3.5	0.5	3.5
6	Max Gap	0.5	5.0	0.5	5.0	0.5	5.0	0.5	5.0
7	Min Gap	0.5	2.0	0.5	2.0	0.5	2.0	0.5	2.0
8	Max Limit	17	40	17	40	17	40	17	40
9	Max Limit 2	30	70	30	70	30	70	30	70
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
D	Reduce Every	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
E	Yellow Change	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
F	Red Clear	0.0	0.5	0.0	1.0	0.0	0.5	0.0	1.0

Phase Timing - Bank 3 <F Page>

Row		7 Time	8 Dwell	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Output	Row	
0	Delay Only --->	0	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	0	
1		0	0								1	
2		0	0								2	
3		0	0								3	
4		0	0								4	
5		0	0								5	
6		0	0								6	
7		0	0								7	
8		0	0								8	
9	Limited Service	0	0								9	
A	Int. --->	- - -	0								A	**<--- Limited Service Interval** (Set Dwell = 255)
B		0	0								B	
C		0	0								C	
D		0	0								D	
E		0	0								E	
F		0	0								F	

Special Event Schedule <C Page with F+9+F=22>

LOCATION: **RTE 5 NB @ 24th Street**

CALTRANS C8 Version 3 DATE: 4/11/13

.F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9
0	WALK	1	1	1	1	1	7	1	1	CLK RST
1	DONT WALK	1	1	1	1	1	18	1	1	
2	MIN GREEN	1	5	1	1	5	5	1	5	
3	TYPE 3 DET	0	0	0	0	0	0	0	0	
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	PASSAGE	0.9	5.0	0.9	0.9	2.0	5.0	0.9	2.0	
6	MAX GAP	0.9	7.0	0.9	0.9	2.0	7.0	0.9	2.0	
7	MIN GAP	0.9	3.0	0.9	0.9	2.0	3.0	0.9	2.0	
8	MAX EXT	9	35	9	9	25	35	9	20	
9	MAX 2									YR
A	MAX 3					35				MO
B										DAY
C	REDUCE BY	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	DOW
D	EVERY	1.0	0.6	1.0	1.0	1.0	0.6	1.0	1.0	HR
E	YELLOW	3.0	3.6	3.0	3.0	3.2	3.6	3.0	3.6	MIN
F	RED	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	SEC
3.5'	PED XING FT						75'			

	PRE-EMPTION E		F FLAGS	1	2	3	4	5	6	7	8	
	EV SEL	0	PERMIT		2			5	6		8	0
	RR1 CLR	5	RED LOCK									1
	EVA DLY	0	YEL LOCK									2
	EVA CLR	5	V RECALL		2				6			3
	EVB DLY	0	P RECALL									4
	EVB CLR	5	PED PHASES						6			5
	EVC DLY	0	RT OLA									6
	EVC CLR	5	RT OLB									7
	EVD DLY	0	DBL ENTRY									8
	EVD CLR	5	MAX 2 PHASES									9
	MAX EV	255	LAG PHASES	READ ONLY								A
	RR2 CLR	5	RED REST									B
			REST-IN-WALK									C
			MAX 3 PHASES					5				D
			YEL START UP		2				6			E
			FIRST PHASE								8	F
				1	2	3	4	5	6	7	8	

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	0
FOF	5

FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

NOTES:

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY

LOCATION: **RTE 5 NB @ 24th Street**

CALTRANS C8 Version 3 DATE: 8/18/11

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE	FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E	F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH	80	90	100											LAG FZ FREE		2		4		6		8	0
1	FZ1 GRN FCTR													GAPOUT CP1	LAG FZ CP 1		2		4		6		8	1
2														GAPOUT CP2	LAG FZ CP 2		2		4		6		8	2
3	FZ3 GRN FCTR													GAPOUT CP3	LAG FZ CP 3		2		4		6		8	3
4	FZ4 GRN FCTR										PERM TIME			GAPOUT CP4	LAG FZ CP 4									4
5	FZ5 GRN FCTR	20	25	30							LAG OFFSET			GAPOUT CP5	LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6	LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7	LAG FZ CP 7									7
8	FZ8 GRN FCTR	20	22	25							NO GREEN			GAPOUT CP8	LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9	LAG FZ CP 9									9
A	OFFSET A	40	45	50							OFFSET				LAG C COORD									A
B	OFFSET B	40	45	50											LAG D COORD									B
C	OFFSET C	40	45	50											COORD FAZES		2				6			C
D	FZ 3 EXT																							D
E	FZ 7 EXT																							E
F	OFFSET INTRPT																							F
																1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:
NB OFF

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		1
2		
3		
4		
5		
6		
7		
8		

COO = 1

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

D PAGE

	D MAX RCL	FLAGS 1	2	3	4	5	6	7	8	E MIN RCL	FLAGS 1	2	3	4	5	6	7	8	F PED RCL	FLAGS 1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1					5				CP 1								8	CP 1								
2	CP 2					5				CP 2								8	CP 2								
3	CP 3					5				CP 3								8	CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E FUNCTION	FLAGS 1	2	3	4	5	6	7	8	F FUNCTION	FLAGS 1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE									4
5										2 PED		2							5
6										6 PED						6			6
7										4 PED				4					7
8										8 PED								8	8
9																			9
A	OLA NOT									OLA ON									A
B	OLB NOT									OLB ON									B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E
MINUTE = D-B-E
DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES
(CALL ACTIVE LIGHTS)
RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES
(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F
MINUTE = D-B-F
DAY = D-C-F

D-E-E = C8 VERSION NUMBER
D-E-F = LITHIUM BATTERY CONDITION
84 = BAD
85 = GOOD

LOCATION: **RTE 5 NB @ 24th Street**

CALTRANS C8 Version 3 DATE: 11/26/12

7 PAGE

9 PAGE C09 = 0 or 1

9 PAGE C09 = 2

TIME OF DAY ACTIVITY TABLE												
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS												
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	**06**	**00**	**3**	**ON**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	**18**	**00**	**3**		**1**	**2**	**3**	**4**	**5**	**6**	**7**
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	**06**	**00**	**1**	**A**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	**18**	**00**	**E**	**A**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED
7 ENERGIZE AUX OUTPUT-GREEN
8 ENERGIZE AUX OUTPUT-YELLOW
9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

LOCATION: **RTE 5 NB @ 24th Street**

CALTRANS C8 Version 3 DATE: 4/11/13 PAGE 5

E PAGE D PAGE

F+C+F+1+2+3+E+B+ E+PHASES or TYPE+EVENT NO.									
		PHASES C		TYPE D			PHASES E		TYPE F
0	I1	1		5,6		J1	5	5,6	
1	I2U	2		5,6		J2U	6	5 5,6	
2	I2L	2		5,6		J2L	6	5 5,6	
3	I3U	2		5,6		J3U	6	5,6	
4	I3L	2		5		J3L	6	5	5,6
5	I4	2		7,8		J4	6	7,8	
6	I5	3		5,6		J5	7	5,6	
7	I6U	4		5,6		J6U	8	5,6	
8	I6L	4		5,6		J6L	8	5,6	
9	I7U	4		5,6		J7U	8	5,6	
A	I7L	4		5		J7L	8	5	
B	I8	4		7,8		J8	8	7,8	5,6
C	I9U	1		5,6		J9U	5	5,6	
D	I9L	3		5,6		J9L	7	5,6	

DETECTOR TYPE

1 RED LOCK

2 YELLOW LOCK

5 EXTENSION

6 COUNT

7 CALLING

8 TYPE 3 DISCONNECT

DETECTOR SETTINGS									
I FILE					J FILE				
	DELAY		CARRYOVER			DELAY		CARRYOVER	
I1	D10		D30		J1	D2O	2.0	D4O	
I2U	D11		D31		J2U	D21		D41	
I2L	D12		D32		J2L	D22		D42	
I3U	D13		D33		J3U	D23		D43	
I3L	D14		D34		J3L	D24		D44	
I4	D15		D35		J4	D25		D45	
I5	D16		D36		J5	D26		D46	
I6U	D17		D37		J6U	D27		D47	
I6L	D18		D38		J6L	D28		D48	
I7U	D19		D39		J7U	D29		D49	
I7L	D1A		D3A		J7L	D2A	7.0	D4A	
I8	D1B		D3B		J8	D2B		D4B	
I9U	D1C		D3C		J9U	D2C		D4C	
I9L	D1D		D3D		J9L	D2D		D4D	

REASSIGNS DETECTORS TO VARIOUS PHASES / FUNCTIONS

F-C-F MUST EQUAL ZERO WHEN FINISHED

LOWER CASE NUMBERS ARE DEFAULT VALUES

BLANK SPACES CONTAIN DEFAULTS (DO NOT ZERO OUT)

LOCATION: **RTE 5 SB @ 24th Street - Mile of Cars**

CALTRANS C8 Version 3 DATE: 1/14/13 PAGE 1

F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9
0	WALK	1	1	1	1	1	7	1	1	CLK RST
1	DONT WALK	1	1	1	1	1	16	1	1	
2	MIN GREEN	5	10	1	5	1	10	1	1	
3	TYPE 3 DET	0	0	0	0	0	0	0	0	
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	PASSAGE	2.0	5.0	0.9	2.0	0.9	5.0	0.9	0.9	
6	MAX GAP	2.0	7.0	0.9	2.0	0.9	7.0	0.9	0.9	
7	MIN GAP	2.0	3.0	0.9	2.0	0.9	3.0	0.9	0.9	
8	MAX EXT	30	30	9	30	9	30	9	9	
9	MAX 2									YR
A	MAX 3	45								MO
B										DAY
C	REDUCE BY	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	DOW
D	EVERY	1.0	0.6	1.0	1.0	1.0	0.6	1.0	1.0	HR
E	YELLOW	3.2	3.6	3.0	3.6	3.0	3.6	3.0	3.0	MIN
F	RED	1.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	SEC
3.5'	PED XING FT						70'			
	BIKE XING FT		45'				65'			

PRE-EMPTION E		FLAGS	1	2	3	4	5	6	7	8	
EV SEL	0	PERMIT	1	2		4		6			0
RR1 CLR	5	RED LOCK	1			4					1
EVA DLY	0	YEL LOCK									2
EVA CLR	5	V RECALL		2				6			3
EVB DLY	0	P RECALL									4
EVB CLR	5	PED PHASES						6			5
EVC DLY	0	RT OLA									6
EVC CLR	5	RT OLB									7
EVD DLY	0	DBL ENTRY									8
EVD CLR	5	MAX 2 PHASES									9
MAX EV	255	LAG PHASES	READ ONLY								A
RR2 CLR	5	RED REST									B
		REST-IN-WALK									C
		MAX 3 PHASES	1								D
		YEL START UP		2				6			E
		FIRST PHASE				4					F
			1	2	3	4	5	6	7	8	

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	0
FOF	5

FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

NOTES:

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY ▒

LOCATION: **RTE 5 SB @ 24th Street - Mile of Cars**

CALTRANS C8 Version 3 DATE: 8/18/11 PAGE 2

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE	FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E	F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH	80	90	100											LAG FZ FREE		2		4		6		8	0
1	FZ1 GRN FCTR	20	25	30										GAPOUT CP1	LAG FZ CP 1		2		4		6		8	1
2														GAPOUT CP2	LAG FZ CP 2		2		4		6		8	2
3	FZ3 GRN FCTR													GAPOUT CP3	LAG FZ CP 3		2		4		6		8	3
4	FZ4 GRN FCTR	20	22	25							PERM TIME			GAPOUT CP4	LAG FZ CP 4									4
5	FZ5 GRN FCTR										LAG OFFSET			GAPOUT CP5	LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6	LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7	LAG FZ CP 7									7
8	FZ8 GRN FCTR										NO GREEN			GAPOUT CP8	LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9	LAG FZ CP 9									9
A	OFFSET A										OFFSET				LAG C COORD									A
B	OFFSET B														LAG D COORD									B
C	OFFSET C														COORD FAZES		2				6			C
D	FZ 3 EXT																							D
E	FZ 7 EXT																							E
F	OFFSET INTRPT																							F
																1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:
NB OFF

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		
2		2
3		
4		
5		
6		
7		
8		

COO = 2

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

LOCATION: **RTE 5 SB @ 24th Street - Mile of Cars**

CALTRANS C8 Version 3 DATE: 8/18/11

D PAGE

	D	FLAGS								E	FLAGS								F	FLAGS							
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1	1								CP 1				4					CP 1								
2	CP 2	1								CP 2				4					CP 2								
3	CP 3	1								CP 3				4					CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E	FLAGS								F	FLAGS								
	FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE									4
5										2 PED		2							5
6										6 PED						6			6
7										4 PED				4					7
8										8 PED								8	8
9																			9
A	OLA NOT									OLA ON									A
B	OLB NOT									OLB ON									B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E

MINUTE = D-B-E

DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES

(CALL ACTIVE LIGHTS)

RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES

(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F

MINUTE = D-B-F

DAY = D-C-F

D-E-E = C8 VERSION NUMBER

D-E-F = LITHIUM BATTERY CONDITION

84 = BAD

85 = GOOD

7 PAGE

TIME OF DAY ACTIVITY TABLE											
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS											
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	06	00	3	ON	1	2	3	4	5	6	7
1	18	00	3		1	2	3	4	5	6	7
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED
7 ENERGIZE AUX OUTPUT-GREEN
8 ENERGIZE AUX OUTPUT-YELLOW
9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

9 PAGE C09 = 0 or 1

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	06	00	1	A	1	2	3	4	5	6	7
1	18	00	E	A	1	2	3	4	5	6	7
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE CO9 = 2

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

LOCATION: **RTE 5 SB @ 24th Street - Mile of Cars**

CALTRANS C8 Version 3 DATE: 11/20/12 PAGE 5

E PAGE

D PAGE

F+C+F+1+2+3+E+B+ E+PHASES or TYPE+EVENT NO.										
		PHASES		TYPE			PHASES		TYPE	
		C		D			E		F	
0	I1	1		5,6		J1	5		5,6	
1	I2U	2		5,6		J2U	6		5,6	
2	I2L	2		5,6		J2L	6		5,6	
3	I3U	2		5,6		J3U	6		5,6	
4	I3L	2		5		J3L	6		5	5,6
5	I4	2		7,8	5,6	J4	6		7,8	5,6
6	I5	3		5,6		J5	7		5,6	
7	I6U	4		5,6		J6U	8		5,6	
8	I6L	4		5,6		J6L	8		5,6	
9	I7U	4		5,6		J7U	8		5,6	
A	I7L	4		5		J7L	8		5	
B	I8	4		7,8	5,6	J8	8		7,8	
C	I9U	1		5,6		J9U	5		5,6	
D	I9L	3		5,6		J9L	7		5,6	

DETECTOR TYPE

1 RED LOCK

2 YELLOW LOCK

5 EXTENSION

6 COUNT

7 CALLING

8 TYPE 3 DISCONNECT

DETECTOR SETTINGS									
I FILE					J FILE				
	DELAY		CARRYOVER			DELAY		CARRYOVER	
I1	D10		D30		J1	D20		D40	
I2U	D11		D31		J2U	D21		D41	
I2L	D12		D32		J2L	D22		D42	
I3U	D13		D33		J3U	D23		D43	
I3L	D14		D34		J3L	D24		D44	
I4	D15		D35		J4	D25		D45	
I5	D16		D36		J5	D26		D46	
I6U	D17		D37		J6U	D27		D47	
I6L	D18		D38		J6L	D28		D48	
I7U	D19		D39		J7U	D29		D49	
I7L	D1A		D3A		J7L	D2A		D4A	
I8	D1B		D3B		J8	D2B		D4B	
I9U	D1C		D3C		J9U	D2C		D4C	
I9L	D1D		D3D		J9L	D2D		D4D	

REASSIGNS DETECTORS TO VARIOUS PHASES / FUNCTIONS

F-C-F MUST EQUAL ZERO WHEN FINISHED

FUTURE 11-2976U4

LOWER CASE NUMBERS ARE DEFAULT VALUES

BLANK SPACES CONTAIN DEFAULTS (DO NOT ZERO OUT)

INTERSECTION: Tidelands @ 19th

Group Assignment: **None**
Field Master Assignment: **None**
System Reference Number:

N/S Street Name: **Tidelands**
E/W Street Name: **19th**

Last Database Change: **3/3/2011 0:00**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Drop Number		<C+0+0>
Zone Number		<C+0+1>
Area Number		<C+0+2>
Area Address		<C+0+3>
QuicNet Channel		(QuicNet)

Communication Addresses

Manual Plan		<C+A+1>
Manual Offset		<C+B+1>

Manual Selection

Max Initial	**20**	<F+0+E>
Red Revert	**5.0**	<F+0+F>
All Red Start	**5.0**	<F+C+0>

Start / Revert Times

	Phase							
Column Numbers ---->	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Row *Phase Names ---->*								
0 Ped Walk	**0**	**7**	**0**	**7**	**0**	**7**	**0**	**0**
1 Ped FDW	**0**	**21**	**0**	**19**	**0**	**22**	**0**	**0**
2 Min Green	**0**	**10**	**0**	**5**	**0**	**10**	**0**	**5**
3 Type 3 Limit	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4 Added Initial	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
5 Veh Extension	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
6 Max Gap	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
7 Min Gap	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
8 Max Limit	**0**	**30**	**0**	**25**	**0**	**30**	**0**	**25**
9 Max Limit 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A - - - - - -	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
B Call To Phase	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
C Reduce By	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
D Reduce Every	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
E Yellow Change	**0.0**	**4.0**	**0.0**	**4.0**	**0.0**	**4.0**	**0.0**	**4.0**
F Red Clear	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**

Phase Timing - Bank 1 <F Page>

Row	**E**	
	RR-1 Delay	**0**
	RR-1 Clear	**0**
	EV-A Delay	**0**
	EV-A Clear	**0**
	EV-B Delay	**0**
	EV-B Clear	**0**
	EV-C Delay	**0**
	EV-C Clear	**0**
	EV-D Delay	**0**
	EV-D Clear	**0**
	RR-2 Delay	**0**
	RR-2 Clear	**0**
	View EV Delay	- - -
	View EV Clear	- - -
	View RR Delay	- - -
	View RR Clear	- - -

Preempt Timing

	F	Row
Permit	**_2_4_6_8**	**0**
Red Lock	_____	**1**
Yellow Lock	_____	**2**
Min Recall	_____	**3**
Ped Recall	_____	**4**
View Set Peds	**- - - - -**	**5**
Rest In Walk	_____	**6**
Red Rest	_____	**7**
Dual Entry	**_2_4_6_8**	**8**
Max Recall	_____	**9**
Soft Recall	**___4___8**	**A**
Max 2	_____	**B**
Cond. Service	_____	**C**
Man Cntrl Calls	_____	**D**
Yellow Start	**_2___6__**	**E**
First Phases	**___4___8**	**F**

Phase Functions <F Page>

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Coordination <C Page>

Row	Column Numbers ---->	Plan 1	2	3	4	5	6	7	8	9	Row
	Plan Name ---->										
0	Cycle Length	0	0	0	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0	3
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	0	4
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0	7
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset 1	0	0	0	0	0	0	0	0	0	A
B	Offset 2	0	0	0	0	0	0	0	0	0	B
C	Offset 3	0	0	0	0	0	0	0	0	0	C
D	Permissive	0	0	0	0	0	0	0	0	0	D
E	Hold Release	0	0	0	0	0	0	0	0	0	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

(* = Coordination Recall)

Sync Phases <C Page>

Row		E	Row
0			0
1	Plan 1 - Sync		1
2	Plan 2 - Sync		2
3	Plan 3 - Sync		3
4	Plan 4 - Sync		4
5	Plan 5 - Sync		5
6	Plan 6 - Sync		6
7	Plan 7 - Sync		7
8	Plan 8 - Sync		8
9	Plan 9 - Sync		9
A	Coord Ped *		A
B	NEMA Hold		B
C			C
D			D
E			E
F			F

Configuration <E Page>

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	6
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	2
B	EV-B Phases	4
C	EV-C Phases	6
D	EV-D Phases	8
E	Extra 1 Config. Bits	1_3
F	IC Select (Interconnect)	2

Configuration <E Page>

	F
RR Overlap A - Phases	
RR Overlap B - Phases	
RR Overlap C - Phases	
RR Overlap D - Phases	
Ped 2P	2
Ped 6P	6
Ped 4P	4
Ped 8P	
Yellow Flash Phases	
Overlap A - Phases	
Overlap B - Phases	
Overlap C - Phases	
Overlap D - Phases	
Restricted Phases	
Assign 5 Outputs	

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 =
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

Assign 5 Outputs
(Ped Loadswitch Yellows)
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Force-Off Adjust	0

Coord Force-Off Adjust for Ped Service <C+D+F>

Transition Type	0

TBC Transition <C+D+D>

Transition Type
0 = Shortway
Non-zero = Lengthen

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Lag Phases <C Page>

Row		F	Row
0	Free Lag	2_4_6_8	0
1	Plan 1 - Lag	2_4_6_8	1
2	Plan 2 - Lag	2_4_6_8	2
3	Plan 3 - Lag	2_4_6_8	3
4	Plan 4 - Lag	2_4_6_8	4
5	Plan 5 - Lag	2_4_6_8	5
6	Plan 6 - Lag	2_4_6_8	6
7	Plan 7 - Lag	2_4_6_8	7
8	Plan 8 - Lag	2_4_6_8	8
9	Plan 9 - Lag	2_4_6_8	9
A	Coord Max *		A
B	Coord Lag *		B
C			C
D			D
E			E
F			F

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination
<9 Key with C+D+9=0>

Time	Funct.	Day of Week	Column F Phases/Bits
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function
<7 Key>

<D Page>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 1
TOD Coordination
<9 Key with C+D+9=1>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 2
TOD Coordination
<9 Key with C+D+9=2>

Time	Plan	Offset	Day of Week	Row
00:00	0	0		0
00:00	0	0		1
00:00	0	0		2
00:00	0	0		3
00:00	0	0		4
00:00	0	0		5
00:00	0	0		6
00:00	0	0		7
00:00	0	0		8
00:00	0	0		9
00:00	0	0		A
00:00	0	0		B
00:00	0	0		C
00:00	0	0		D
00:00	0	0		E
00:00	0	0		F

Holiday # 3
TOD Coordination
<9 Key with C+D+9=3>

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Offset Select
A = Offset A
B = Offset B
C = Offset C

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Month Select
1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Row		Day	Year	Month	Day of Week
A	Holiday # 1 Date	0	0	0	
B	Holiday # 2 Date	0	0	0	
C	Holiday # 3 Date	0	0	0	

Holiday Dates
<8 Key>

Row	1 Delay	3 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		I-1	14
1	0.0	0.0		I-2U	1
2	0.0	0.0		I-2L	5
3	0.0	0.0		I-3U	21
4	0.0	0.0		I-3L	25
5	0.0	0.0		I-4	9
6	0.0	0.0		I-5	16
7	0.0	0.0		I-6U	3
8	0.0	0.0		I-6L	7
9	0.0	0.0		I-7U	23
A	0.0	0.0		I-7L	27
B	0.0	0.0		I-8	11
C	0.0	0.0		I-9U	18
D	0.0	0.0		I-9L	20
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Row	2 Delay	4 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		J-1	13
1	0.0	0.0		J-2U	2
2	0.0	0.0		J-2L	6
3	0.0	0.0		J-3U	22
4	0.0	0.0		J-3L	26
5	0.0	0.0		J-4	10
6	0.0	0.0		J-5	15
7	0.0	0.0		J-6U	4
8	0.0	0.0		J-6L	8
9	0.0	0.0		J-7U	24
A	0.0	0.0		J-7L	28
B	0.0	0.0		J-8	12
C	0.0	0.0		J-9U	17
D	0.0	0.0		J-9L	19
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Detector Delay & Carryover <D Page>

Row		9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
A	Overlap A	0.0	0.0	0.0	0
B	Overlap B	0.0	0.0	0.0	0
C	Overlap C	0.0	0.0	0.0	0
D	Overlap D	0.0	0.0	0.0	0

Overlap Timing <F Page> <D Page>

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Note: Initialized data is for all detectors to be active (ie, all flag bits set). A Detector which is "not flagged", will not be active as a Phase Detector, and WILL NOT call or extend its associated phase. It will still function as a System Detector.

Row		0 Detector Number
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (minutes)	5	<D+A+E>
Max OFF (minutes)	60	<D+A+F>

Detector Failure Monitor

Phase Number	0	<F+C+1>
Time Before Yellow	0.0	<F+C+3>

Advance Warning Beacon - Sign 1

Phase Number	0	<F+D+1>
Time Before Yellow	0.0	<F+D+3>

Advance Warning Beacon - Sign 2

Long Failure	0.0	<F+0+6>
Short Failure	0.0	<F+0+7>

Power Cycle Correction (Default = 0.5)

Disable Parity	0	<D+B+0>

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	0	0	0	0	0	0	0
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Max Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Max Limit	0	0	0	0	0	0	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2 <F Page>

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	0	0	0	0	0	0	0
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Max Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Max Limit	0	0	0	0	0	0	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3 <F Page>

Row	Delay Only --->	7 Time	8 Dwell	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Output
0		0	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1		0	0							
2		0	0							
3		0	0							
4		0	0							
5		0	0							
6		0	0							
7		0	0							
8		0	0							
9	Limited Service	0	0							
A	Int. --->	- - -	0							
B		0	0							
C		0	0							
D		0	0							
E		0	0							
F		0	0							

<--- Limited Service Interval
(Set Dwell = 255)

Special Event Schedule <C Page with F+9+F=22>

INTERSECTION: Tidelands @ Bay Marina

Group Assignment: **None**
Field Master Assignment: **None**
System Reference Number:

N/S Street Name: **Tidelands**
E/W Street Name: **Bay Marina**

Last Database Change: **3/2/2011 0:00**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Drop Number		<C+0+0>
Zone Number		<C+0+1>
Area Number		<C+0+2>
Area Address		<C+0+3>
QuicNet Channel		(QuicNet)

Communication Addresses

Manual Plan		<C+A+1>
Manual Offset		<C+B+1>

Manual Selection

Max Initial	**20**	<F+0+E>
Red Revert	**5.0**	<F+0+F>
All Red Start	**5.0**	<F+C+0>

Start / Revert Times

	Phase							
Column Numbers ---->	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Row *Phase Names ---->*								
0 Ped Walk	**0**	**7**	**0**	**7**	**0**	**7**	**0**	**7**
1 Ped FDW	**0**	**17**	**0**	**20**	**0**	**20**	**0**	**19**
2 Min Green	**0**	**10**	**0**	**5**	**0**	**10**	**0**	**5**
3 Type 3 Limit	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4 Added Initial	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
5 Veh Extension	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
6 Max Gap	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
7 Min Gap	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**	**0.0**	**3.0**
8 Max Limit	**0**	**30**	**0**	**25**	**0**	**30**	**0**	**25**
9 Max Limit 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A - - - - - -	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
B Call To Phase	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
C Reduce By	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
D Reduce Every	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
E Yellow Change	**0.0**	**4.0**	**0.0**	**4.0**	**0.0**	**4.0**	**0.0**	**4.0**
F Red Clear	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**

Phase Timing - Bank 1 <F Page>

Row	**E**	
RR-1 Delay	**0**	
RR-1 Clear	**0**	
EV-A Delay	**0**	
EV-A Clear	**20**	
EV-B Delay	**0**	
EV-B Clear	**20**	
EV-C Delay	**0**	
EV-C Clear	**20**	
EV-D Delay	**0**	
EV-D Clear	**20**	
RR-2 Delay	**0**	
RR-2 Clear	**0**	
View EV Delay	- - -	
View EV Clear	- - -	
View RR Delay	- - -	
View RR Clear	- - -	

Preempt Timing

	F	Row
Permit	**_2_4_6_8**	**0**
Red Lock	_____	**1**
Yellow Lock	_____	**2**
Min Recall	_____	**3**
Ped Recall	_____	**4**
View Set Peds	**- - - - -**	**5**
Rest In Walk	_____	**6**
Red Rest	_____	**7**
Dual Entry	**_2_4_6_8**	**8**
Max Recall	_____	**9**
Soft Recall	**_2___6__**	**A**
Max 2	_____	**B**
Cond. Service	_____	**C**
Man Cntrl Calls	_____	**D**
Yellow Start	**_2___6__**	**E**
First Phases	**___4___8**	**F**

Phase Functions <F Page>

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Coordination <C Page>

Row	Column Numbers ---->	Plan 1	2	3	4	5	6	7	8	9	Row
	Plan Name ---->										
0	Cycle Length	0	0	0	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0	3
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	0	4
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0	7
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset 1	0	0	0	0	0	0	0	0	0	A
B	Offset 2	0	0	0	0	0	0	0	0	0	B
C	Offset 3	0	0	0	0	0	0	0	0	0	C
D	Permissive	0	0	0	0	0	0	0	0	0	D
E	Hold Release	0	0	0	0	0	0	0	0	0	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

(* = Coordination Recall)

Sync Phases <C Page>

Row		E	Row
0			0
1	Plan 1 - Sync		1
2	Plan 2 - Sync		2
3	Plan 3 - Sync		3
4	Plan 4 - Sync		4
5	Plan 5 - Sync		5
6	Plan 6 - Sync		6
7	Plan 7 - Sync		7
8	Plan 8 - Sync		8
9	Plan 9 - Sync		9
A	Coord Ped *		A
B	NEMA Hold		B
C			C
D			D
E			E
F			F

Configuration <E Page>

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	2
B	EV-B Phases	4
C	EV-C Phases	6
D	EV-D Phases	8
E	Extra 1 Config. Bits	
F	IC Select (Interconnect)	

Configuration <E Page>

	F
RR Overlap A - Phases	
RR Overlap B - Phases	
RR Overlap C - Phases	
RR Overlap D - Phases	
Ped 2P	2
Ped 6P	6
Ped 4P	4
Ped 8P	8
Yellow Flash Phases	
Overlap A - Phases	
Overlap B - Phases	
Overlap C - Phases	
Overlap D - Phases	
Restricted Phases	
Assign 5 Outputs	

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 =
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

Assign 5 Outputs
(Ped Loadswitch Yellows)
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Force-Off Adjust	0

Coord Force-Off Adjust for Ped Service <C+D+F>

Transition Type	0

TBC Transition <C+D+D>

Transition Type
0 = Shortway
Non-zero = Lengthen

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Lag Phases <C Page>

Row		F	Row
0	Free Lag	2 4 6 8	0
1	Plan 1 - Lag	2 4 6 8	1
2	Plan 2 - Lag	2 4 6 8	2
3	Plan 3 - Lag	2 4 6 8	3
4	Plan 4 - Lag	2 4 6 8	4
5	Plan 5 - Lag	2 4 6 8	5
6	Plan 6 - Lag	2 4 6 8	6
7	Plan 7 - Lag	2 4 6 8	7
8	Plan 8 - Lag	2 4 6 8	8
9	Plan 9 - Lag	2 4 6 8	9
A	Coord Max *	2 4 6 8	A
B	Coord Lag *	2 4 6 8	B
C			C
D			D
E			E
F			F

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination
<9 Key with C+D+9=0>

Time	Funct.	Day of Week	Column F Phases/Bits
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function
<7 Key>

<D Page>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 1
TOD Coordination
<9 Key with C+D+9=1>

Time	Plan	Offset	Day of Week
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday # 2
TOD Coordination
<9 Key with C+D+9=2>

Time	Plan	Offset	Day of Week	Row
00:00	0	0		0
00:00	0	0		1
00:00	0	0		2
00:00	0	0		3
00:00	0	0		4
00:00	0	0		5
00:00	0	0		6
00:00	0	0		7
00:00	0	0		8
00:00	0	0		9
00:00	0	0		A
00:00	0	0		B
00:00	0	0		C
00:00	0	0		D
00:00	0	0		E
00:00	0	0		F

Holiday # 3
TOD Coordination
<9 Key with C+D+9=3>

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Offset Select
A = Offset A
B = Offset B
C = Offset C

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Month Select
1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Row		Day	Year	Month	Day of Week
A	Holiday # 1 Date	0	0	0	
B	Holiday # 2 Date	0	0	0	
C	Holiday # 3 Date	0	0	0	

Holiday Dates
<8 Key>

Row	1 Delay	3 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		I-1	14
1	0.0	0.0		I-2U	1
2	0.0	0.0		I-2L	5
3	0.0	0.0		I-3U	21
4	0.0	0.0		I-3L	25
5	0.0	0.0		I-4	9
6	0.0	0.0		I-5	16
7	0.0	0.0		I-6U	3
8	0.0	0.0		I-6L	7
9	0.0	0.0		I-7U	23
A	0.0	0.0		I-7L	27
B	0.0	0.0		I-8	11
C	0.0	0.0		I-9U	18
D	0.0	0.0		I-9L	20
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Row	2 Delay	4 Carry-over	Detector Name	332 Input File	Detector Number
0	0.0	0.0		J-1	13
1	0.0	0.0		J-2U	2
2	0.0	0.0		J-2L	6
3	0.0	0.0		J-3U	22
4	0.0	0.0		J-3L	26
5	0.0	0.0		J-4	10
6	0.0	0.0		J-5	15
7	0.0	0.0		J-6U	4
8	0.0	0.0		J-6L	8
9	0.0	0.0		J-7U	24
A	0.0	0.0		J-7L	28
B	0.0	0.0		J-8	12
C	0.0	0.0		J-9U	17
D	0.0	0.0		J-9L	19
E	- - -	- - -	- - -	- - -	- - -
F	- - -	- - -	- - -	- - -	- - -

Detector Delay & Carryover <D Page>

Row		9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
A	Overlap A	0.0	0.0	0.0	0
B	Overlap B	0.0	0.0	0.0	0
C	Overlap C	0.0	0.0	0.0	0
D	Overlap D	0.0	0.0	0.0	0

Overlap Timing <F Page> <D Page>

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Note: Initialized data is for all detectors to be active (ie, all flag bits set). A Detector which is "not flagged", will not be active as a Phase Detector, and WILL NOT call or extend its associated phase. It will still function as a System Detector.

Row		0 Detector Number
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (minutes)	5	<D+A+E>
Max OFF (minutes)	60	<D+A+F>

Detector Failure Monitor

Phase Number	0	<F+C+1>
Time Before Yellow	0.0	<F+C+3>

Advance Warning Beacon - Sign 1

Phase Number	0	<F+D+1>
Time Before Yellow	0.0	<F+D+3>

Advance Warning Beacon - Sign 2

Long Failure	0.0	<F+0+6>
Short Failure	0.0	<F+0+7>

Power Cycle Correction (Default = 0.5)

Disable Parity	0	<D+B+0>

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	0	0	0	0	0	0	0
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Max Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Max Limit	0	0	0	0	0	0	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2 <F Page>

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ----->								
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	0	0	0	0	0	0	0
3	Type 3 Limit	0	0	0	0	0	0	0	0
4	Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Max Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Max Limit	0	0	0	0	0	0	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	- - - - - -	0	0	0	0	0	0	0	0
B	Call To Phase	0	0	0	0	0	0	0	0
C	Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3 <F Page>

Row		7 Time	8 Dwell	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Output	Row	
0	Delay Only --->	0	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	0	
1		0	0								1	
2		0	0								2	
3		0	0								3	
4		0	0								4	
5		0	0								5	
6		0	0								6	
7		0	0								7	
8		0	0								8	
9	Limited Service	0	0								9	
A	Int. --->	- - -	0								A	**<--- Limited Service Interval** (Set Dwell = 255)
B		0	0								B	
C		0	0								C	
D		0	0								D	
E		0	0								E	
F		0	0								F	

Special Event Schedule <C Page with F+9+F=22>

Prepared by NDS/ATD

VOLUME

Cleveland Ave Bet. W 18th St & W 19th St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_001

DAILY TOTALS	NB	SB	EB	WB	Total
	1,373	3,950	0	0	5,323

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	4		8						12		12:00	24		52						76	
0:15	0		3						3		12:15	18		57						75	
0:30	1		7						8		12:30	10		47						57	
0:45	1	6	10	28					11	34	12:45	26	78	70	226					96	304
1:00	0		5						5		13:00	22		46						68	
1:15	1		1						2		13:15	15		55						70	
1:30	0		5						5		13:30	11		60						71	
1:45	0	1	3	14					3	15	13:45	19	67	54	215					73	282
2:00	1		1						2		14:00	14		54						68	
2:15	0		0						0		14:15	19		77						96	
2:30	1		0						1		14:30	15		77						92	
2:45	0	2	4	5					4	7	14:45	20	68	109	317					129	385
3:00	1		1						2		15:00	13		95						108	
3:15	0		2						2		15:15	18		116						134	
3:30	1		9						10		15:30	16		136						152	
3:45	0	2	12	24					12	26	15:45	8	55	86	433					94	488
4:00	2		4						6		16:00	7		110						117	
4:15	3		7						10		16:15	11		109						120	
4:30	1		15						16		16:30	5		102						107	
4:45	10	16	25	51					35	67	16:45	10	33	88	409					98	442
5:00	8		23						31		17:00	10		77						87	
5:15	13		31						44		17:15	5		60						65	
5:30	31		40						71		17:30	9		58						67	
5:45	45	97	64	158					109	255	17:45	7	31	64	259					71	290
6:00	42		58						100		18:00	6		49						55	
6:15	37		56						93		18:15	6		45						51	
6:30	56		61						117		18:30	2		28						30	
6:45	72	207	89	264					161	471	18:45	3	17	25	147					28	164
7:00	43		74						117		19:00	3		27						30	
7:15	54		73						127		19:15	6		23						29	
7:30	78		61						139		19:30	7		25						32	
7:45	56	231	56	264					112	495	19:45	1	17	24	99					25	116
8:00	43		67						110		20:00	1		19						20	
8:15	60		60						120		20:15	2		15						17	
8:30	35		40						75		20:30	3		18						21	
8:45	52	190	36	203					88	393	20:45	5	11	13	65					18	76
9:00	34		47						81		21:00	6		12						18	
9:15	25		70						95		21:15	1		6						7	
9:30	14		50						64		21:30	6		15						21	
9:45	17	90	56	223					73	313	21:45	2	15	11	44					13	59
10:00	13		49						62		22:00	2		13						15	
10:15	15		46						61		22:15	1		7						8	
10:30	13		46						59		22:30	3		10						13	
10:45	10	51	50	191					60	242	22:45	2	8	12	42					14	50
11:00	20		56						76		23:00	1		10						11	
11:15	6		56						62		23:15	4		8						12	
11:30	25		58						83		23:30	1		4						5	
11:45	21	72	75	245					96	317	23:45	2	8	2	24					4	32
TOTALS		965		1670						2635	TOTALS		408		2280						2688
SPLIT %		36.6%		63.4%						49.5%	SPLIT %		15.2%		84.8%						50.5%

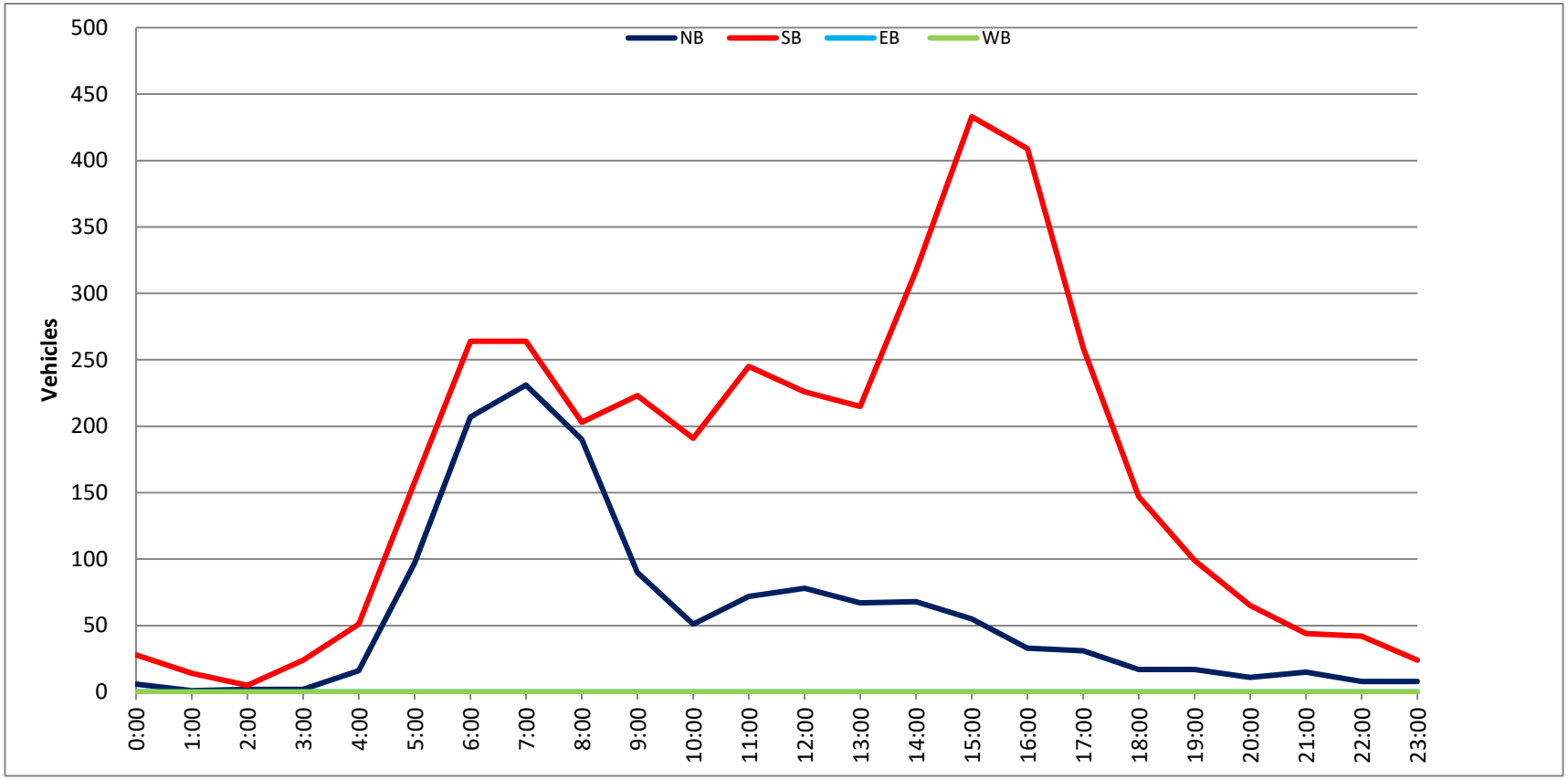
DAILY TOTALS	NB	SB	EB	WB	Total
	1,373	3,950	0	0	5,323

AM Peak Hour	6:45	6:30			6:45	PM Peak Hour	12:00	14:45			14:45
AM Pk Volume	247	297			544	PM Pk Volume	78	456			523
Pk Hr Factor	0.792	0.834			0.845	Pk Hr Factor	0.750	0.838			0.860
7 - 9 Volume	421	467	0	0	888	4 - 6 Volume	64	668	0	0	732
7 - 9 Peak Hour	7:30	7:00			7:00	4 - 6 Peak Hour	16:15	16:00			16:00
7 - 9 Pk Volume	237	264	0	0	495	4 - 6 Pk Volume	36	409	0	0	442
Pk Hr Factor	0.760	0.892	0.000	0.000	0.890	Pk Hr Factor	0.818	0.930	0.000	0.000	0.921

Prepared by NDS/ATD

Project #: CA17_4129_001 **City:** National City

Location: Cleveland Ave Bet. W 18th St & W 19th St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Cleveland Ave Bet. W 19th St & W 23rd St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_002

DAILY TOTALS	NB	SB	EB	WB	Total
	2,477	2,598	0	0	5,075

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	1		4						5		12:00	39		45						84	
0:15	0		1						1		12:15	37		35						72	
0:30	1		2						3		12:30	29		63						92	
0:45	1	3	4	11					5	14	12:45	41	146	37	180					78	326
1:00	0		3						3		13:00	38		28						66	
1:15	2		1						3		13:15	59		50						109	
1:30	2		2						4		13:30	37		103						140	
1:45	1	5	1	7					2	12	13:45	16	150	30	211					46	361
2:00	1		0						1		14:00	19		33						52	
2:15	1		2						3		14:15	19		59						78	
2:30	10		1						11		14:30	18		58						76	
2:45	10	22	1	4					11	26	14:45	19	75	77	227					96	302
3:00	4		1						5		15:00	21		78						99	
3:15	5		1						6		15:15	19		99						118	
3:30	14		0						14		15:30	15		116						131	
3:45	32	55	0	2					32	57	15:45	9	64	77	370					86	434
4:00	9		9						18		16:00	16		111						127	
4:15	19		4						23		16:15	7		82						89	
4:30	49		19						68		16:30	11		103						114	
4:45	69	146	11	43					80	189	16:45	13	47	76	372					89	419
5:00	22		39						61		17:00	16		77						93	
5:15	35		15						50		17:15	16		74						90	
5:30	75		8						83		17:30	8		56						64	
5:45	99	231	14	76					113	307	17:45	8	48	39	246					47	294
6:00	72		12						84		18:00	9		34						43	
6:15	72		12						84		18:15	11		25						36	
6:30	88		13						101		18:30	5		17						22	
6:45	118	350	9	46					127	396	18:45	8	33	7	83					15	116
7:00	79		11						90		19:00	5		19						24	
7:15	92		16						108		19:15	11		10						21	
7:30	98		25						123		19:30	19		9						28	
7:45	102	371	8	60					110	431	19:45	20	55	7	45					27	100
8:00	78		26						104		20:00	12		14						26	
8:15	64		40						104		20:15	21		4						25	
8:30	51		21						72		20:30	21		22						43	
8:45	52	245	20	107					72	352	20:45	26	80	12	52					38	132
9:00	49		24						73		21:00	7		15						22	
9:15	24		25						49		21:15	2		8						10	
9:30	20		39						59		21:30	6		4						10	
9:45	25	118	35	123					60	241	21:45	3	18	5	32					8	50
10:00	14		19						33		22:00	6		28						34	
10:15	20		21						41		22:15	2		15						17	
10:30	23		32						55		22:30	7		6						13	
10:45	21	78	33	105					54	183	22:45	1	16	6	55					7	71
11:00	20		27						47		23:00	2		5						7	
11:15	21		37						58		23:15	5		7						12	
11:30	33		25						58		23:30	2		1						3	
11:45	37	111	36	125					73	236	23:45	1	10	3	16					4	26
TOTALS		1735		709						2444	TOTALS		742		1889						2631
SPLIT %		71.0%		29.0%						48.2%	SPLIT %		28.2%		71.8%						51.8%

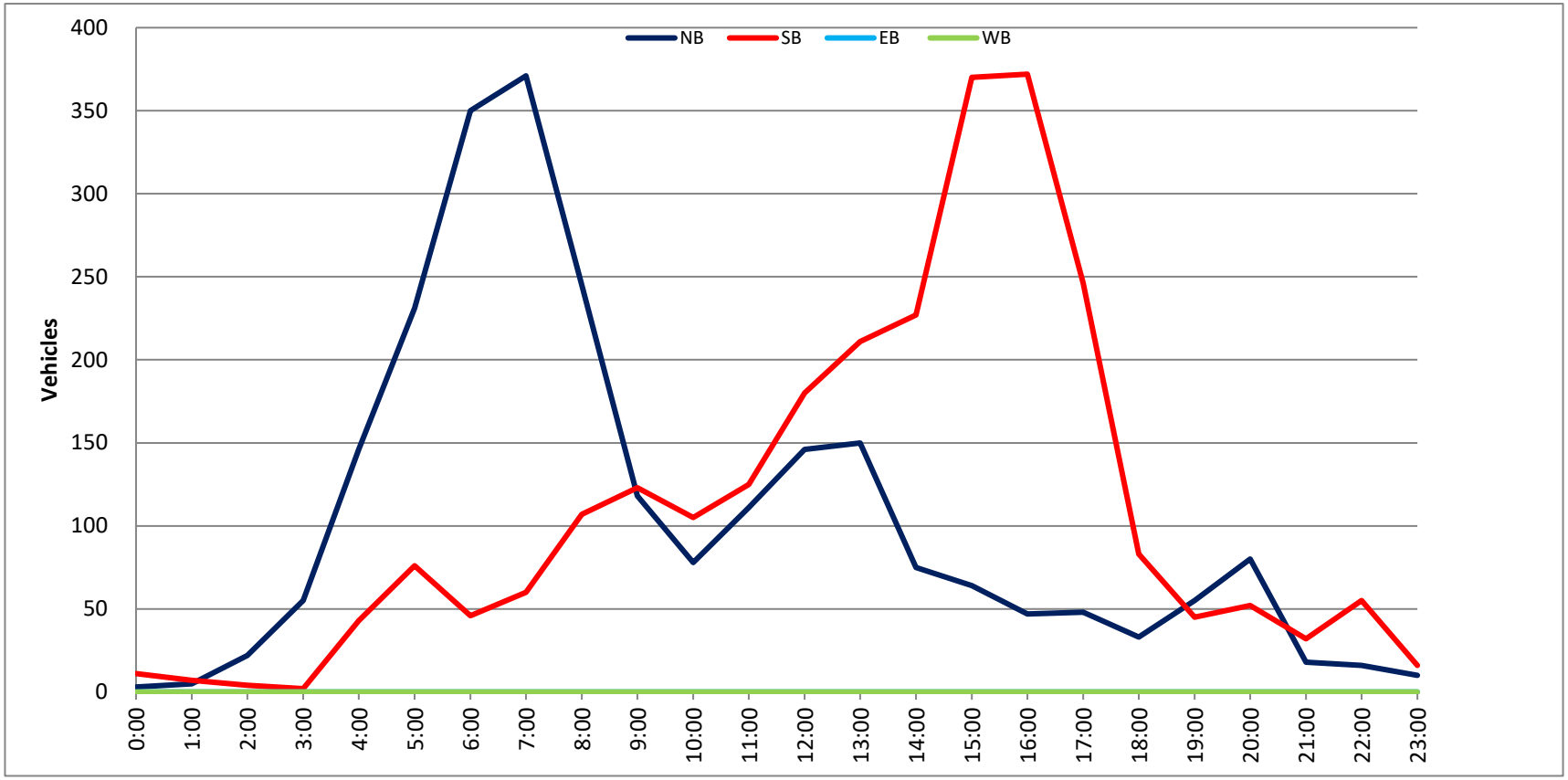
DAILY TOTALS	NB	SB	EB	WB	Total
	2,477	2,598	0	0	5,075

AM Peak Hour	6:45	11:45			6:45	PM Peak Hour	12:45	15:15			15:15
AM Pk Volume	387	179			448	PM Pk Volume	175	403			462
Pk Hr Factor	0.820	0.710			0.882	Pk Hr Factor	0.742	0.869			0.882
7 - 9 Volume	616	167	0	0	783	4 - 6 Volume	95	618	0	0	713
7 - 9 Peak Hour	7:00	8:00			7:15	4 - 6 Peak Hour	16:30	16:00			16:00
7 - 9 Pk Volume	371	107	0	0	445	4 - 6 Pk Volume	56	372	0	0	419
Pk Hr Factor	0.909	0.669	0.000	0.000	0.904	Pk Hr Factor	0.875	0.838	0.000	0.000	0.825

Prepared by NDS/ATD

Project #: CA17_4129_002 **City:** National City

Location: Cleveland Ave Bet. W 19th St & W 23rd St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Cleveland Ave Bet. W 14th St & W 18th St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_003

DAILY TOTALS	NB	SB	EB	WB	Total
	1,551	3,173	0	0	4,724

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	2		7						9		12:00	24		40						64	
0:15	0		3						3		12:15	28		44						72	
0:30	0		4						4		12:30	13		31						44	
0:45	2	4	8	22					10	26	12:45	25	90	56	171					81	261
1:00	0		3						3		13:00	23		40						63	
1:15	1		1						2		13:15	23		38						61	
1:30	0		5						5		13:30	17		44						61	
1:45	1	2	3	12					4	14	13:45	25	88	46	168					71	256
2:00	0		0						0		14:00	16		46						62	
2:15	1		1						2		14:15	20		54						74	
2:30	0		0						0		14:30	30		71						101	
2:45	0	1	2	3					2	4	14:45	17	83	76	247					93	330
3:00	2		1						3		15:00	20		89						109	
3:15	3		1						4		15:15	25		89						114	
3:30	0		6						6		15:30	23		106						129	
3:45	1	6	8	16					9	22	15:45	13	81	76	360					89	441
4:00	0		6						6		16:00	16		103						119	
4:15	3		8						11		16:15	12		97						109	
4:30	2		17						19		16:30	11		83						94	
4:45	3	8	17	48					20	56	16:45	14	53	77	360					91	413
5:00	7		19						26		17:00	17		74						91	
5:15	14		25						39		17:15	6		53						59	
5:30	28		33						61		17:30	9		54						63	
5:45	41	90	53	130					94	220	17:45	5	37	58	239					63	276
6:00	42		41						83		18:00	4		40						44	
6:15	36		39						75		18:15	9		36						45	
6:30	60		34						94		18:30	2		25						27	
6:45	60	198	75	189					135	387	18:45	3	18	20	121					23	139
7:00	49		58						107		19:00	3		26						29	
7:15	68		49						117		19:15	8		17						25	
7:30	81		41						122		19:30	5		17						22	
7:45	76	274	48	196					124	470	19:45	2	18	18	78					20	96
8:00	60		49						109		20:00	2		23						25	
8:15	50		53						103		20:15	2		15						17	
8:30	42		32						74		20:30	4		16						20	
8:45	54	206	32	166					86	372	20:45	5	13	13	67					18	80
9:00	40		37						77		21:00	4		9						13	
9:15	23		48						71		21:15	1		6						7	
9:30	16		37						53		21:30	1		13						14	
9:45	18	97	39	161					57	258	21:45	4	10	8	36					12	46
10:00	20		31						51		22:00	2		11						13	
10:15	24		40						64		22:15	1		10						11	
10:30	13		42						55		22:30	4		7						11	
10:45	19	76	45	158					64	234	22:45	2	9	10	38					12	47
11:00	23		29						52		23:00	1		9						10	
11:15	13		46						59		23:15	2		8						10	
11:30	24		38						62		23:30	3		6						9	
11:45	22	82	48	161					70	243	23:45	1	7	3	26					4	33
TOTALS		1044		1262						**2306**	**TOTALS**		507		1911						**2418**
SPLIT %		45.3%		54.7%						**48.8%**	**SPLIT %**		21.0%		79.0%						**51.2%**

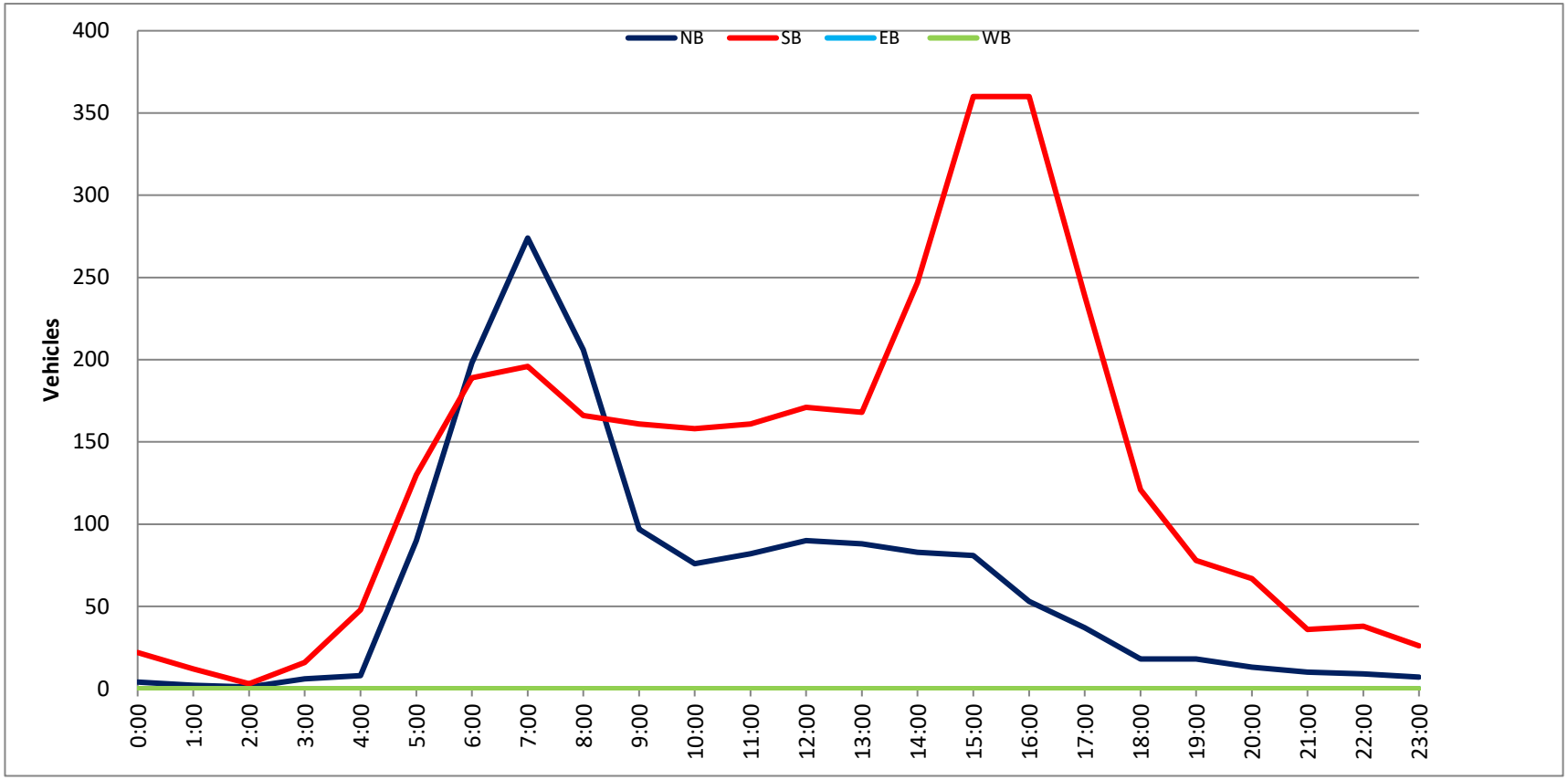
DAILY TOTALS	NB	SB	EB	WB	Total
	1,551	3,173	0	0	4,724

AM Peak Hour	7:15	6:45			**6:45**	**PM Peak Hour**	14:30	15:30			**15:15**
AM Pk Volume	285	223			**481**	**PM Pk Volume**	92	382			**451**
Pk Hr Factor	0.880	0.743			**0.891**	**Pk Hr Factor**	0.767	0.901			**0.874**
7 - 9 Volume	480	362	0	0	**842**	**4 - 6 Volume**	90	599	0	0	**689**
7 - 9 Peak Hour	7:15	7:00			**7:15**	**4 - 6 Peak Hour**	16:15	16:00			**16:00**
7 - 9 Pk Volume	285	196	0	0	**472**	**4 - 6 Pk Volume**	54	360	0	0	**413**
Pk Hr Factor	0.880	0.845	0.000	0.000	**0.952**	**Pk Hr Factor**	0.794	0.874	0.000	0.000	**0.868**

Prepared by NDS/ATD

Project #: CA17_4129_003 **City:** National City

Location: Cleveland Ave Bet. W 14th St & W 18th St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Cleveland Ave Bet. W 23rd St & W Bay Marina Dr

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_004

DAILY TOTALS	NB	SB	EB	WB	Total
	2,759	2,949	0	0	5,708

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	2		6				8		12:00	45		52				97	
0:15	1		2				3		12:15	39		45				84	
0:30	1		2				3		12:30	33		72				105	
0:45	1	5	3	13			4	18	12:45	56	173	42	211			98	384
1:00	1		3				4		13:00	43		33				76	
1:15	1		1				2		13:15	61		69				130	
1:30	3		2				5		13:30	48		106				154	
1:45	3	8	2	8			5	16	13:45	22	174	37	245			59	419
2:00	1		1				2		14:00	32		35				67	
2:15	1		0				1		14:15	31		77				108	
2:30	11		1				12		14:30	23		62				85	
2:45	11	24	2	4			13	28	14:45	25	111	83	257			108	368
3:00	4		4				8		15:00	26		87				113	
3:15	5		1				6		15:15	27		103				130	
3:30	14		1				15		15:30	18		121				139	
3:45	32	55	5	11			37	66	15:45	14	85	83	394			97	479
4:00	9		9				18		16:00	17		125				142	
4:15	21		4				25		16:15	15		98				113	
4:30	49		18				67		16:30	9		109				118	
4:45	66	145	11	42			77	187	16:45	12	53	85	417			97	470
5:00	24		38				62		17:00	10		96				106	
5:15	41		13				54		17:15	11		89				100	
5:30	74		9				83		17:30	11		69				80	
5:45	104	243	15	75			119	318	17:45	7	39	45	299			52	338
6:00	75		15				90		18:00	8		41				49	
6:15	72		14				86		18:15	10		31				41	
6:30	96		15				111		18:30	7		19				26	
6:45	119	362	10	54			129	416	18:45	10	35	12	103			22	138
7:00	82		11				93		19:00	11		22				33	
7:15	94		18				112		19:15	9		13				22	
7:30	110		14				124		19:30	21		12				33	
7:45	89	375	18	61			107	436	19:45	19	60	10	57			29	117
8:00	94		29				123		20:00	14		18				32	
8:15	71		35				106		20:15	21		13				34	
8:30	61		27				88		20:30	22		23				45	
8:45	69	295	24	115			93	410	20:45	25	82	13	67			38	149
9:00	52		20				72		21:00	9		18				27	
9:15	29		27				56		21:15	7		8				15	
9:30	28		44				72		21:30	5		6				11	
9:45	35	144	38	129			73	273	21:45	6	27	9	41			15	68
10:00	22		21				43		22:00	7		30				37	
10:15	31		28				59		22:15	3		17				20	
10:30	28		38				66		22:30	5		6				11	
10:45	24	105	38	125			62	230	22:45	2	17	6	59			8	76
11:00	27		33				60		23:00	3		5				8	
11:15	26		45				71		23:15	5		7				12	
11:30	34		24				58		23:30	2		2				4	
11:45	44	131	45	147			89	278	23:45	1	11	1	15			2	26
TOTALS		1892		784				**2676**	**TOTALS**		867		2165				**3032**
SPLIT %		70.7%		29.3%				**46.9%**	**SPLIT %**		28.6%		71.4%				**53.1%**

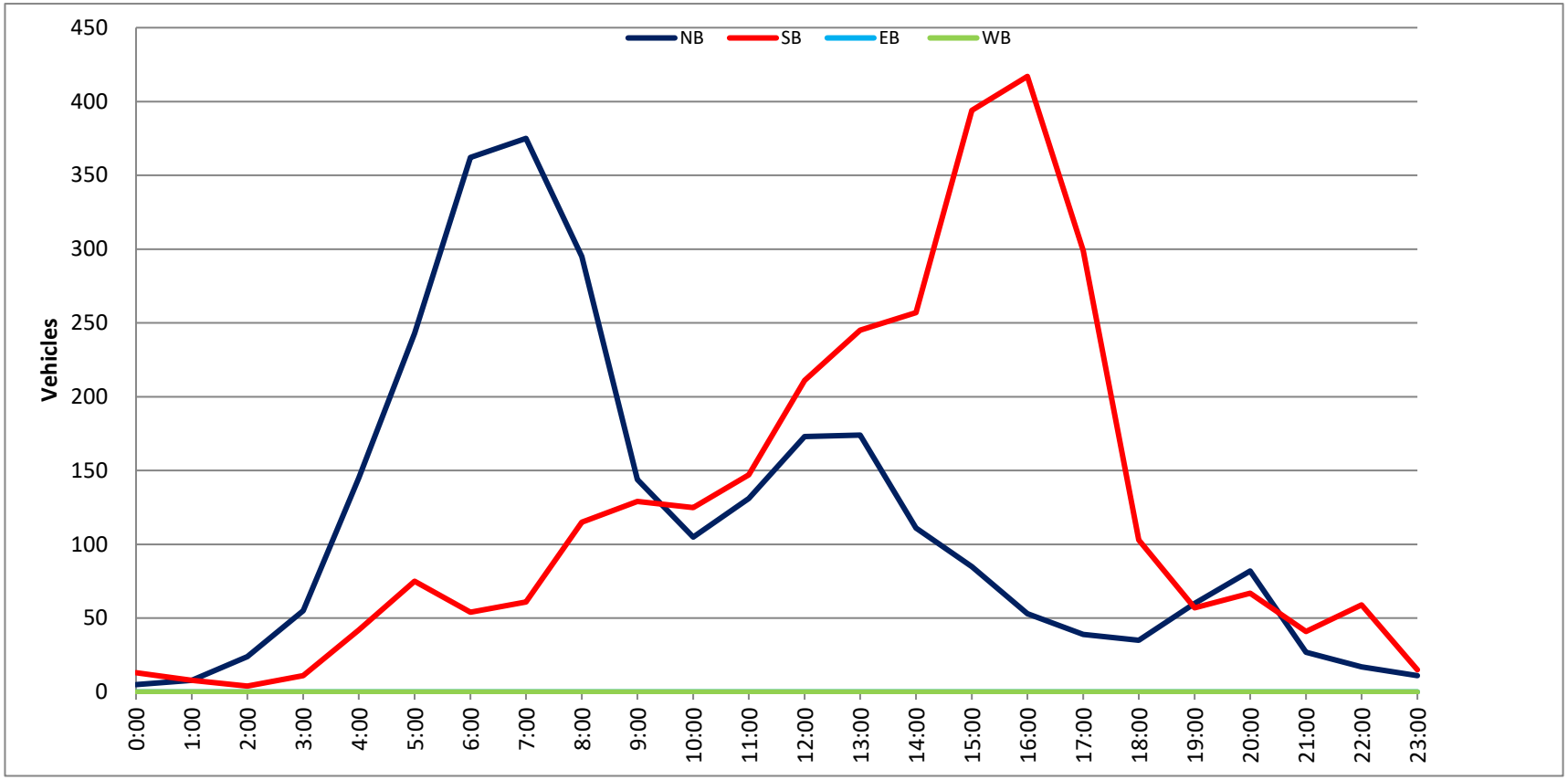
DAILY TOTALS	NB	SB	EB	WB	Total
	2,759	2,949	0	0	5,708

AM Peak Hour	6:45	11:45					**7:15**		**PM Peak Hour**	12:45	15:15					**15:15**		
AM Pk Volume	405	214					**466**		**PM Pk Volume**	208	432					**508**		
Pk Hr Factor	0.851	0.743					**0.940**		**Pk Hr Factor**	0.852	0.864					**0.894**		
7 - 9 Volume	670	176	0	0			**846**		**4 - 6 Volume**	92	716	0	0			**808**		
7 - 9 Peak Hour	7:15	8:00					**7:15**		**4 - 6 Peak Hour**	16:00	16:00					**16:00**		
7 - 9 Pk Volume	387	115	0	0			**466**		**4 - 6 Pk Volume**	53	417	0	0			**470**		
Pk Hr Factor	0.880	0.821	0.000	0.000			**0.940**		**Pk Hr Factor**	0.779	0.834	0.000	0.000			**0.827**		

Prepared by NDS/ATD

Project #: CA17_4129_004 **City:** National City

Location: Cleveland Ave Bet. W 23rd St & W Bay **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Cleveland Ave Bet. W 14th St & Civic Center Dr / Tidelands Ave

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_005

DAILY TOTALS	NB	SB	EB	WB	Total
	3,513	1,309	0	0	4,822

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	7		5				12		12:00	59		22				81	
0:15	5		1				6		12:15	70		17				87	
0:30	2		2				4		12:30	63		16				79	
0:45	0	14	1	9			1	23	12:45	65	257	14	69			79	326
1:00	0		2				2		13:00	67		16				83	
1:15	2		0				2		13:15	66		11				77	
1:30	0		1				1		13:30	44		13				57	
1:45	1	3	0	3			1	6	13:45	66	243	22	62			88	305
2:00	2		1				3		14:00	60		14				74	
2:15	2		0				2		14:15	58		20				78	
2:30	1		1				2		14:30	62		26				88	
2:45	2	7	0	2			2	9	14:45	40	220	40	100			80	320
3:00	5		0				5		15:00	55		56				111	
3:15	3		1				4		15:15	47		49				96	
3:30	2		2				4		15:30	39		72				111	
3:45	3	13	1	4			4	17	15:45	31	172	54	231			85	403
4:00	9		2				11		16:00	28		73				101	
4:15	9		1				10		16:15	32		59				91	
4:30	15		2				17		16:30	29		57				86	
4:45	21	54	6	11			27	65	16:45	41	130	62	251			103	381
5:00	39		1				40		17:00	33		46				79	
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5:30	71		2				73		17:30	37		37				74	
5:45	81	255	3	7			84	262	17:45	28	123	30	153			58	276
6:00	85		2				87		18:00	27		20				47	
6:15	89		6				95		18:15	26		17				43	
6:30	82		2				84		18:30	17		10				27	
6:45	69	325	3	13			72	338	18:45	25	95	5	52			30	147
7:00	72		8				80		19:00	21		10				31	
7:15	96		7				103		19:15	20		5				25	
7:30	103		7				110		19:30	20		4				24	
7:45	98	369	14	36			112	405	19:45	10	71	1	20			11	91
8:00	81		6				87		20:00	16		6				22	
8:15	71		20				91		20:15	14		2				16	
8:30	90		7				97		20:30	19		3				22	
8:45	65	307	7	40			72	347	20:45	12	61	6	17			18	78
9:00	67		14				81		21:00	11		1				12	
9:15	48		22				70		21:15	13		3				16	
9:30	52		17				69		21:30	7		2				9	
9:45	66	233	11	64			77	297	21:45	9	40	3	9			12	49
10:00	47		19				66		22:00	6		3				9	
10:15	60		12				72		22:15	10		2				12	
10:30	54		14				68		22:30	10		3				13	
10:45	44	205	20	65			64	270	22:45	8	34	2	10			10	44
11:00	69		10				79		23:00	8		7				15	
11:15	56		18				74		23:15	8		1				9	
11:30	61		18				79		23:30	10		3				13	
11:45	65	251	22	68			87	319	23:45	5	31	2	13			7	44
TOTALS		2036		322				2358	TOTALS		1477		987				2464
SPLIT %		86.3%		13.7%				48.9%	SPLIT %		59.9%		40.1%				51.1%

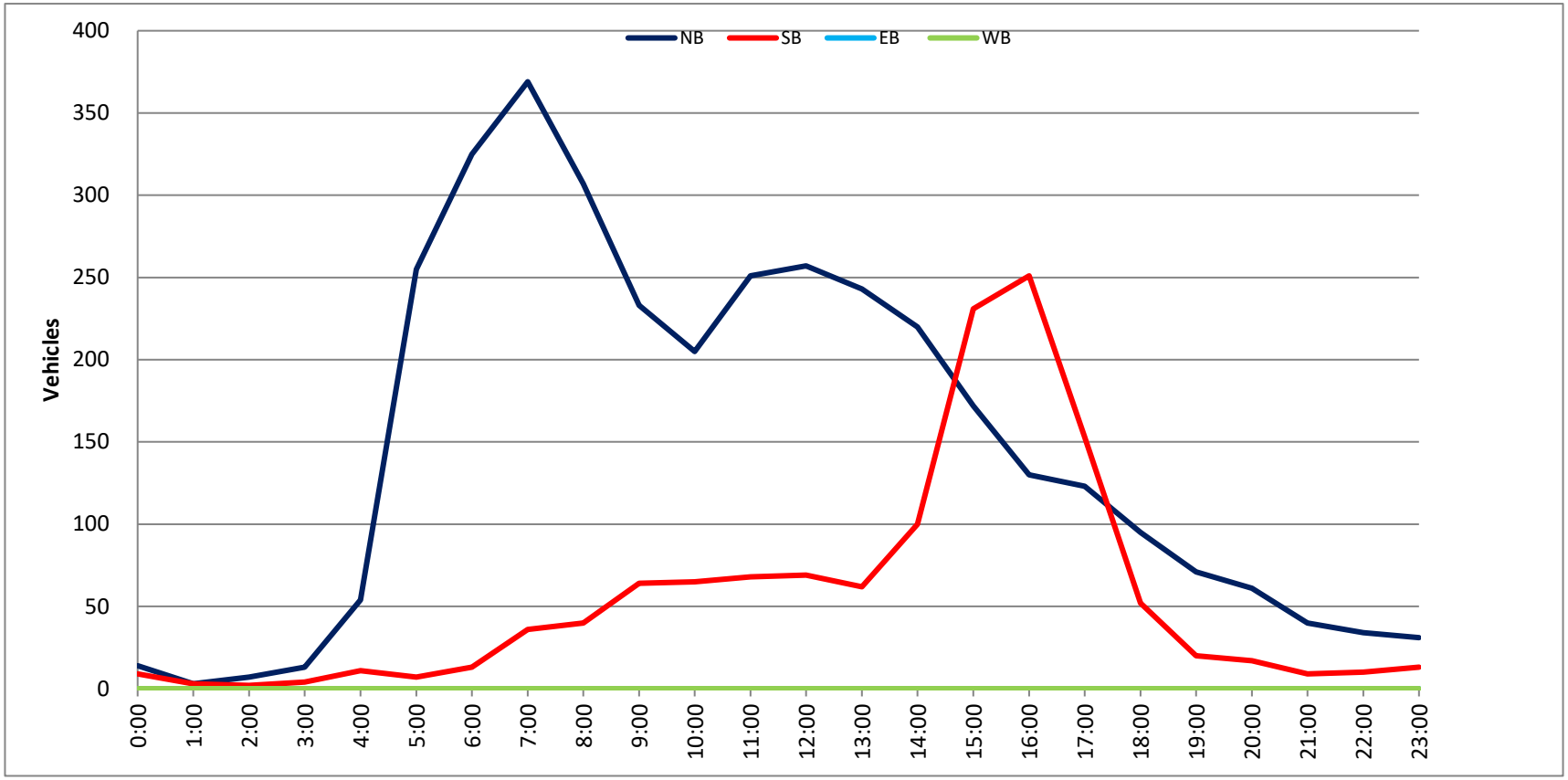
DAILY TOTALS	NB	SB	EB	WB	Total
	3,513	1,309	0	0	4,822

AM Peak Hour	7:15	11:15				7:15	PM Peak Hour	12:15	15:30				15:00
AM Pk Volume	378	80				412	PM Pk Volume	265	258				403
Pk Hr Factor	0.917	0.909				0.920	Pk Hr Factor	0.946	0.884				0.908
7 - 9 Volume	676	76	0	0		752	4 - 6 Volume	253	404	0	0		657
7 - 9 Peak Hour	7:15	7:30				7:15	4 - 6 Peak Hour	16:45	16:00				16:00
7 - 9 Pk Volume	378	47	0	0		412	4 - 6 Pk Volume	136	251	0	0		381
Pk Hr Factor	0.917	0.588	0.000	0.000		0.920	Pk Hr Factor	0.829	0.860	0.000	0.000		0.925

Prepared by NDS/ATD

Project #: CA17_4129_005 **City:** National City

Location: Cleveland Ave Bet. W 14th St & Civic Center **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Mckinley Ave Bet. W 19th St & W 23rd St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_006

DAILY TOTALS	NB	SB	EB	WB	Total
	246	225	0	0	471

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	0		1						1		12:00	6		1						7	
0:15	1		0						1		12:15	4		5						9	
0:30	0		0						0		12:30	1		8						9	
0:45	0	1	0	1					0	2	12:45	4	15	2	16					6	31
1:00	0		1						1		13:00	1		3						4	
1:15	0		0						0		13:15	6		6						12	
1:30	1		0						1		13:30	4		1						5	
1:45	0	1	0	1					0	2	13:45	3	14	2	12					5	26
2:00	0		0						0		14:00	2		6						8	
2:15	0		0						0		14:15	3		2						5	
2:30	1		1						2		14:30	6		8						14	
2:45	0	1	0	1					0	2	14:45	3	14	4	20					7	34
3:00	0		0						0		15:00	6		4						10	
3:15	0		0						0		15:15	5		10						15	
3:30	1		1						2		15:30	3		4						7	
3:45	0	1	0	1					0	2	15:45	8	22	5	23					13	45
4:00	0		0						0		16:00	10		1						11	
4:15	1		1						2		16:15	1		4						5	
4:30	2		0						2		16:30	1		6						7	
4:45	0	3	0	1					0	4	16:45	3	15	3	14					6	29
5:00	0		0						0		17:00	3		2						5	
5:15	1		1						2		17:15	0		3						3	
5:30	2		1						3		17:30	3		2						5	
5:45	3	6	3	5					6	11	17:45	3	9	1	8					4	17
6:00	11		7						18		18:00	2		4						6	
6:15	7		2						9		18:15	0		2						2	
6:30	1		4						5		18:30	2		1						3	
6:45	13	32	3	16					16	48	18:45	3	7	1	8					4	15
7:00	6		3						9		19:00	2		1						3	
7:15	2		4						6		19:15	0		3						3	
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8:15	3		4						7		20:15	3		0						3	
8:30	3		4						7		20:30	0		0						0	
8:45	4	20	4	18					8	38	20:45	0	3	1	3					1	6
9:00	3		1						4		21:00	0		0						0	
9:15	3		2						5		21:15	2		1						3	
9:30	6		7						13		21:30	0		0						0	
9:45	6	18	2	12					8	30	21:45	0	2	1	2					1	4
10:00	4		2						6		22:00	0		2						2	
10:15	6		4						10		22:15	0		0						0	
10:30	5		8						13		22:30	1		1						2	
10:45	4	19	4	18					8	37	22:45	0	1	0	3					0	4
11:00	5		5						10		23:00	3		2						5	
11:15	3		2						5		23:15	1		1						2	
11:30	5		3						8		23:30	1		1						2	
11:45	3	16	4	14					7	30	23:45	2	7	2	6					4	13
TOTALS		133		104						**237**	**TOTALS**		113		121						**234**
SPLIT %		56.1%		43.9%						**50.3%**	**SPLIT %**		48.3%		51.7%						**49.7%**

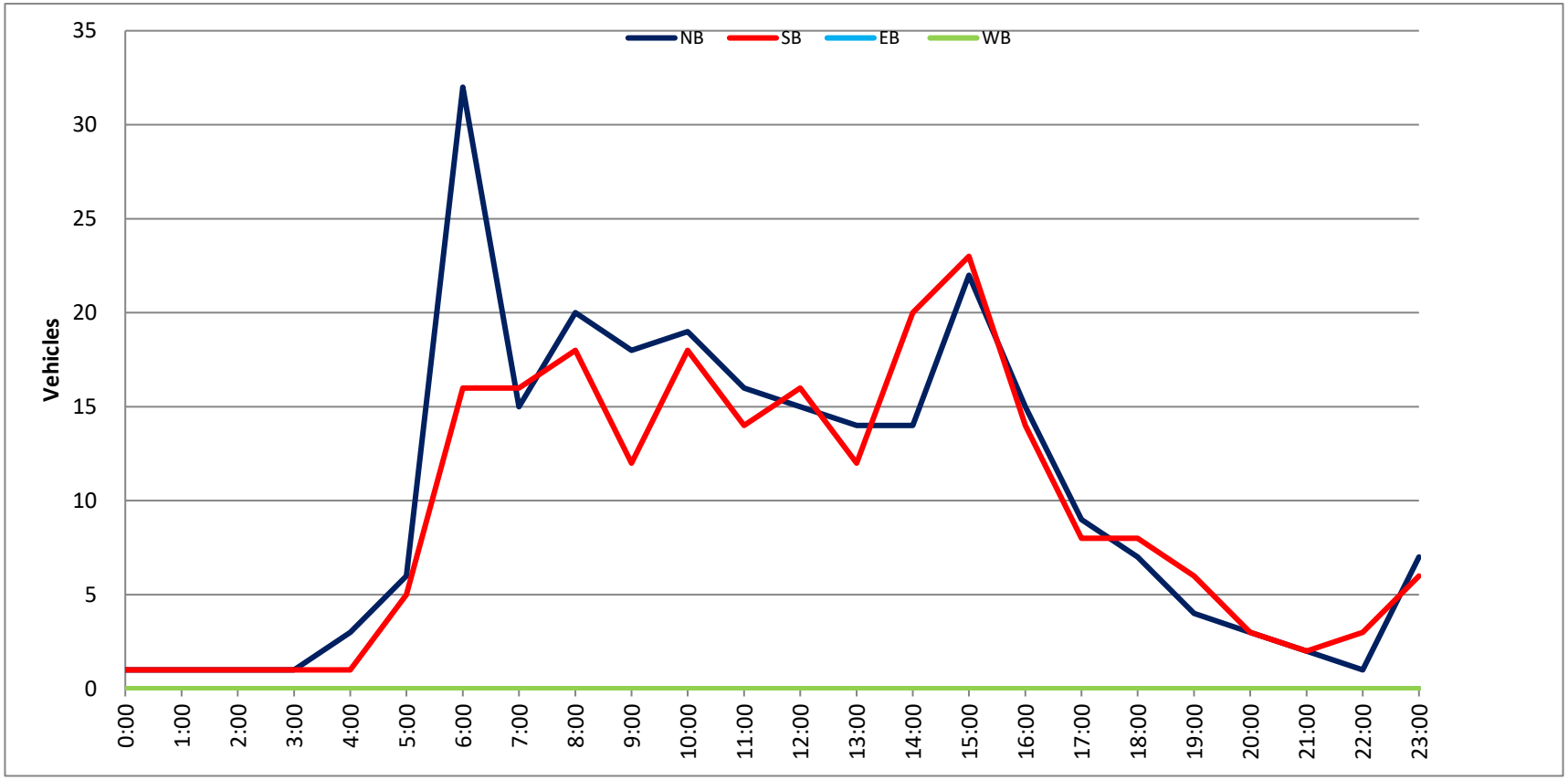
DAILY TOTALS	NB	SB	EB	WB	Total
	246	225	0	0	471

AM Peak Hour	6:00	10:15			**6:00**	**PM Peak Hour**	15:15	14:30			**14:30**
AM Pk Volume	32	21			**48**	**PM Pk Volume**	26	26			**46**
Pk Hr Factor	0.615	0.656			**0.667**	**Pk Hr Factor**	0.650	0.650			**0.767**
7 - 9 Volume	35	34	0	0	**69**	**4 - 6 Volume**	24	22	0	0	**46**
7 - 9 Peak Hour	7:30	7:15			**7:30**	**4 - 6 Peak Hour**	16:00	16:15			**16:00**
7 - 9 Pk Volume	20	19	0	0	**39**	**4 - 6 Pk Volume**	15	15	0	0	**29**
Pk Hr Factor	0.500	0.792	0.000	0.000	**0.609**	**Pk Hr Factor**	0.375	0.625	0.000	0.000	**0.659**

Prepared by NDS/ATD

Project #: CA17_4129_006 **City:** National City

Location: Mckinley Ave Bet. W 19th St & W 23rd St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Mckinley Ave Bet. W 14th St & W 18th St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_007

DAILY TOTALS	NB	SB	EB	WB	Total
	227	366	0	0	593

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	1		1						2		12:00	4		11						15	
0:15	1		0						1		12:15	8		9						17	
0:30	0		0						0		12:30	2		4						6	
0:45	1	3	1	2					2	5	12:45	4	18	10	34					14	52
1:00	0		0						0		13:00	3		7						10	
1:15	0		0						0		13:15	7		11						18	
1:30	0		0						0		13:30	7		1						8	
1:45	0		0						0		13:45	5	22	11	30					16	52
2:00	0		0						0		14:00	6		7						13	
2:15	0		0						0		14:15	6		6						12	
2:30	0		1						1		14:30	6		10						16	
2:45	0		1	2					1	2	14:45	3	21	11	34					14	55
3:00	0		0						0		15:00	1		9						10	
3:15	0		0						0		15:15	8		19						27	
3:30	0		1						1		15:30	8		5						13	
3:45	1	1	1	2					2	3	15:45	2	19	6	39					8	58
4:00	0		0						0		16:00	7		5						12	
4:15	1		0						1		16:15	6		3						9	
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4:45	0	1	0						0	1	16:45	1	16	8	21					9	37
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5:15	0		2						2		17:15	4		2						6	
5:30	2		5						7		17:30	1		3						4	
5:45	1	4	3	10					4	14	17:45	1	10	6	18					7	28
6:00	3		4						7		18:00	2		3						5	
6:15	1		0						1		18:15	0		5						5	
6:30	4		2						6		18:30	4		4						8	
6:45	4	12	3	9					7	21	18:45	1	7	0	12					1	19
7:00	5		5						10		19:00	0		1						1	
7:15	1		10						11		19:15	2		2						4	
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7:45	9	15	8	24					17	39	19:45	1	3	2	8					3	11
8:00	6		7						13		20:00	1		2						3	
8:15	3		6						9		20:15	1		1						2	
8:30	4		4						8		20:30	0		2						2	
8:45	3	16	8	25					11	41	20:45	0	2	0	5					0	7
9:00	3		3						6		21:00	0		0						0	
9:15	5		8						13		21:15	2		1						3	
9:30	2		8						10		21:30	0		3						3	
9:45	5	15	7	26					12	41	21:45	0	2	1	5					1	7
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10:45	2	13	5	21					7	34	22:45	1	4	2	8					3	12
11:00	5		8						13		23:00	2		2						4	
11:15	4		8						12		23:15	0		2						2	
11:30	6		4						10		23:30	0		1						1	
11:45	5	20	6	26					11	46	23:45	1	3	0	5					1	8
TOTALS		100		147						**247**	**TOTALS**		127		219						**346**
SPLIT %		40.5%		59.5%						**41.7%**	**SPLIT %**		36.7%		63.3%						**58.3%**

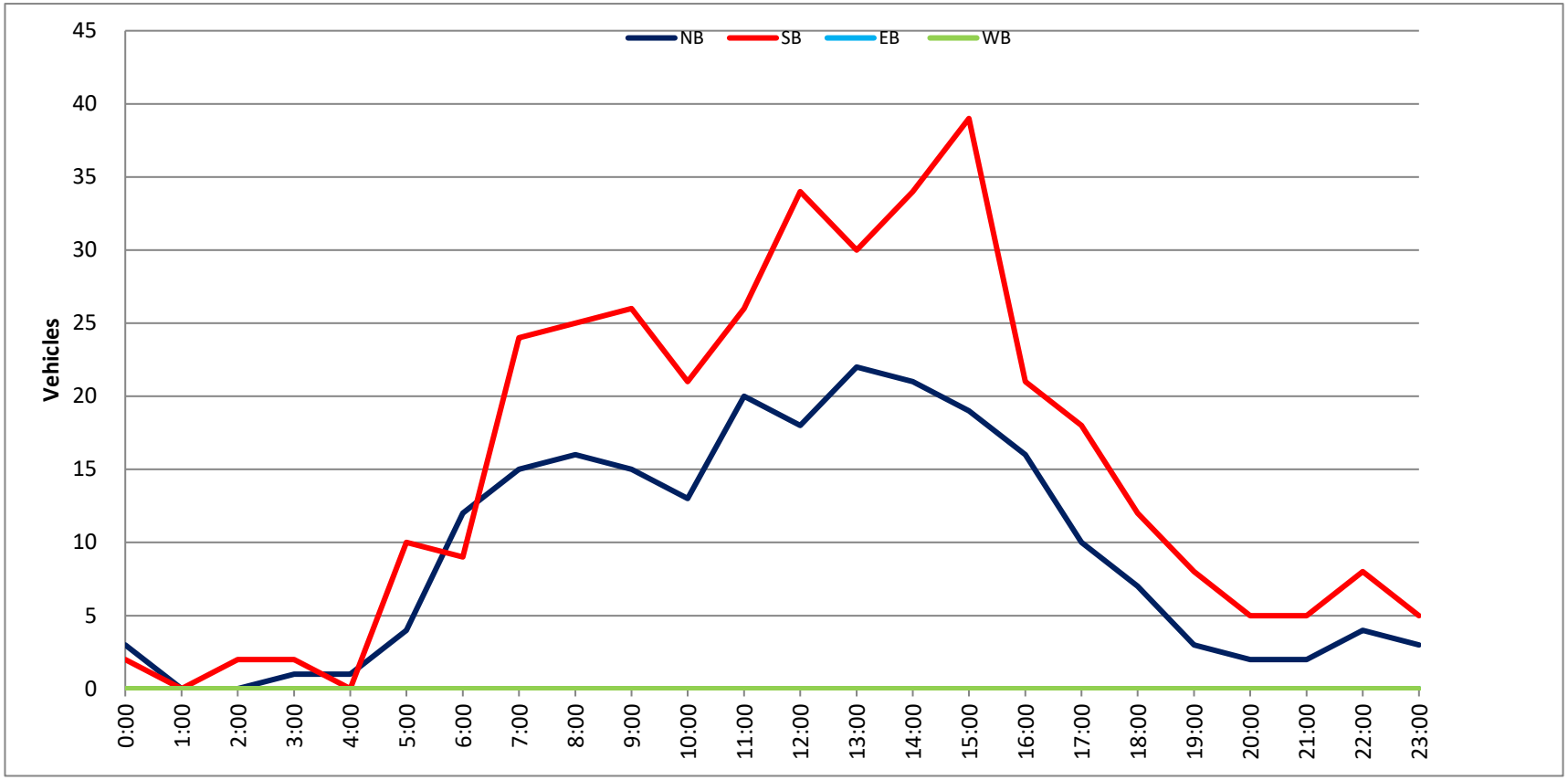
DAILY TOTALS	NB	SB	EB	WB	Total
	227	366	0	0	593

AM Peak Hour	11:30	9:15			**11:30**	**PM Peak Hour**	13:15	14:30			**14:30**
AM Pk Volume	23	31			**53**	**PM Pk Volume**	25	49			**67**
Pk Hr Factor	0.719	0.969			**0.779**	**Pk Hr Factor**	0.893	0.645			**0.620**
7 - 9 Volume	31	49	0	0	**80**	**4 - 6 Volume**	26	39	0	0	**65**
7 - 9 Peak Hour	7:45	7:15			**7:45**	**4 - 6 Peak Hour**	16:00	16:15			**16:00**
7 - 9 Pk Volume	22	26	0	0	**47**	**4 - 6 Pk Volume**	16	23	0	0	**37**
Pk Hr Factor	0.611	0.650	0.000	0.000	**0.691**	**Pk Hr Factor**	0.571	0.719	0.000	0.000	**0.771**

Prepared by NDS/ATD

Project #: CA17_4129_007 **City:** National City

Location: Mckinley Ave Bet. W 14th St & W 18th St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Mckinley Ave Bet. W 18th St & W 19th St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_008

DAILY TOTALS	NB	SB	EB	WB	Total
	234	399	0	0	633

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	1		1						2		12:00	3		4						7	
0:15	0		0						0		12:15	8		8						16	
0:30	0		1						1		12:30	6		8						14	
0:45	1	2	0	2					1	4	12:45	6	23	8	28					14	51
1:00	1		0						1		13:00	3		7						10	
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1:30	1		0						1		13:30	7		1						8	
1:45	0	2	1	2					1	4	13:45	2	21	6	22					8	43
2:00	1		0						1		14:00	3		7						10	
2:15	0		1						1		14:15	8		10						18	
2:30	1		0						1		14:30	7		8						15	
2:45	0	2	1	2					1	4	14:45	3	21	6	31					9	52
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3:30	2		1						3		15:30	4		7						11	
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4:00	0		0						0		16:00	3		6						9	
4:15	1		5						6		16:15	2		10						12	
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11:00	6		4						10		23:00	2		2						4	
11:15	2		2						4		23:15	1		3						4	
11:30	4		5						9		23:30	2		2						4	
11:45	2	14	5	16					7	30	23:45	1	6	1	8					2	14
TOTALS		105		156						261	TOTALS		129		243						372
SPLIT %		40.2%		59.8%						41.2%	SPLIT %		34.7%		65.3%						58.8%

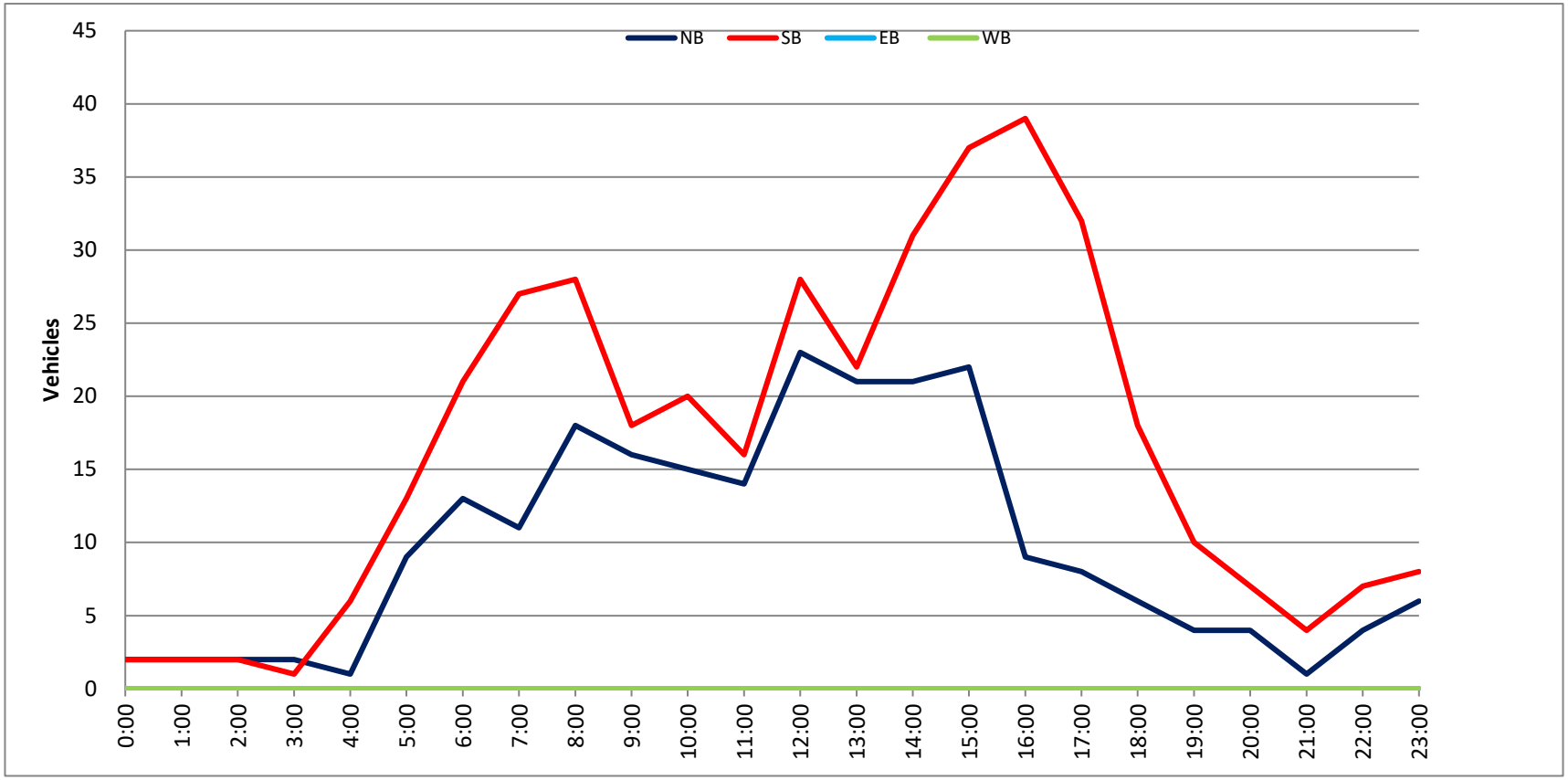
DAILY TOTALS	NB	SB	EB	WB	Total
	234	399	0	0	633

AM Peak Hour	11:45	7:15			7:15	PM Peak Hour	12:45	16:15			15:00
AM Pk Volume	19	34			50	PM Pk Volume	25	42			59
Pk Hr Factor	0.594	0.708			0.658	Pk Hr Factor	0.694	0.700			0.776
7 - 9 Volume	29	55	0	0	84	4 - 6 Volume	17	71	0	0	88
7 - 9 Peak Hour	7:30	7:15			7:15	4 - 6 Peak Hour	16:30	16:15			16:15
7 - 9 Pk Volume	18	34	0	0	50	4 - 6 Pk Volume	11	42	0	0	52
Pk Hr Factor	0.643	0.708	0.000	0.000	0.658	Pk Hr Factor	0.688	0.700	0.000	0.000	0.765

Prepared by NDS/ATD

Project #: CA17_4129_008 **City:** National City

Location: Mckinley Ave Bet. W 18th St & W 19th St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

W 18th St Bet. Cleveland Ave & Mckinley Ave

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_009

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	0	1,148	1,148

AM Period	NB	SB	EB	WB		TOTAL		PM Period	NB	SB	EB	WB		TOTAL	
0:00			0	1		1		12:00			0	21		21	
0:15			0	1		1		12:15			0	27		27	
0:30			0	3		3		12:30			0	25		25	
0:45			0	3	8	3	8	12:45			0	22	95	22	95
1:00			0	0		0		13:00			0	18		18	
1:15			0	1		1		13:15			0	29		29	
1:30			0	2		2		13:30			0	22		22	
1:45			0	0	3	0	3	13:45			0	13	82	13	82
2:00			0	0		0		14:00			0	17		17	
2:15			0	1		1		14:15			0	21		21	
2:30			0	0		0		14:30			0	14		14	
2:45			0	2	3	2	3	14:45			0	24	76	24	76
3:00			0	0		0		15:00			0	19		19	
3:15			0	1		1		15:15			0	19		19	
3:30			0	2		2		15:30			0	22		22	
3:45			0	3	6	3	6	15:45			0	19	79	19	79
4:00			0	0		0		16:00			0	19		19	
4:15			0	2		2		16:15			0	17		17	
4:30			0	3		3		16:30			0	15		15	
4:45			0	8	13	8	13	16:45			0	20	71	20	71
5:00			0	7		7		17:00			0	12		12	
5:15			0	17		17		17:15			0	10		10	
5:30			0	19		19		17:30			0	7		7	
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7:00			0	22		22		19:00			0	5		5	
7:15			0	22		22		19:15			0	9		9	
7:30			0	25		25		19:30			0	5		5	
7:45			0	18	87	18	87	19:45			0	4	23	4	23
8:00			0	23		23		20:00			0	2		2	
8:15			0	32		32		20:15			0	3		3	
8:30			0	18		18		20:30			0	3		3	
8:45			0	17	90	17	90	20:45			0	3	11	3	11
9:00			0	18		18		21:00			0	1		1	
9:15			0	23		23		21:15			0	2		2	
9:30			0	14		14		21:30			0	5		5	
9:45			0	10	65	10	65	21:45			0	2	10	2	10
10:00			0	21		21		22:00			0	2		2	
10:15			0	16		16		22:15			0	1		1	
10:30			0	11		11		22:30			0	3		3	
10:45			0	15	63	15	63	22:45			0	4	10	4	10
11:00			0	21		21		23:00			0	1		1	
11:15			0	24		24		23:15			0	2		2	
11:30			0	21		21		23:30			0	1		1	
11:45			0	26	92	26	92	23:45			0	2	6	2	6
TOTALS					621		621	TOTALS					527		527
SPLIT %					100.0%		54.1%	SPLIT %					100.0%		45.9%

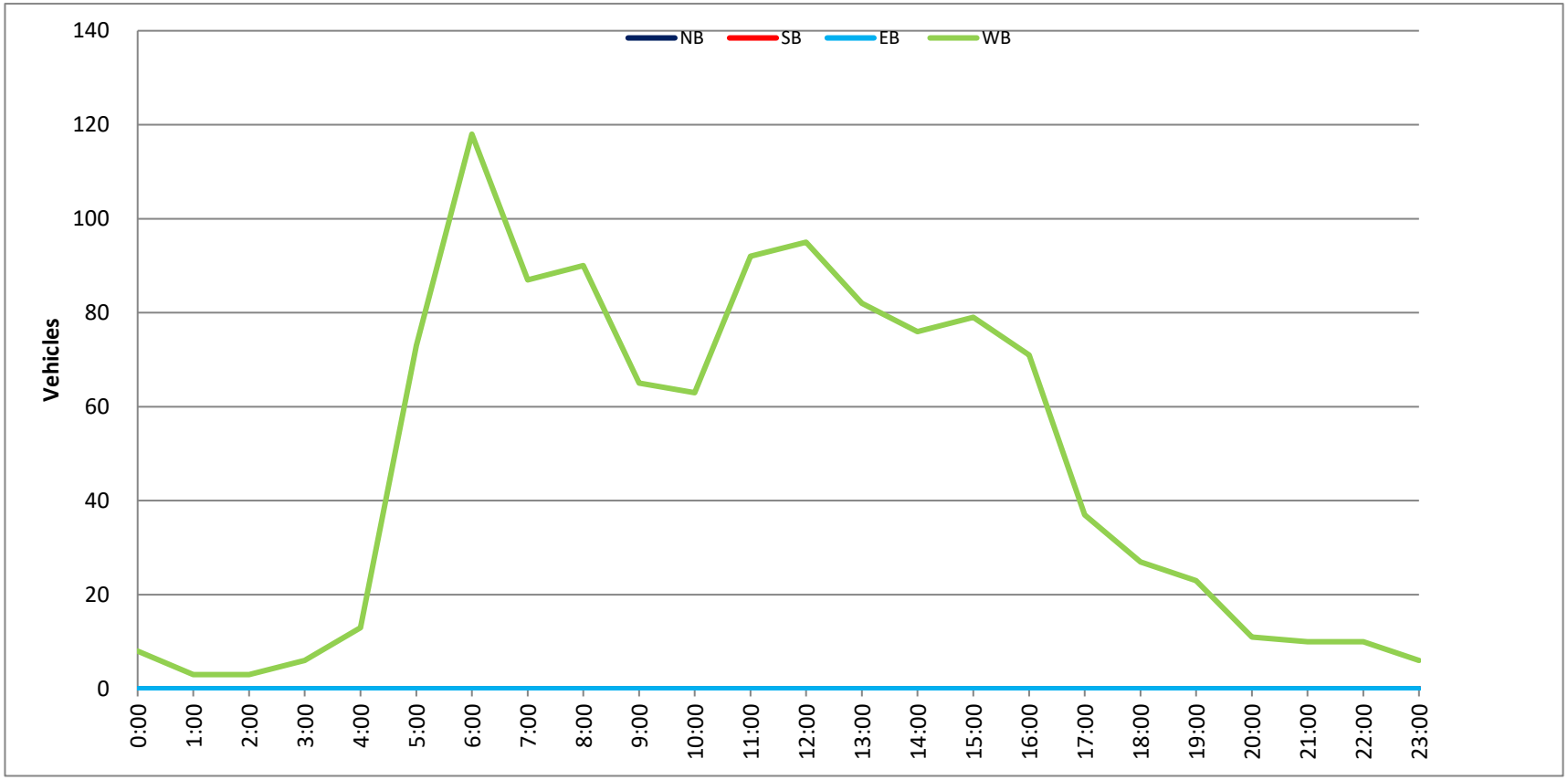
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	0	1,148	1,148

AM Peak Hour					5:45		5:45	PM Peak Hour					12:00		12:00
AM Pk Volume					123		123	PM Pk Volume					95		95
Pk Hr Factor					0.699		0.699	Pk Hr Factor					0.880		0.880
7 - 9 Volume	0	0	0		177		177	4 - 6 Volume	0	0	0		108		108
7 - 9 Peak Hour					7:30		7:30	4 - 6 Peak Hour					16:00		16:00
7 - 9 Pk Volume	0	0	0		98		98	4 - 6 Pk Volume	0	0	0		71		71
Pk Hr Factor	0.000	0.000	0.000		0.766		0.766	Pk Hr Factor	0.000	0.000	0.000		0.888		0.888

Prepared by NDS/ATD

Project #: CA17_4129_009 **City:** National City

Location: W 18th St Bet. Cleveland Ave & Mckinley **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

W 19th St Bet. Tidelands Ave & Cleveland Ave

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_010

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,846	2,091	3,937

AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			10	1	11	12:00			24	24	48
0:15			5	2	7	12:15			24	30	54
0:30			1	1	2	12:30			66	24	90
0:45			0	16 1 5	1 21	12:45			13 127	35 113	48 240
1:00			1	2	3	13:00			22	39	61
1:15			0	2	2	13:15			47	61	108
1:30			1	2	3	13:30			111	40	151
1:45			0	2 2 8	2 10	13:45			43 223	22 162	65 385
2:00			1	0	1	14:00			34	22	56
2:15			0	1	1	14:15			51	19	70
2:30			1	8	9	14:30			65	14	79
2:45			0	2 13 22	13 24	14:45			36 186	11 66	47 252
3:00			0	2	2	15:00			60	17	77
3:15			1	9	10	15:15			47	15	62
3:30			0	20	20	15:30			48	14	62
3:45			0	1 37 68	37 69	15:45			27 182	10 56	37 238
4:00			10	14	24	16:00			89	16	105
4:15			4	19	23	16:15			40	7	47
4:30			23	51	74	16:30			48	6	54
4:45			7	44 70 154	77 198	16:45			21 198	7 36	28 234
5:00			43	32	75	17:00			32	7	39
5:15			11	33	44	17:15			43	5	48
5:30			9	75	84	17:30			22	2	24
5:45			15	78 78 218	93 296	17:45			7 104	6 20	13 124
6:00			16	63	79	18:00			19	2	21
6:15			8	61	69	18:15			4	8	12
6:30			7	74	81	18:30			4	4	8
6:45			7	38 101 299	108 337	18:45			5 32	10 24	15 56
7:00			9	83	92	19:00			8	4	12
7:15			21	56	77	19:15			4	5	9
7:30			24	53	77	19:30			4	13	17
7:45			10	64 55 247	65 311	19:45			3 19	23 45	26 64
8:00			12	36	48	20:00			12	12	24
8:15			25	35	60	20:15			9	21	30
8:30			22	27	49	20:30			28	21	49
8:45			19	78 24 122	43 200	20:45			10 59	28 82	38 141
9:00			27	25	52	21:00			14	3	17
9:15			21	40	61	21:15			7	4	11
9:30			21	15	36	21:30			6	1	7
9:45			18	87 29 109	47 196	21:45			11 38	1 9	12 47
10:00			19	21	40	22:00			35	5	40
10:15			16	16	32	22:15			21	1	22
10:30			23	13	36	22:30			7	2	9
10:45			25	83 20 70	45 153	22:45			3 66	2 10	5 76
11:00			30	21	51	23:00			6	1	7
11:15			22	31	53	23:15			9	2	11
11:30			23	39	62	23:30			3	1	4
11:45			24	99 49 140	73 239	23:45			2 20	2 6	4 26
TOTALS				592 1462	**2054**	**TOTALS**				1254 629	**1883**
SPLIT %				28.8% 71.2%	**52.2%**	**SPLIT %**				66.6% 33.4%	**47.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,846	2,091	3,937

AM Peak Hour				11:45	6:15	**6:30**	**PM Peak Hour**			13:30	12:45	**13:00**
AM Pk Volume				138	319	**358**	**PM Pk Volume**			239	175	**385**
Pk Hr Factor				0.523	0.790	**0.829**	**Pk Hr Factor**			0.538	0.717	**0.637**
7 - 9 Volume	0	0		142	369	**511**	**4 - 6 Volume**	0	0	302	56	**358**
7 - 9 Peak Hour				8:00	7:00	**7:00**	**4 - 6 Peak Hour**			16:00	16:00	**16:00**
7 - 9 Pk Volume	0	0		78	247	**311**	**4 - 6 Pk Volume**	0	0	198	36	**234**
Pk Hr Factor	0.000	0.000		0.780	0.744	**0.845**	**Pk Hr Factor**	0.000	0.000	0.556	0.563	**0.557**

Prepared by NDS/ATD

Project #: CA17_4129_010 **City:** National City

Location: W 19th St Bet. Tidelands Ave & Cleveland **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

W 19th St Bet. Cleveland Ave & Mckinley Ave

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4129_011

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,218	0	2,218

AM Period	NB	SB	EB		WB	TOTAL		PM Period	NB	SB	EB		WB	TOTAL	
00:00			6		0	6		12:00			49		0	49	
00:15			4		0	4		12:15			32		0	32	
00:30			6		0	6		12:30			49		0	49	
00:45			2	18	0	2	18	12:45			49	179	0	49	179
01:00			6		0	6		13:00			50		0	50	
01:15			3		0	3		13:15			53		0	53	
01:30			1		0	1		13:30			41		0	41	
01:45			0	10	0	0	10	13:45			43	187	0	43	187
02:00			2		0	2		14:00			43		0	43	
02:15			2		0	2		14:15			38		0	38	
02:30			3		0	3		14:30			78		0	78	
02:45			1	8	0	1	8	14:45			47	206	0	47	206
03:00			1		0	1		15:00			52		0	52	
03:15			4		0	4		15:15			46		0	46	
03:30			1		0	1		15:30			68		0	68	
03:45			1	7	0	1	7	15:45			51	217	0	51	217
04:00			2		0	2		16:00			59		0	59	
04:15			2		0	2		16:15			55		0	55	
04:30			5		0	5		16:30			57		0	57	
04:45			7	16	0	7	16	16:45			44	215	0	44	215
05:00			11		0	11		17:00			44		0	44	
05:15			13		0	13		17:15			43		0	43	
05:30			15		0	15		17:30			41		0	41	
05:45			27	66	0	27	66	17:45			37	165	0	37	165
06:00			23		0	23		18:00			29		0	29	
06:15			16		0	16		18:15			21		0	21	
06:30			15		0	15		18:30			17		0	17	
06:45			20	74	0	20	74	18:45			8	75	0	8	75
07:00			22		0	22		19:00			13		0	13	
07:15			26		0	26		19:15			18		0	18	
07:30			29		0	29		19:30			13		0	13	
07:45			28	105	0	28	105	19:45			10	54	0	10	54
08:00			19		0	19		20:00			14		0	14	
08:15			26		0	26		20:15			12		0	12	
08:30			19		0	19		20:30			16		0	16	
08:45			24	88	0	24	88	20:45			10	52	0	10	52
09:00			34		0	34		21:00			13		0	13	
09:15			18		0	18		21:15			16		0	16	
09:30			24		0	24		21:30			10		0	10	
09:45			32	108	0	32	108	21:45			7	46	0	7	46
10:00			25		0	25		22:00			17		0	17	
10:15			23		0	23		22:15			12		0	12	
10:30			31		0	31		22:30			11		0	11	
10:45			40	119	0	40	119	22:45			8	48	0	8	48
11:00			29		0	29		23:00			6		0	6	
11:15			37		0	37		23:15			10		0	10	
11:30			33		0	33		23:30			6		0	6	
11:45			30	129	0	30	129	23:45			4	26	0	4	26
TOTALS			748			748		TOTALS			1470			1470	
SPLIT %			100.0%			33.7%		SPLIT %			100.0%			66.3%	

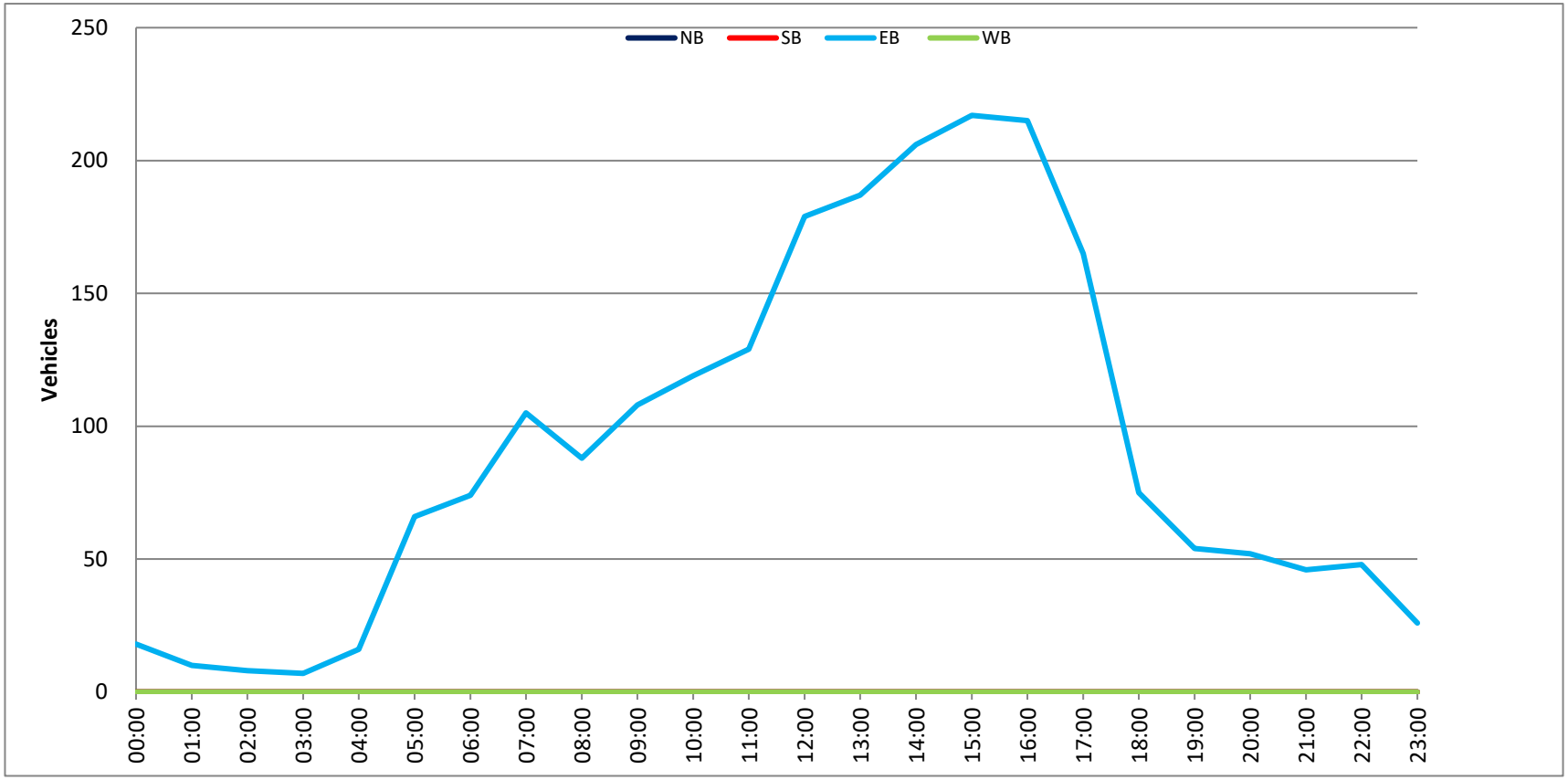
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,218	0	2,218

AM Peak Hour			11:45			11:45		PM Peak Hour			15:30			15:30	
AM Pk Volume			160			160		PM Pk Volume			233			233	
Pk Hr Factor			0.816			0.816		Pk Hr Factor			0.857			0.857	
7 - 9 Volume	0	0	193	0		193		4 - 6 Volume	0	0	380	0		380	
7 - 9 Peak Hour			07:00			07:00		4 - 6 Peak Hour			16:00			16:00	
7 - 9 Pk Volume	0	0	105	0		105		4 - 6 Pk Volume	0	0	215	0		215	
Pk Hr Factor	0.000	0.000	0.905	0.000		0.905		Pk Hr Factor	0.000	0.000	0.911	0.000		0.911	

Prepared by NDS/ATD

Project #: CA17_4129_011 **City:** National City

Location: W 19th St Bet. Cleveland Ave & Mckinley **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Bay Marina Dr Bet. Marina Way & Cleveland Ave

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,689	4,783	8,472

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			6		6		12		12:00			83		83		166	
0:15			7		3		10		12:15			64		94		158	
0:30			1		3		4		12:30			63		72		135	
0:45			2	16	7	19	9	35	12:45			82	292	85	334	167	626
1:00			3		4		7		13:00			72		67		139	
1:15			3		1		4		13:15			45		88		133	
1:30			1		9		10		13:30			78		52		130	
1:45			8	15	12	26	20	41	13:45			64	259	81	288	145	547
2:00			1		3		4		14:00			90		63		153	
2:15			5		18		23		14:15			88		95		183	
2:30			2		5		7		14:30			196		68		264	
2:45			3	11	15	41	18	52	14:45			136	510	64	290	200	800
3:00			3		12		15		15:00			98		47		145	
3:15			10		12		22		15:15			51		56		107	
3:30			9		7		16		15:30			56		42		98	
3:45			3	25	22	53	25	78	15:45			45	250	49	194	94	444
4:00			4		20		24		16:00			60		48		108	
4:15			4		31		35		16:15			57		29		86	
4:30			18		31		49		16:30			124		26		150	
4:45			10	36	59	141	69	177	16:45			89	330	25	128	114	458
5:00			9		81		90		17:00			66		31		97	
5:15			16		114		130		17:15			30		21		51	
5:30			16		152		168		17:30			61		23		84	
5:45			12	53	195	542	207	595	17:45			33	190	17	92	50	282
6:00			33		141		174		18:00			46		30		76	
6:15			16		107		123		18:15			43		33		76	
6:30			19		97		116		18:30			48		22		70	
6:45			19	87	195	540	214	627	18:45			19	156	25	110	44	266
7:00			19		138		157		19:00			41		32		73	
7:15			51		133		184		19:15			46		24		70	
7:30			25		111		136		19:30			42		16		58	
7:45			20	115	95	477	115	592	19:45			31	160	19	91	50	251
8:00			15		123		138		20:00			44		13		57	
8:15			21		110		131		20:15			18		11		29	
8:30			30		101		131		20:30			27		17		44	
8:45			18	84	98	432	116	516	20:45			27	116	12	53	39	169
9:00			32		83		115		21:00			20		18		38	
9:15			28		59		87		21:15			18		14		32	
9:30			35		61		96		21:30			12		21		33	
9:45			51	146	53	256	104	402	21:45			11	61	5	58	16	119
10:00			64		54		118		22:00			21		8		29	
10:15			68		61		129		22:15			11		7		18	
10:30			62		56		118		22:30			10		7		17	
10:45			80	274	78	249	158	523	22:45			11	53	0	22	11	75
11:00			72		71		143		23:00			41		7		48	
11:15			100		78		178		23:15			14		8		22	
11:30			95		81		176		23:30			11		9		20	
11:45			87	354	88	318	175	672	23:45			30	96	5	29	35	125
TOTALS				1216		3094		**4310**	**TOTALS**				2473		1689		**4162**
SPLIT %				28.2%		71.8%		**50.9%**	**SPLIT %**				59.4%		40.6%		**49.1%**

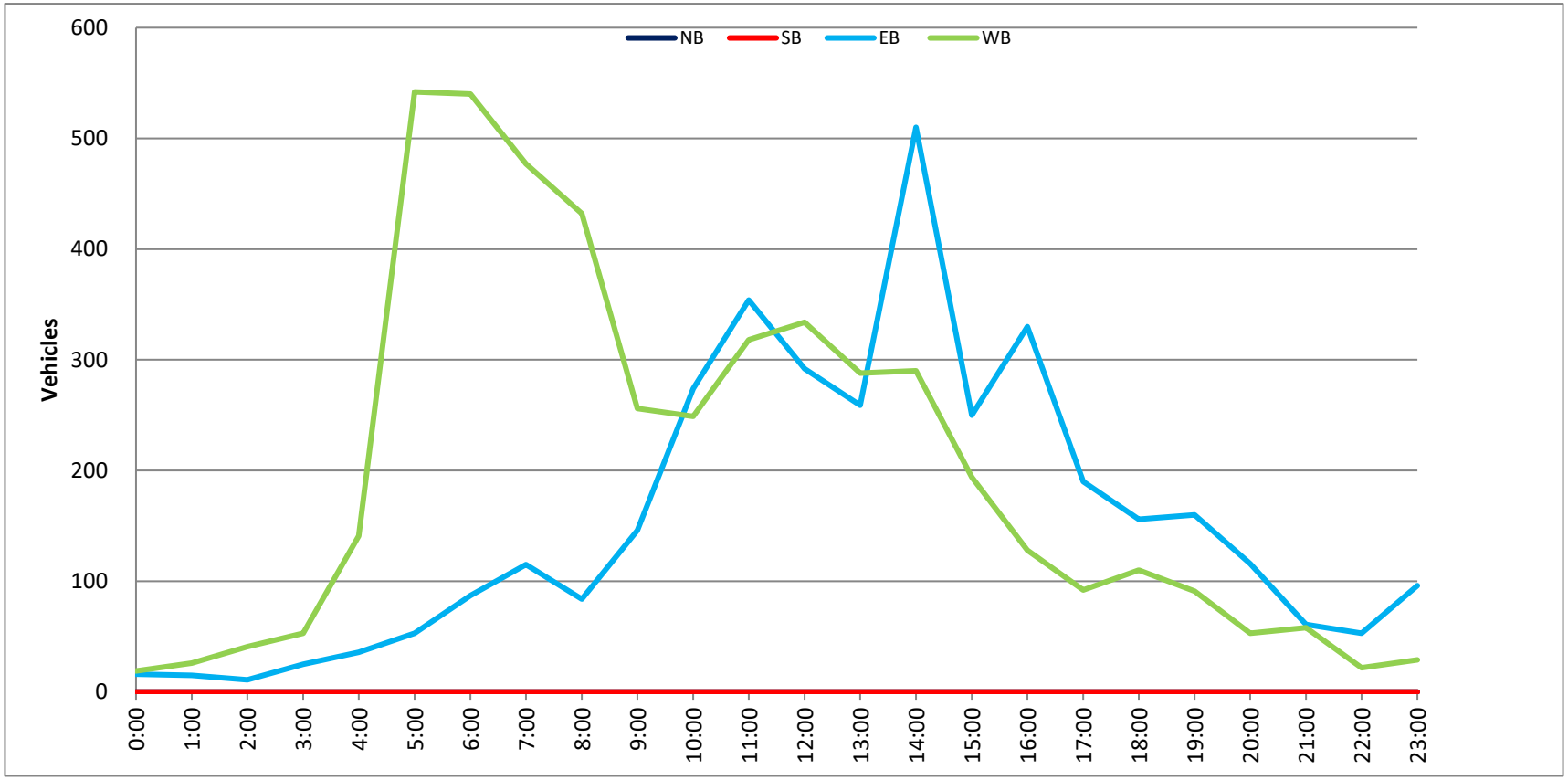
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,689	4,783	8,472

AM Peak Hour				11:15		5:15		**11:15**	**PM Peak Hour**				14:15		12:00		**14:00**
AM Pk Volume				365		602		**695**	**PM Pk Volume**				518		334		**800**
Pk Hr Factor				0.913		0.772		**0.976**	**Pk Hr Factor**				0.661		0.888		**0.758**
7 - 9 Volume	0	0		199		909		**1108**	**4 - 6 Volume**	0	0		520		220		**740**
7 - 9 Peak Hour				7:00		7:00		**7:00**	**4 - 6 Peak Hour**				16:15		16:00		**16:00**
7 - 9 Pk Volume	0	0		115		477		**592**	**4 - 6 Pk Volume**	0	0		336		128		**458**
Pk Hr Factor	0.000	0.000		0.564		0.864		**0.804**	**Pk Hr Factor**	0.000	0.000		0.677		0.667		**0.763**

Prepared by NDS/ATD

Project #: CA17_4132_002 **City:** National City

Location: Bay Marina Dr Bet. Marina Way & Cleveland **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Bay Marina Dr Bet. Tidelands Ave & Marina Way

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_003

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,553	4,020	7,573

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			5		5		10		12:00			75		62		137	
0:15			7		3		10		12:15			76		87		163	
0:30			2		2		4		12:30			70		65		135	
0:45			4	18	5	15	9	33	12:45			67	288	74	288	141	576
1:00			7		3		10		13:00			56		58		114	
1:15			3		1		4		13:15			54		73		127	
1:30			1		7		8		13:30			73		46		119	
1:45			11	22	11	22	22	44	13:45			54	237	68	245	122	482
2:00			0		2		2		14:00			75		51		126	
2:15			4		17		21		14:15			73		86		159	
2:30			3		4		7		14:30			175		55		230	
2:45			2	9	15	38	17	47	14:45			108	431	52	244	160	675
3:00			3		11		14		15:00			135		44		179	
3:15			9		10		19		15:15			87		43		130	
3:30			10		7		17		15:30			91		36		127	
3:45			3	25	21	49	24	74	15:45			77	390	40	163	117	553
4:00			9		19		28		16:00			95		34		129	
4:15			7		26		33		16:15			78		23		101	
4:30			20		28		48		16:30			127		14		141	
4:45			9	45	53	126	62	171	16:45			56	356	21	92	77	448
5:00			12		71		83		17:00			36		22		58	
5:15			15		103		118		17:15			25		15		40	
5:30			19		138		157		17:30			48		21		69	
5:45			13	59	182	494	195	553	17:45			25	134	10	68	35	202
6:00			27		122		149		18:00			39		28		67	
6:15			19		100		119		18:15			35		24		59	
6:30			25		84		109		18:30			41		17		58	
6:45			19	90	176	482	195	572	18:45			16	131	19	88	35	219
7:00			35		129		164		19:00			25		23		48	
7:15			73		117		190		19:15			39		20		59	
7:30			27		98		125		19:30			28		8		36	
7:45			24	159	70	414	94	573	19:45			20	112	13	64	33	176
8:00			25		99		124		20:00			27		9		36	
8:15			30		59		89		20:15			11		6		17	
8:30			38		85		123		20:30			23		11		34	
8:45			41	134	88	331	129	465	20:45			18	79	9	35	27	114
9:00			40		70		110		21:00			19		13		32	
9:15			36		49		85		21:15			7		13		20	
9:30			36		47		83		21:30			10		12		22	
9:45			46	158	45	211	91	369	21:45			9	45	4	42	13	87
10:00			43		43		86		22:00			20		6		26	
10:15			46		50		96		22:15			8		5		13	
10:30			45		48		93		22:30			15		8		23	
10:45			56	190	57	198	113	388	22:45			10	53	4	23	14	76
11:00			66		52		118		23:00			37		7		44	
11:15			79		68		147		23:15			15		5		20	
11:30			83		68		151		23:30			10		6		16	
11:45			73	301	76	264	149	565	23:45			25	87	6	24	31	111
TOTALS				1210		2644		**3854**	**TOTALS**				2343		1376		**3719**
SPLIT %				31.4%		68.6%		**50.9%**	**SPLIT %**				63.0%		37.0%		**49.1%**

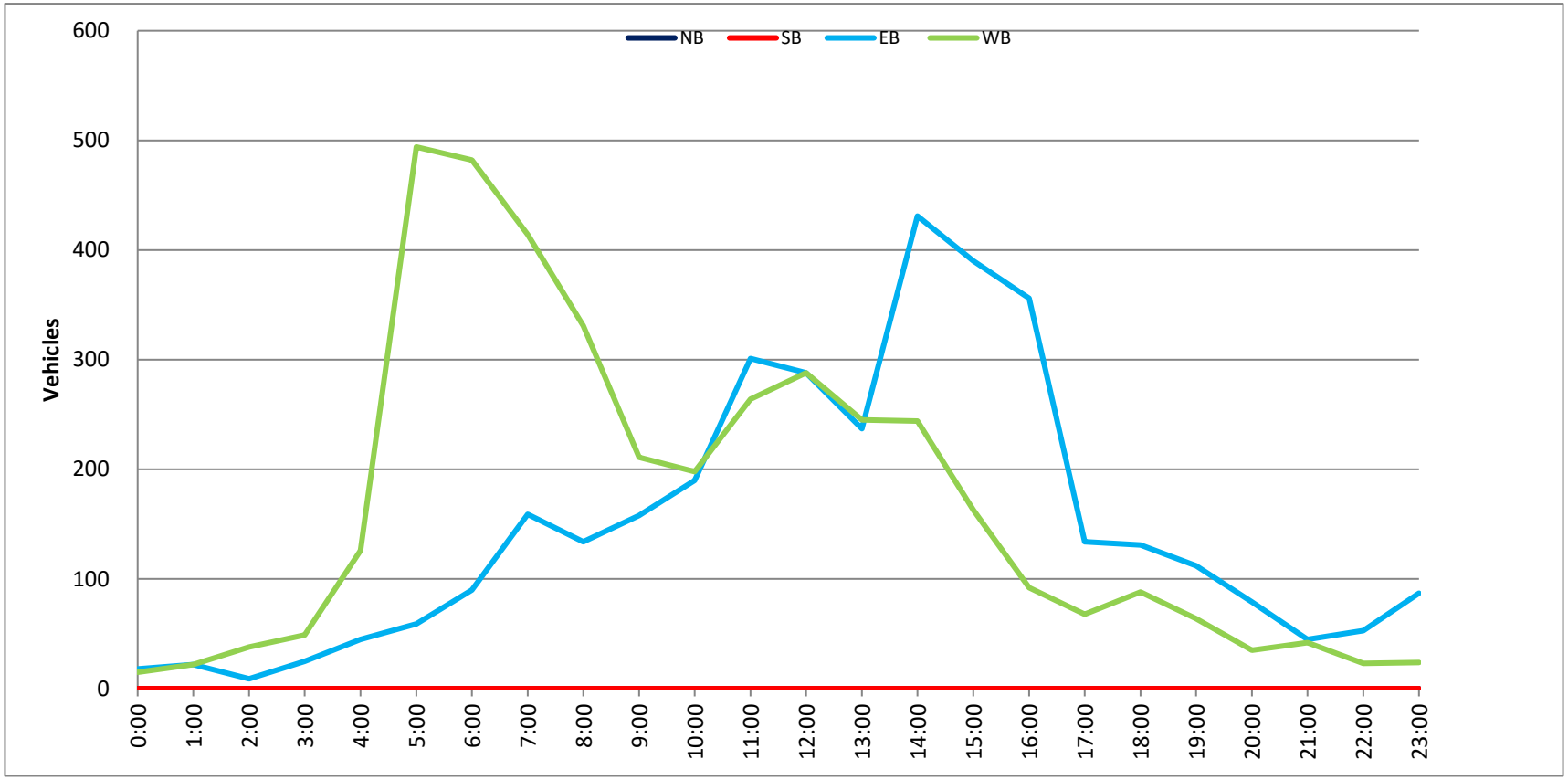
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,553	4,020	7,573

AM Peak Hour			11:15	5:15	**6:45**	**PM Peak Hour**			14:30	12:00	**14:15**
AM Pk Volume			310	545	**674**	**PM Pk Volume**			505	288	**728**
Pk Hr Factor			0.934	0.749	**0.864**	**Pk Hr Factor**			0.721	0.828	**0.791**
7 - 9 Volume	0	0	293	745	**1038**	**4 - 6 Volume**	0	0	490	160	**650**
7 - 9 Peak Hour			7:00	7:00	**7:00**	**4 - 6 Peak Hour**			16:00	16:00	**16:00**
7 - 9 Pk Volume	0	0	159	414	**573**	**4 - 6 Pk Volume**	0	0	356	92	**448**
Pk Hr Factor	0.000	0.000	0.545	0.802	**0.754**	**Pk Hr Factor**	0.000	0.000	0.701	0.676	**0.794**

Prepared by NDS/ATD

Project #: CA17_4132_003 **City:** National City

Location: Bay Marina Dr Bet. Tidelands Ave & Marina **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Marina Way Bet. Bay Marina Dwy & W 32ns St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_017

DAILY TOTALS	NB	SB	EB	WB	Total
	747	643	0	0	1,390

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00	1		2						3		12:00	15		20						35	
0:15	1		0						1		12:15	13		15						28	
0:30	0		1						1		12:30	10		12						22	
0:45	1	3	2	5					3	8	12:45	18	56	15	62					33	118
1:00	0		1						1		13:00	14		12						26	
1:15	1		1						2		13:15	9		14						23	
1:30	2		1						3		13:30	18		13						31	
1:45	0	3	0	3					0	6	13:45	10	51	13	52					23	103
2:00	2		1						3		14:00	14		15						29	
2:15	1		0						1		14:15	15		11						26	
2:30	0		1						1		14:30	19		10						29	
2:45	1	4	0	2					1	6	14:45	17	65	6	42					23	107
3:00	0		0						0		15:00	17		12						29	
3:15	1		1						2		15:15	16		13						29	
3:30	1		0						1		15:30	14		8						22	
3:45	0	2	0	1					0	3	15:45	5	52	9	42					14	94
4:00	1		1						2		16:00	9		15						24	
4:15	0		0						0		16:15	8		11						19	
4:30	2		0						2		16:30	32		11						43	
4:45	4	7	2	3					6	10	16:45	15	64	6	43					21	107
5:00	1		0						1		17:00	29		7						36	
5:15	2		3						5		17:15	10		14						24	
5:30	3		5						8		17:30	9		10						19	
5:45	7	13	1	9					8	22	17:45	7	55	10	41					17	96
6:00	6		10						16		18:00	8		7						15	
6:15	8		2						10		18:15	8		13						21	
6:30	7		4						11		18:30	4		8						12	
6:45	5	26	1	17					6	43	18:45	5	25	7	35					12	60
7:00	4		2						6		19:00	10		11						21	
7:15	4		4						8		19:15	11		11						22	
7:30	12		5						17		19:30	13		11						24	
7:45	3	23	12	23					15	46	19:45	13	47	7	40					20	87
8:00	9		18						27		20:00	14		7						21	
8:15	3		4						7		20:15	8		5						13	
8:30	13		9						22		20:30	3		8						11	
8:45	7	32	8	39					15	71	20:45	7	32	6	26					13	58
9:00	11		5						16		21:00	1		4						5	
9:15	5		8						13		21:15	10		2						12	
9:30	10		4						14		21:30	4		7						11	
9:45	14	40	7	24					21	64	21:45	2	17	4	17					6	34
10:00	18		7						25		22:00	1		4						5	
10:15	14		8						22		22:15	4		2						6	
10:30	10		8						18		22:30	5		2						7	
10:45	11	53	14	37					25	90	22:45	2	12	1	9					3	21
11:00	10		10						20		23:00	3		2						5	
11:15	14		13						27		23:15	4		4						8	
11:30	16		20						36		23:30	2		2						4	
11:45	13	53	19	62					32	115	23:45	3	12	1	9					4	21
TOTALS		259		225						**484**	**TOTALS**		488		418						**906**
SPLIT %		53.5%		46.5%						**34.8%**	**SPLIT %**		53.9%		46.1%						**65.2%**

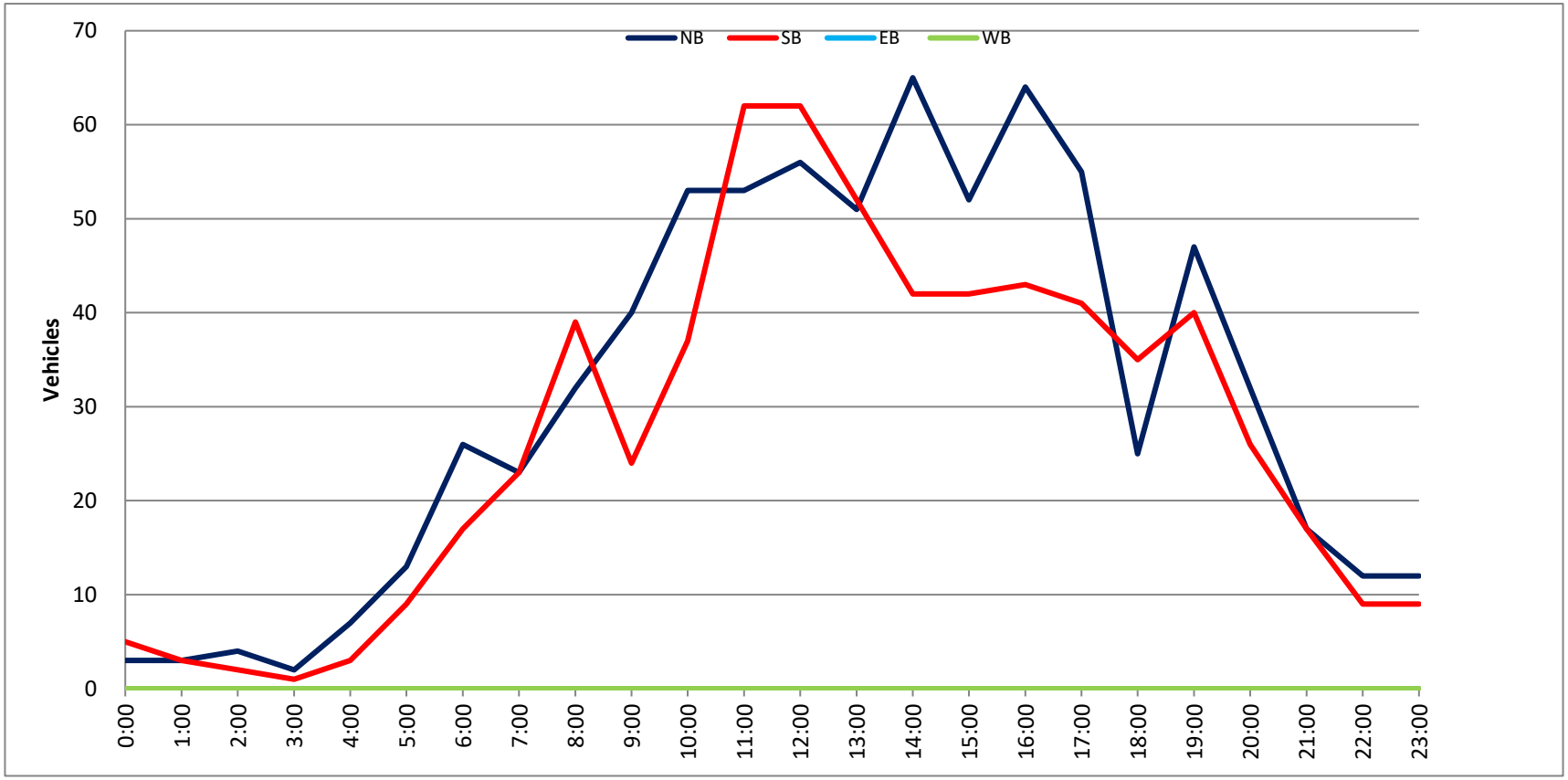
DAILY TOTALS	NB	SB	EB	WB	Total
	747	643	0	0	1,390

AM Peak Hour	11:15	11:30			**11:30**	**PM Peak Hour**	16:30	12:00			**16:30**
AM Pk Volume	58	74			**131**	**PM Pk Volume**	86	62			**124**
Pk Hr Factor	0.906	0.925			**0.910**	**Pk Hr Factor**	0.672	0.775			**0.721**
7 - 9 Volume	55	62	0	0	**117**	**4 - 6 Volume**	119	84	0	0	**203**
7 - 9 Peak Hour	8:00	7:45			**7:45**	**4 - 6 Peak Hour**	16:30	16:00			**16:30**
7 - 9 Pk Volume	32	43	0	0	**71**	**4 - 6 Pk Volume**	86	43	0	0	**124**
Pk Hr Factor	0.615	0.597	0.000	0.000	**0.657**	**Pk Hr Factor**	0.672	0.717	0.000	0.000	**0.721**

Prepared by NDS/ATD

Project #: CA17_4132_017 **City:** National City

Location: Marina Way Bet. Bay Marina Dwy & W 32ns **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

N Harbor Dr Bet. Belt St & Civic Center Dr

Day: Tuesday
Date: 5/2/2017

City: San Diego
Project #: CA17_4132_025

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	9,863	9,519	19,382

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
0:00					14		4		18		12:00					133		169		302	
0:15					9		4		13		12:15					119		139		258	
0:30					19		4		23		12:30					97		157		254	
0:45					11	53	5	17	16	70	12:45					107	456	169	634	276	1090
1:00					11		3		14		13:00					121		108		229	
1:15					2		3		5		13:15					136		143		279	
1:30					13		7		20		13:30					148		137		285	
1:45					7	33	9	22	16	55	13:45					137	542	124	512	261	1054
2:00					3		7		10		14:00					178		154		332	
2:15					2		9		11		14:15					166		187		353	
2:30					2		11		13		14:30					303		181		484	
2:45					2	9	20	47	22	56	14:45					386	1033	167	689	553	1722
3:00					2		22		24		15:00					342		173		515	
3:15					3		41		44		15:15					340		132		472	
3:30					2		56		58		15:30					358		139		497	
3:45					6	13	87	206	93	219	15:45					373	1413	114	558	487	1971
4:00					9		86		95		16:00					370		105		475	
4:15					9		114		123		16:15					367		94		461	
4:30					15		144		159		16:30					333		75		408	
4:45					21	54	116	460	137	514	16:45					386	1456	66	340	452	1796
5:00					28		131		159		17:00					321		89		410	
5:15					35		159		194		17:15					373		79		452	
5:30					49		167		216		17:30					334		90		424	
5:45					59	171	131	588	190	759	17:45					272	1300	55	313	327	1613
6:00					45		168		213		18:00					160		63		223	
6:15					52		152		204		18:15					122		67		189	
6:30					63		151		214		18:30					89		55		144	
6:45					51	211	190	661	241	872	18:45					80	451	41	226	121	677
7:00					68		222		290		19:00					66		41		107	
7:15					61		222		283		19:15					94		38		132	
7:30					63		279		342		19:30					56		50		106	
7:45					60	252	259	982	319	1234	19:45					56	272	27	156	83	428
8:00					57		239		296		20:00					54		25		79	
8:15					62		299		361		20:15					52		28		80	
8:30					53		286		339		20:30					50		17		67	
8:45					49	221	277	1101	326	1322	20:45					32	188	11	81	43	269
9:00					75		249		324		21:00					28		14		42	
9:15					76		208		284		21:15					23		16		39	
9:30					77		129		206		21:30					36		9		45	
9:45					90	318	129	715	219	1033	21:45					30	117	13	52	43	169
10:00					121		110		231		22:00					40		18		58	
10:15					107		120		227		22:15					32		16		48	
10:30					114		101		215		22:30					29		15		44	
10:45					109	451	118	449	227	900	22:45					29	130	7	56	36	186
11:00					148		152		300		23:00					52		7		59	
11:15					144		130		274		23:15					25		11		36	
11:30					142		176		318		23:30					61		12		73	
11:45					115	549	157	615	272	1164	23:45					32	170	9	39	41	209
TOTALS						2335		5863		8198	TOTALS						7528		3656		11184
SPLIT %						28.5%		71.5%		42.3%	SPLIT %						67.3%		32.7%		57.7%

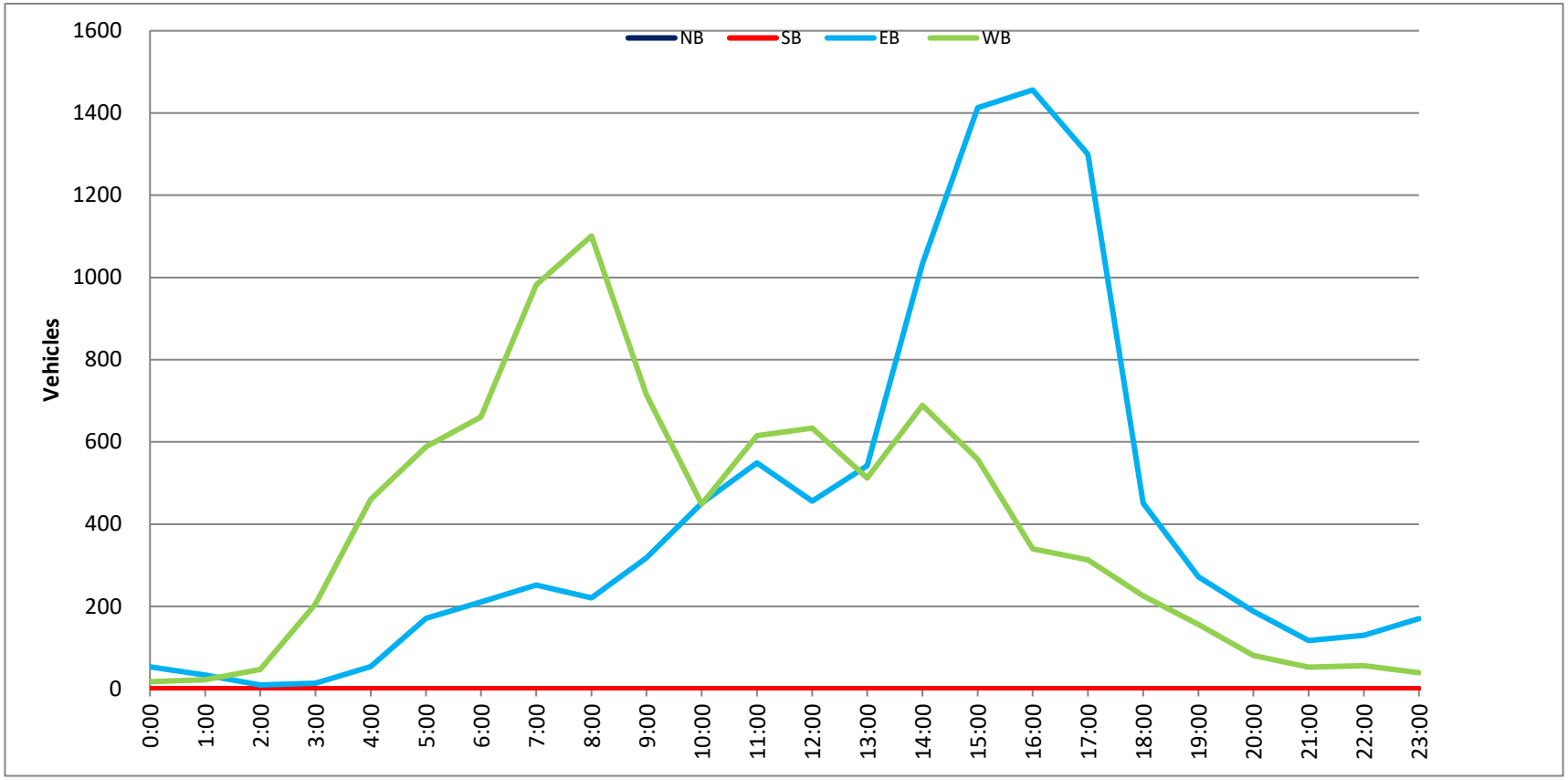
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	9,863	9,519	19,382

AM Peak Hour			11:00	8:15	8:15	PM Peak Hour			15:30	14:15	14:45
AM Pk Volume			549	1111	1350	PM Pk Volume			1468	708	2037
Pk Hr Factor			0.927	0.929	0.935	Pk Hr Factor			0.984	0.947	0.921
7 - 9 Volume	0	0	473	2083	2556	4 - 6 Volume	0	0	2756	653	3409
7 - 9 Peak Hour			7:00	8:00	8:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	252	1101	1322	4 - 6 Pk Volume	0	0	1456	340	1796
Pk Hr Factor	0.000	0.000	0.926	0.921	0.916	Pk Hr Factor	0.000	0.000	0.943	0.810	0.945

Prepared by NDS/ATD

Project #: CA17_4132_025 **City:** San Diego

Location: N Harbor Dr Bet. Belt St & Civic Center Dr **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Tidelands Ave Bet. W 19th St & Bay Marina Dr

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_032

DAILY TOTALS	NB	SB	EB	WB	Total
	1,243	972	0	0	2,215

AM Period	NB		SB		EB		WB		TOTAL	
0:00	1		1						2	
0:15	0		0						0	
0:30	1		1						2	
0:45	0	2	0	2					0	4
1:00	2		1						3	
1:15	0		0						0	
1:30	0		1						1	
1:45	3	5	0	2					3	7
2:00	0		3						3	
2:15	1		0						1	
2:30	0		0						0	
2:45	0	1	1	4					1	5
3:00	0		1						1	
3:15	1		0						1	
3:30	0		1						1	
3:45	3	4	0	2					3	6
4:00	0		0						0	
4:15	1		5						6	
4:30	10		1						11	
4:45	7	18	0	6					7	24
5:00	15		1						16	
5:15	31		3						34	
5:30	40		3						43	
5:45	56	142	8	15					64	157
6:00	39		1						40	
6:15	44		8						52	
6:30	44		7						51	
6:45	57	184	5	21					62	205
7:00	47		12						59	
7:15	47		9						56	
7:30	43		12						55	
7:45	19	156	9	42					28	198
8:00	44		13						57	
8:15	22		15						37	
8:30	38		30						68	
8:45	24	128	35	93					59	221
9:00	24		10						34	
9:15	16		20						36	
9:30	18		21						39	
9:45	18	76	19	70					37	146
10:00	20		19						39	
10:15	23		37						60	
10:30	16		22						38	
10:45	13	72	39	117					52	189
11:00	18		18						36	
11:15	14		21						35	
11:30	19		41						60	
11:45	32	83	16	96					48	179
TOTALS		871		470						**1341**
SPLIT %		65.0%		35.0%						**60.5%**

PM Period	NB		SB		EB		WB		TOTAL	
12:00	10		23						33	
12:15	28		15						43	
12:30	10		21						31	
12:45	19	67	19	78					38	145
13:00	12		27						39	
13:15	12		20						32	
13:30	17		14						31	
13:45	13	54	19	80					32	134
14:00	19		19						38	
14:15	15		25						40	
14:30	13		37						50	
14:45	16	63	13	94					29	157
15:00	11		16						27	
15:15	4		21						25	
15:30	8		21						29	
15:45	9	32	15	73					24	105
16:00	15		32						47	
16:15	7		13						20	
16:30	5		9						14	
16:45	7	34	9	63					16	97
17:00	16		5						21	
17:15	13		11						24	
17:30	6		11						17	
17:45	8	43	4	31					12	74
18:00	7		8						15	
18:15	2		4						6	
18:30	12		6						18	
18:45	5	26	9	27					14	53
19:00	11		3						14	
19:15	2		8						10	
19:30	1		5						6	
19:45	3	17	3	19					6	36
20:00	2		5						7	
20:15	2		5						7	
20:30	1		1						2	
20:45	2	7	2	13					4	20
21:00	4		2						6	
21:15	3		3						6	
21:30	2		1						3	
21:45	1	10	1	7					2	17
22:00	1		2						3	
22:15	2		3						5	
22:30	2		1						3	
22:45	3	8	2	8					5	16
23:00	3		3						6	
23:15	4		2						6	
23:30	2		3						5	
23:45	2	11	1	9					3	20
TOTALS		372		502						**874**
SPLIT %		42.6%		57.4%						**39.5%**

DAILY TOTALS	NB	SB	EB	WB	Total
	1,243	972	0	0	2,215

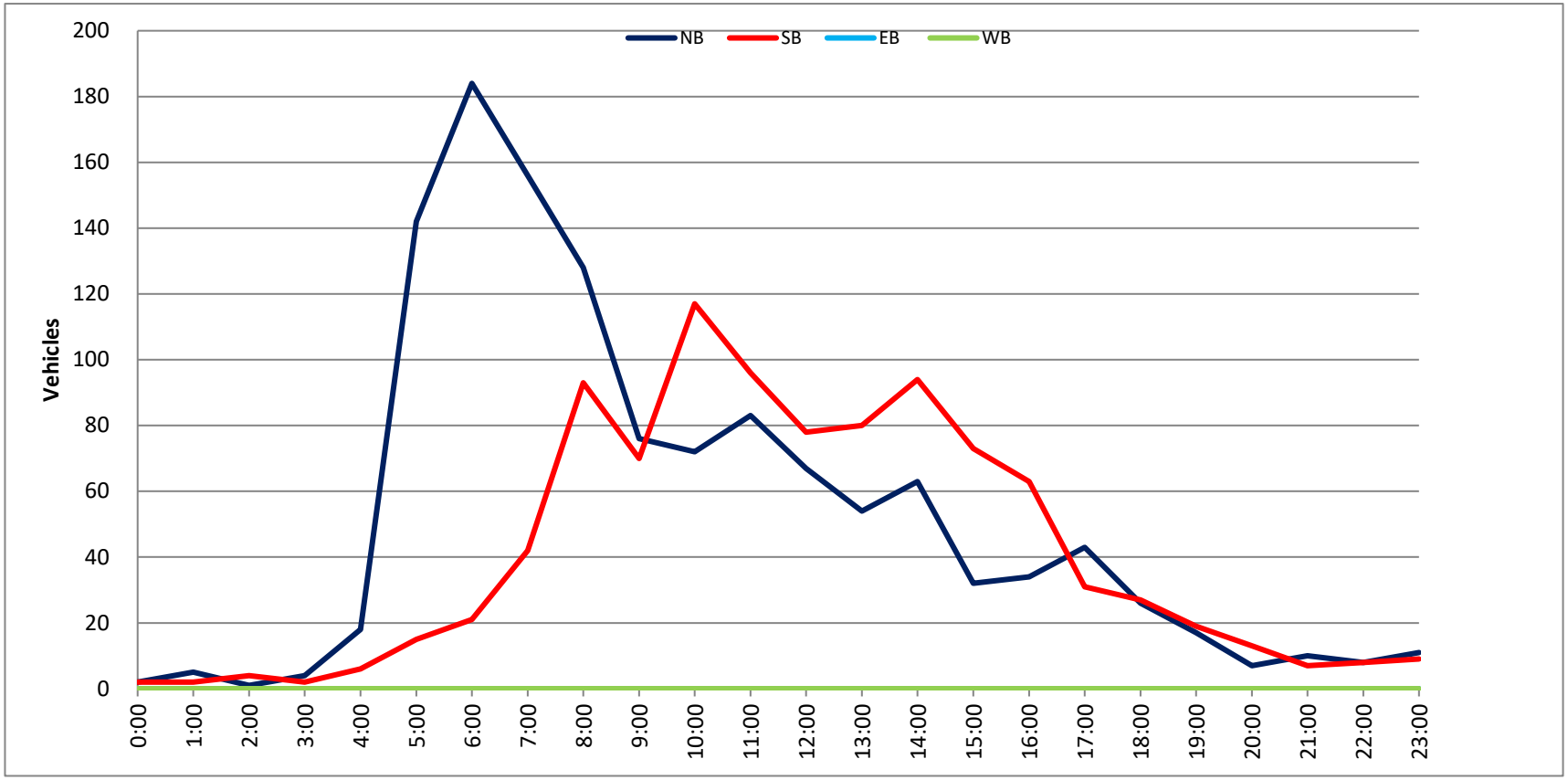
AM Peak Hour	6:30	10:45			**6:45**
AM Pk Volume	195	119			**232**
Pk Hr Factor	0.855	0.726			**0.935**
7 - 9 Volume	284	135	0	0	**419**
7 - 9 Peak Hour	7:00	8:00			**8:00**
7 - 9 Pk Volume	156	93	0	0	**221**
Pk Hr Factor	0.830	0.664	0.000	0.000	**0.813**

PM Peak Hour	12:15	13:45			**13:45**
PM Pk Volume	69	100			**160**
Pk Hr Factor	0.616	0.676			**0.800**
4 - 6 Volume	77	94	0	0	**171**
4 - 6 Peak Hour	17:00	16:00			**16:00**
4 - 6 Pk Volume	43	63	0	0	**97**
Pk Hr Factor	0.672	0.492	0.000	0.000	**0.516**

Prepared by NDS/ATD

Project #: CA17_4132_032 **City:** National City

Location: Tidelands Ave Bet. W 19th St & Bay Marina **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

Tidelands Ave Bet. Harbor Dr & W 19th St

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_034

DAILY TOTALS	NB	SB	EB	WB	Total
	832	1,018	0	0	1,850

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	1		1				2		12:00	9		17				26	
0:15	0		0				0		12:15	18		17				35	
0:30	1		0				1		12:30	10		20				30	
0:45	0	2	1	2			1	4	12:45	13	50	19	73			32	123
1:00	3		0				3		13:00	10		26				36	
1:15	2		0				2		13:15	9		18				27	
1:30	0		1				1		13:30	14		12				26	
1:45	1	6	0	1			1	7	13:45	11	44	18	74			29	118
2:00	0		0				0		14:00	22		16				38	
2:15	1		1				2		14:15	14		20				34	
2:30	0		0				0		14:30	15		20				35	
2:45	1	2	0	1			1	3	14:45	15	66	12	68			27	134
3:00	0		1				1		15:00	11		18				29	
3:15	2		1				3		15:15	10		14				24	
3:30	0		0				0		15:30	10		10				20	
3:45	4	6	1	3			5	9	15:45	12	43	10	52			22	95
4:00	0		0				0		16:00	34		20				54	
4:15	6		3				9		16:15	11		12				23	
4:30	4		1				5		16:30	8		10				18	
4:45	2	12	5	9			7	21	16:45	7	60	8	50			15	110
5:00	4		14				18		17:00	22		7				29	
5:15	5		9				14		17:15	10		11				21	
5:30	12		14				26		17:30	7		10				17	
5:45	10	31	21	58			31	89	17:45	6	45	6	34			12	79
6:00	9		16				25		18:00	8		8				16	
6:15	15		19				34		18:15	2		12				14	
6:30	8		35				43		18:30	12		3				15	
6:45	8	40	22	92			30	132	18:45	3	25	4	27			7	52
7:00	18		28				46		19:00	4		6				10	
7:15	22		18				40		19:15	2		4				6	
7:30	24		19				43		19:30	1		1				2	
7:45	18	82	18	83			36	165	19:45	2	9	2	13			4	22
8:00	27		14				41		20:00	1		4				5	
8:15	18		10				28		20:15	2		2				4	
8:30	18		44				62		20:30	1		2				3	
8:45	14	77	29	97			43	174	20:45	3	7	5	13			8	20
9:00	19		9				28		21:00	2		2				4	
9:15	13		16				29		21:15	1		1				2	
9:30	13		18				31		21:30	2		0				2	
9:45	18	63	27	70			45	133	21:45	0	5	2	5			2	10
10:00	17		15				32		22:00	1		1				2	
10:15	18		30				48		22:15	2		3				5	
10:30	17		26				43		22:30	2		1				3	
10:45	21	73	34	105			55	178	22:45	2	7	2	7			4	14
11:00	15		10				25		23:00	1		2				3	
11:15	18		14				32		23:15	2		1				3	
11:30	12		31				43		23:30	1		1				2	
11:45	26	71	20	75			46	146	23:45	2	6	2	6			4	12
TOTALS		465		596				**1061**	**TOTALS**		367		422				**789**
SPLIT %		43.8%		56.2%				**57.4%**	**SPLIT %**		46.5%		53.5%				**42.6%**

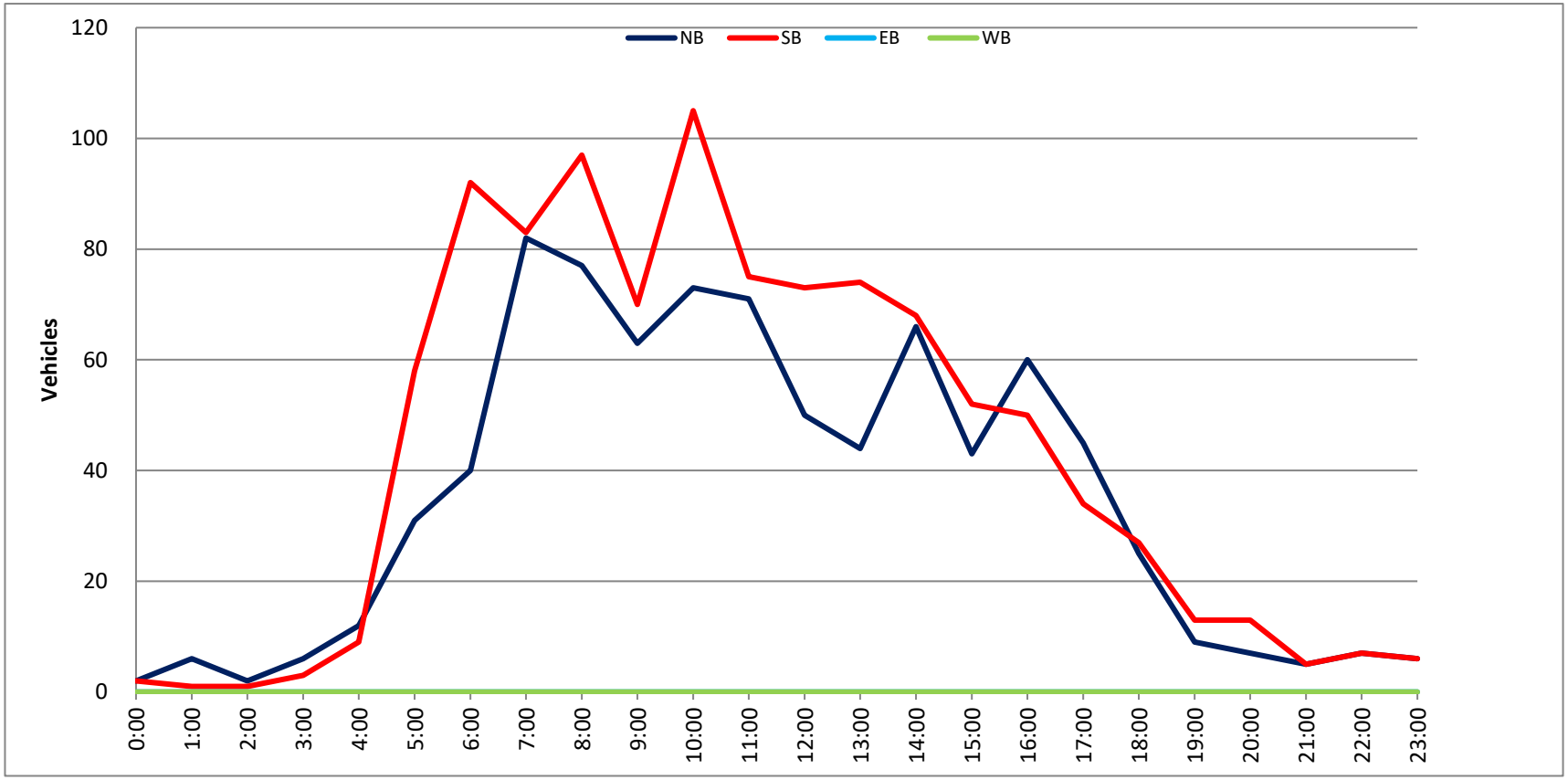
DAILY TOTALS	NB	SB	EB	WB	Total
	832	1,018	0	0	1,850

AM Peak Hour	7:15	10:00					**10:00**		**PM Peak Hour**	15:30	12:30					**13:45**		
AM Pk Volume	91	105					**178**		**PM Pk Volume**	67	83					**136**		
Pk Hr Factor	0.843	0.772					**0.809**		**Pk Hr Factor**	0.493	0.798					**0.895**		
7 - 9 Volume	159	180	0	0			**339**		**4 - 6 Volume**	105	84	0	0			**189**		
7 - 9 Peak Hour	7:15	8:00					**8:00**		**4 - 6 Peak Hour**	16:00	16:00					**16:00**		
7 - 9 Pk Volume	91	97	0	0			**174**		**4 - 6 Pk Volume**	60	50	0	0			**110**		
Pk Hr Factor	0.843	0.551	0.000	0.000			**0.702**		**Pk Hr Factor**	0.441	0.625	0.000	0.000			**0.509**		

Prepared by NDS/ATD

Project #: CA17_4132_034 **City:** National City

Location: Tidelands Ave Bet. Harbor Dr & W 19th St **Date:** 5/2/2017



Prepared by NDS/ATD

VOLUME

W 32nd St Bet. Tidelands Ave & Marina Way

Day: Tuesday
Date: 5/2/2017

City: National City
Project #: CA17_4132_035

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	362	288	650

AM Period	NB		SB		EB		WB		TOTAL	
0:00					1		0		1	
0:15					0		1		1	
0:30					2		0		2	
0:45					1	4	0	1	1	5
1:00					4		2		6	
1:15					2		1		3	
1:30					1		0		1	
1:45					0	7	0	3	0	10
2:00					0		0		0	
2:15					0		0		0	
2:30					0		0		0	
2:45					0		0		0	
3:00					6		0		6	
3:15					0		1		1	
3:30					0		0		0	
3:45					0	6	0	1	0	7
4:00					0		0		0	
4:15					0		0		0	
4:30					0		0		0	
4:45					0		3	3	3	3
5:00					0		1		1	
5:15					2		3		5	
5:30					1		3		4	
5:45					0	3	0	7	0	10
6:00					1		5		6	
6:15					1		1		2	
6:30					2		3		5	
6:45					0	4	0	9	0	13
7:00					1		2		3	
7:15					2		3		5	
7:30					2		9		11	
7:45					1	6	2	16	3	22
8:00					4		2		6	
8:15					1		3		4	
8:30					4		5		9	
8:45					5	14	2	12	7	26
9:00					5		2		7	
9:15					4		4		8	
9:30					2		3		5	
9:45					7	18	3	12	10	30
10:00					7		1		8	
10:15					16		5		21	
10:30					3		5		8	
10:45					8	34	11	22	19	56
11:00					4		3		7	
11:15					5		5		10	
11:30					8		6		14	
11:45					11	28	4	18	15	46
TOTALS						124		104		**228**
SPLIT %						54.4%		45.6%		**35.1%**

PM Period	NB		SB		EB		WB		TOTAL	
12:00					9		3		12	
12:15					5		9		14	
12:30					5		1		6	
12:45					5	24	3	16	8	40
13:00					6		8		14	
13:15					4		3		7	
13:30					5		13		18	
13:45					7	22	4	28	11	50
14:00					6		5		11	
14:15					4		3		7	
14:30					11		8		19	
14:45					9	30	2	18	11	48
15:00					8		6		14	
15:15					7		6		13	
15:30					7		6		13	
15:45					4	26	3	21	7	47
16:00					4		3		7	
16:15					5		11		16	
16:30					4		4		8	
16:45					3	16	4	22	7	38
17:00					5		3		8	
17:15					7		8		15	
17:30					3		2		5	
17:45					4	19	4	17	8	36
18:00					4		1		5	
18:15					4		5		9	
18:30					3		4		7	
18:45					3	14	7	17	10	31
19:00					7		9		16	
19:15					5		3		8	
19:30					11		7		18	
19:45					8	31	3	22	11	53
20:00					8		1		9	
20:15					7		2		9	
20:30					2		6		8	
20:45					7	24	2	11	9	35
21:00					1		0		1	
21:15					5		1		6	
21:30					3		2		5	
21:45					1	10	2	5	3	15
22:00					0		2		2	
22:15					6		3		9	
22:30					5		0		5	
22:45					0	11	0	5	0	16
23:00					1		0		1	
23:15					3		1		4	
23:30					2		0		2	
23:45					5	11	1	2	6	13
TOTALS						238		184		**422**
SPLIT %						56.4%		43.6%		**64.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	362	288	650

AM Peak Hour	10:00	10:45	**10:00**	
AM Pk Volume	34	25	**56**	
Pk Hr Factor	0.531	0.568	**0.667**	
7 - 9 Volume	20	28	**48**	
7 - 9 Peak Hour	8:00	7:00	**8:00**	
7 - 9 Pk Volume	14	16	**26**	
Pk Hr Factor	0.700	0.444	**0.722**	

PM Peak Hour	14:30	13:00	**14:30**	
PM Pk Volume	35	28	**57**	
Pk Hr Factor	0.795	0.538	**0.750**	
4 - 6 Volume	35	39	**74**	
4 - 6 Peak Hour	16:30	16:00	**16:15**	
4 - 6 Pk Volume	19	22	**39**	
Pk Hr Factor	0.679	0.500	**0.609**	

24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: 1. Bay Marina Drive between Cleveland Ave to I-5 SB

Orientation: *East-West*

Date of Count: *Thursday, September 28, 2017*

Analysts: *DASH*

Weather: *Sunny*

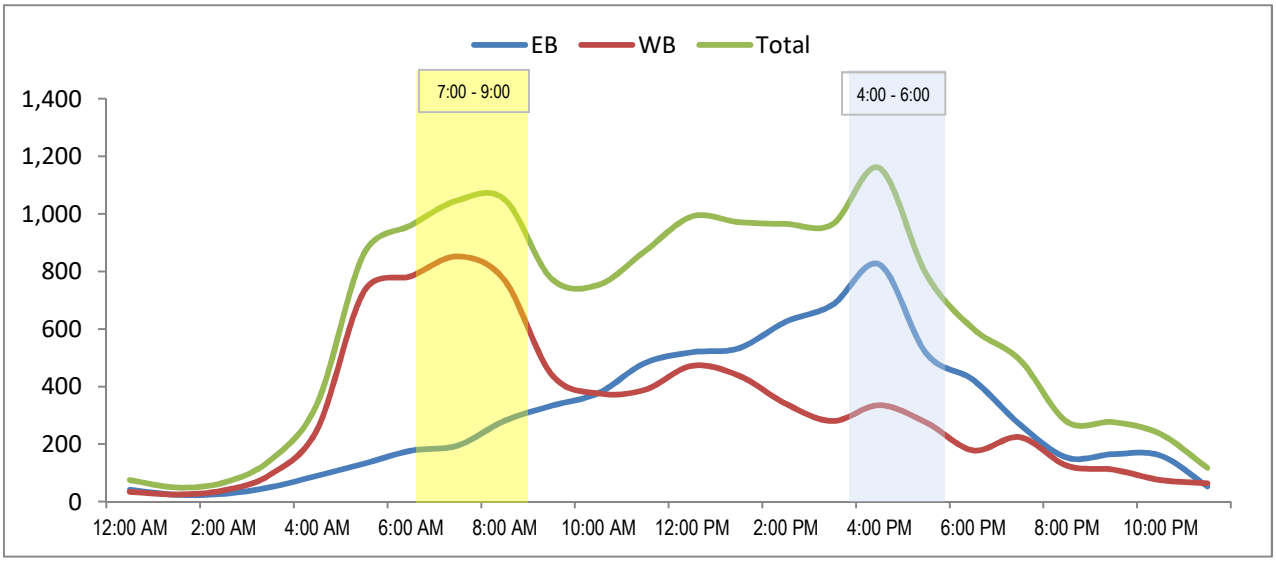
AVC Proj. No: *17-0761*

24 Hour Segment Volume			14,833

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	41	34	75
1:00 AM - 2:00 AM	24	25	49
2:00 AM - 3:00 AM	27	39	66
3:00 AM - 4:00 AM	50	94	144
4:00 AM - 5:00 AM	90	251	341
5:00 AM - 6:00 AM	132	731	863
6:00 AM - 7:00 AM	177	783	960
7:00 AM - 8:00 AM	195	852	1,047
8:00 AM - 9:00 AM	281	769	1,050
9:00 AM - 10:00 AM	333	442	775
10:00 AM - 11:00 AM	377	376	753
11:00 AM - 12:00 PM	482	389	871
Total	**2,209**	**4,785**	**6,994**

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	519	472	991
1:00 PM - 2:00 PM	533	438	971
2:00 PM - 3:00 PM	625	340	965
3:00 PM - 4:00 PM	684	280	964
4:00 PM - 5:00 PM	824	335	1,159
5:00 PM - 6:00 PM	515	275	790
6:00 PM - 7:00 PM	423	178	601
7:00 PM - 8:00 PM	268	224	492
8:00 PM - 9:00 PM	153	125	278
9:00 PM - 10:00 PM	165	111	276
10:00 PM - 11:00 PM	160	75	235
11:00 PM - 12:00 AM	53	64	117
Total	**4,922**	**2,917**	**7,839**

24-Hour EB Volume	7,131	24-Hour WB Volume	7,702



CHEN RYAN

24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: 2. Bay Marina Drive between I-5 SB and I-5 NB

Orientation: *East-West*

Date of Count: *Thursday, September 28, 2017*

Analysts: *DASH*

Weather: *Sunny*

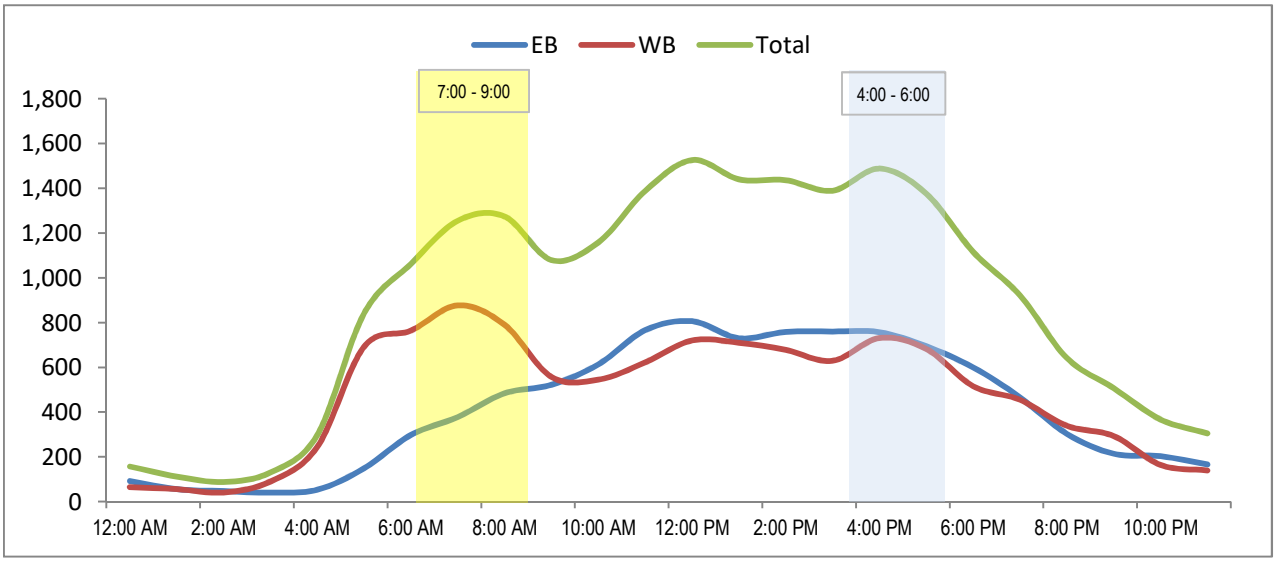
AVC Proj. No: *17-0761*

24 Hour Segment Volume			21,354

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	92	65	157
1:00 AM - 2:00 AM	56	56	112
2:00 AM - 3:00 AM	47	41	88
3:00 AM - 4:00 AM	40	90	130
4:00 AM - 5:00 AM	53	244	297
5:00 AM - 6:00 AM	149	692	841
6:00 AM - 7:00 AM	298	764	1,062
7:00 AM - 8:00 AM	378	877	1,255
8:00 AM - 9:00 AM	484	790	1,274
9:00 AM - 10:00 AM	522	557	1,079
10:00 AM - 11:00 AM	613	545	1,158
11:00 AM - 12:00 PM	766	622	1388
Total	**3,498**	**5,343**	**8,841**

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	806	720	1,526
1:00 PM - 2:00 PM	730	710	1,440
2:00 PM - 3:00 PM	758	678	1,436
3:00 PM - 4:00 PM	760	629	1,389
4:00 PM - 5:00 PM	757	731	1,488
5:00 PM - 6:00 PM	694	682	1,376
6:00 PM - 7:00 PM	600	516	1,116
7:00 PM - 8:00 PM	466	455	921
8:00 PM - 9:00 PM	303	339	642
9:00 PM - 10:00 PM	214	293	507
10:00 PM - 11:00 PM	203	164	367
11:00 PM - 12:00 AM	166	139	305
Total	**6,457**	**6,056**	**12,513**

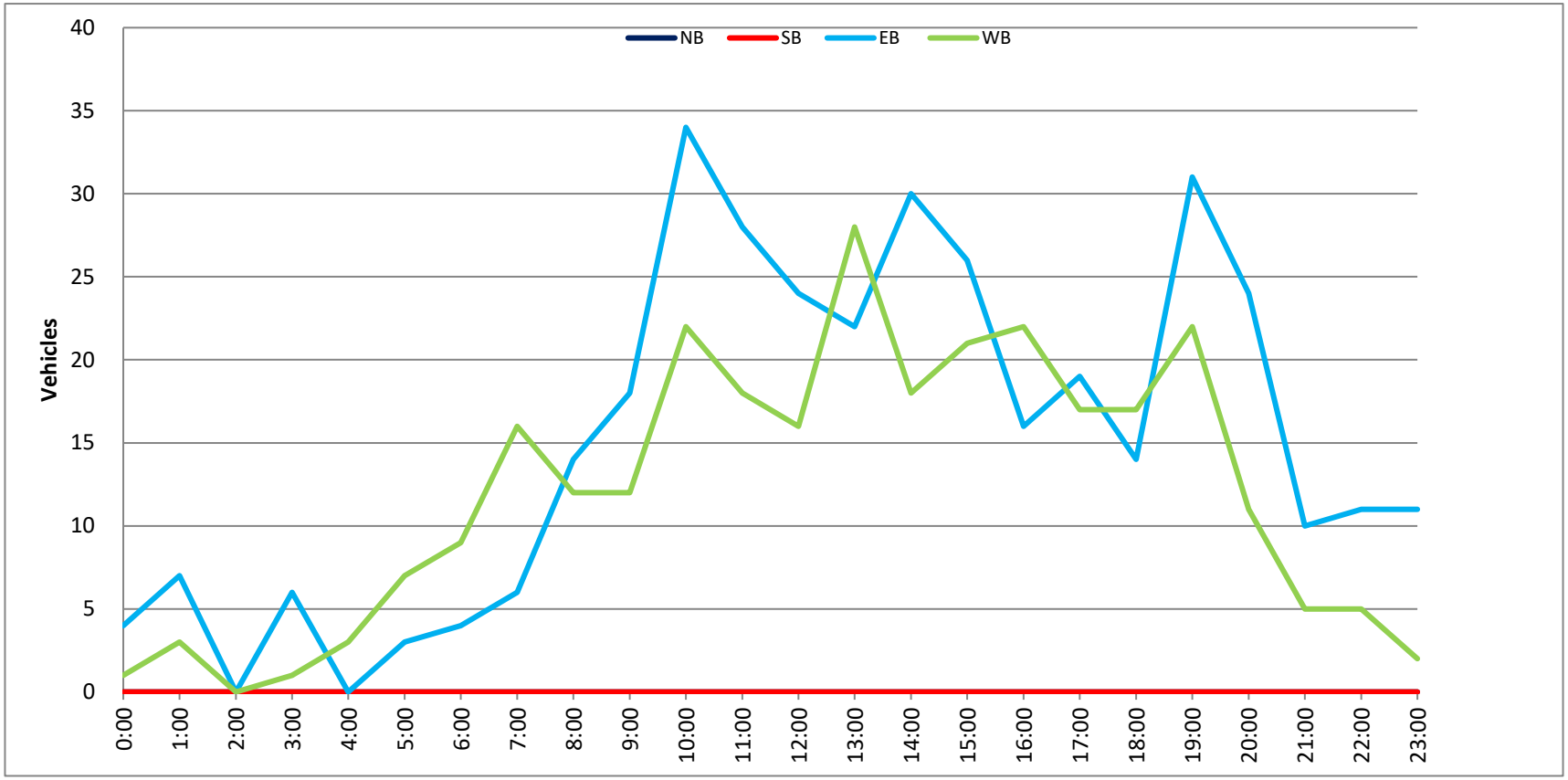
24-Hour EB Volume	9,955	24-Hour WB Volume	11,399



Prepared by NDS/ATD

Project #: CA17_4132_035 **City:** National City

Location: W 32nd St Bet. Tidelands Ave & Marina Way **Date:** 5/2/2017



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-001 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
7:00 AM	23	0	52	0	4	1	0	17	2	1	16	0	116
7:15 AM	17	0	87	0	7	6	0	34	0	0	6	0	157
7:30 AM	13	0	98	0	6	7	0	24	0	2	11	0	161
7:45 AM	12	0	81	0	9	3	0	16	0	4	6	0	131
8:00 AM	13	0	70	0	4	8	0	19	1	1	7	0	123
8:15 AM	7	0	67	0	5	3	0	22	1	5	4	0	114
8:30 AM	12	0	64	1	7	6	0	18	0	2	5	0	115
8:45 AM	5	0	63	0	6	6	0	14	0	3	2	0	99
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	102	0	582	1	48	40	0	164	4	18	57	0	1016
APPROACH %'s :	14.91%	0.00%	85.09%	1.12%	53.93%	44.94%	0.00%	97.62%	2.38%	24.00%	76.00%	0.00%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	55	0	336	0	26	24	0	93	1	7	30	0	572
PEAK HR FACTOR :	0.881			0.962			0.691			0.712			0.888

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	1
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	1
NB	SB	EB	WB
1	0	0	2

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-001 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
4:00 PM	2	0	27	3	65	9	0	51	2	7	2	0	168
4:15 PM	1	0	29	2	58	7	0	17	0	2	3	0	119
4:30 PM	1	0	27	2	57	3	0	41	0	3	1	0	135
4:45 PM	1	0	40	1	56	4	0	12	2	3	4	0	123
5:00 PM	2	0	24	2	46	4	0	19	0	3	1	0	101
5:15 PM	3	0	24	1	41	4	1	7	1	1	3	0	86
5:30 PM	3	0	30	0	36	4	0	8	0	0	5	0	86
5:45 PM	0	0	28	2	30	3	0	6	0	2	2	0	73
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	13	0	229	13	389	38	1	161	5	21	21	0	891
APPROACH %'s :	5.37%	0.00%	94.63%	2.95%	88.41%	8.64%	0.60%	96.41%	2.99%	50.00%	50.00%	0.00%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	5	0	123	8	236	23	0	121	4	15	10	0	545
PEAK HR FACTOR :	0.780			0.867			0.590			0.694			0.811

UTURNS				
	NB	SB	EB	WB
	0	0	0	0
	0	0	0	1
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	1	0
	0	0	0	0
	0	0	0	1
	NB	SB	EB	WB
	0	0	1	2

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-001 **Day:** Tuesday

City: National City **Date:** 5/2/2017

NOON

NS/EW Streets:	Cleveland Ave			Cleveland Ave			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(NB/SB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and Civic Center Dr , National City

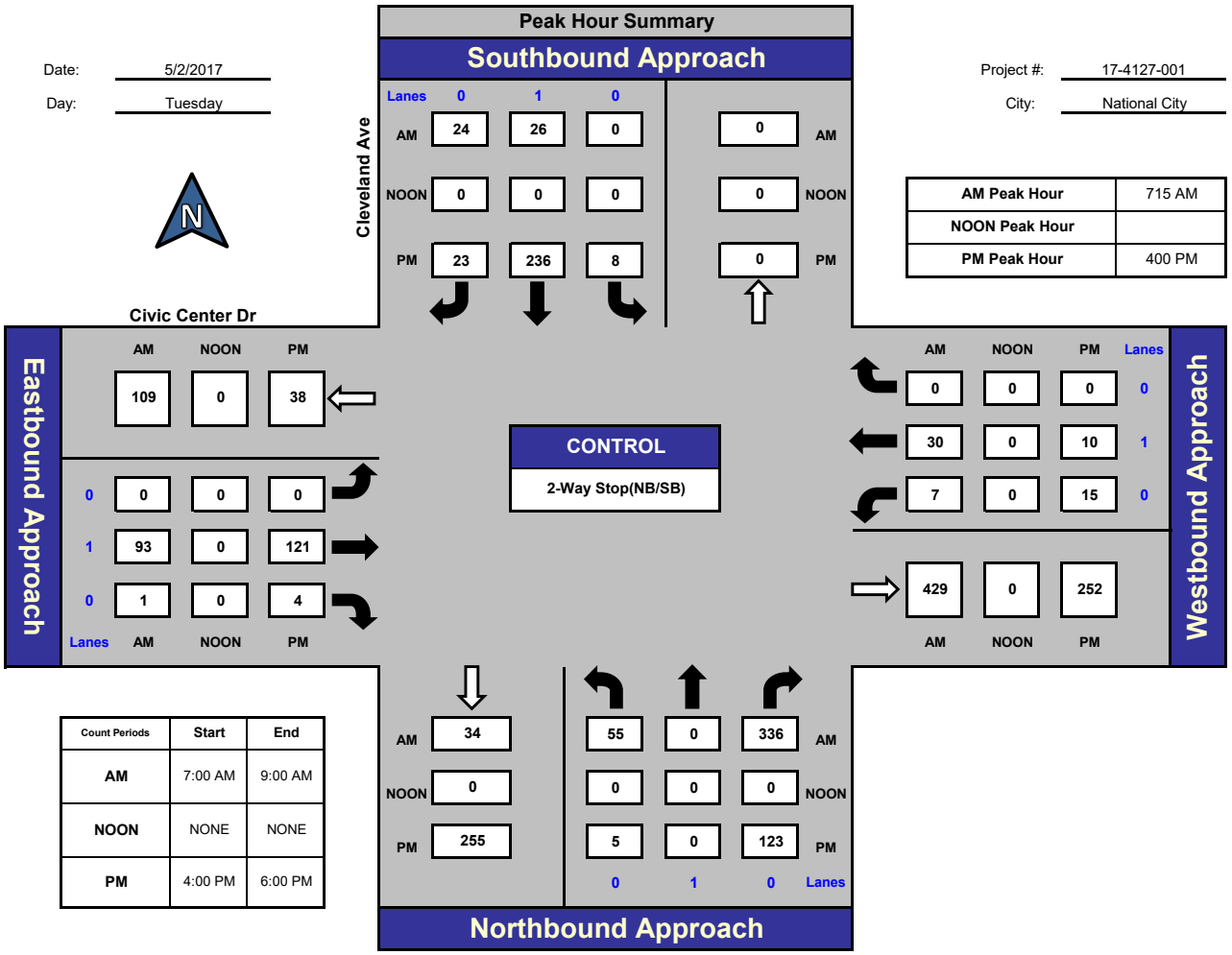
Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-001

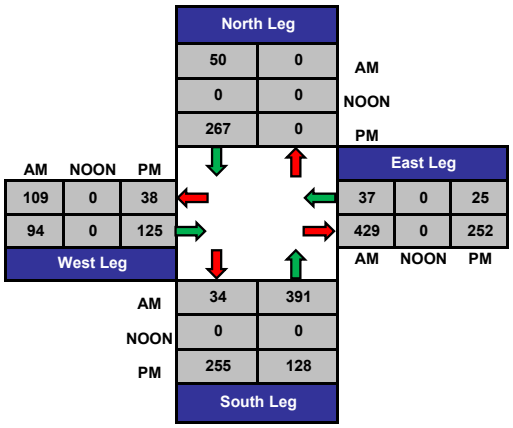
City: National City

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

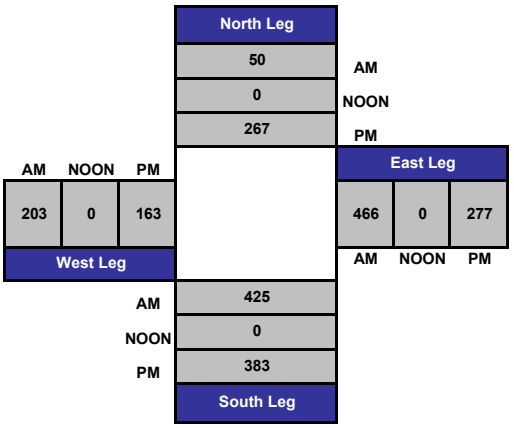


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-001 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
7:00 AM	23	0	52	0	4	1	0	17	2	1	16	0	116
7:15 AM	17	0	87	0	7	6	0	34	0	0	6	0	157
7:30 AM	13	0	98	0	6	7	0	24	0	2	11	0	161
7:45 AM	12	0	81	0	9	3	0	16	0	4	6	0	131
8:00 AM	13	0	70	0	4	8	0	19	1	1	7	0	123
8:15 AM	7	0	67	0	5	3	0	22	1	5	4	0	114
8:30 AM	12	0	64	1	7	6	0	18	0	2	5	0	115
8:45 AM	5	0	63	0	6	6	0	14	0	3	2	0	99
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	102	0	582	1	48	40	0	164	4	18	57	0	1016
APPROACH %'s :	14.91%	0.00%	85.09%	1.12%	53.93%	44.94%	0.00%	97.62%	2.38%	24.00%	76.00%	0.00%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	55	0	336	0	26	24	0	93	1	7	30	0	572
PEAK HR FACTOR :	0.881			0.962			0.691			0.712			0.888

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	1
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	1	0	0	0
	0	0	0	1
	NB	SB	EB	WB
	1	0	0	2

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-001 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
4:00 PM	2	0	27	3	65	9	0	51	2	7	2	0	168
4:15 PM	1	0	29	2	58	7	0	17	0	2	3	0	119
4:30 PM	1	0	27	2	57	3	0	41	0	3	1	0	135
4:45 PM	1	0	40	1	56	4	0	12	2	3	4	0	123
5:00 PM	2	0	24	2	46	4	0	19	0	3	1	0	101
5:15 PM	3	0	24	1	41	4	1	7	1	1	3	0	86
5:30 PM	3	0	30	0	36	4	0	8	0	0	5	0	86
5:45 PM	0	0	28	2	30	3	0	6	0	2	2	0	73
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	13	0	229	13	389	38	1	161	5	21	21	0	891
APPROACH %'s :	5.37%	0.00%	94.63%	2.95%	88.41%	8.64%	0.60%	96.41%	2.99%	50.00%	50.00%	0.00%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	5	0	123	8	236	23	0	121	4	15	10	0	545
PEAK HR FACTOR :	0.780			0.867			0.590			0.694			0.811

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	1
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	1	0
	0	0	0	0
	0	0	0	1
	NB	SB	EB	WB
	0	0	1	2

CONTROL : 2-Way Stop(NB/SB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and Civic Center Dr , National City

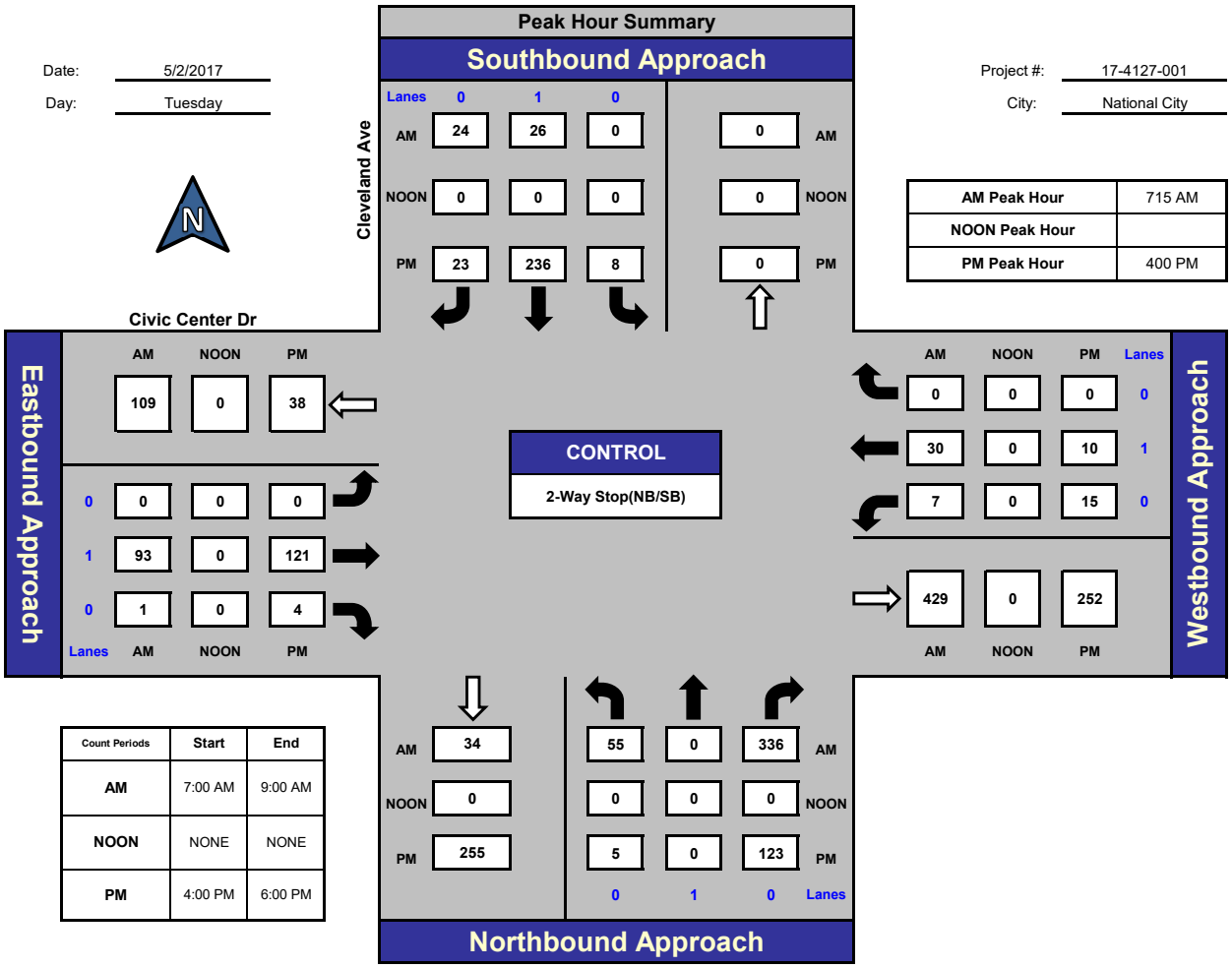
Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-001

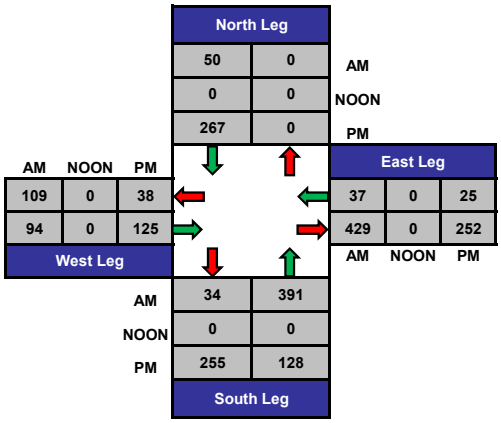
City: National City

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

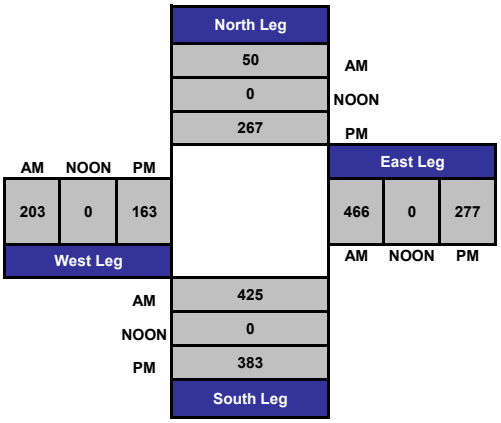


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

AM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
7:00 AM	5	139	19	5	17	5	40	33	1	15	8	39	326
7:15 AM	1	118	17	3	17	9	52	51	1	10	6	35	320
7:30 AM	4	114	25	7	15	11	50	41	2	8	5	29	310
7:45 AM	3	115	35	6	22	8	43	41	3	15	6	30	326
8:00 AM	3	122	37	8	25	11	33	39	4	21	6	28	337
8:15 AM	4	142	37	7	26	12	31	40	6	15	3	20	343
8:30 AM	2	138	36	10	26	12	32	33	3	13	4	14	322
8:45 AM	3	121	31	5	26	15	28	31	4	11	1	14	291
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25.66667	1008.667	236.3333	50.66667	173.6667	82.66667	309	308.3333	24	108.3333	40	207.6667	2575
APPROACH %'s :	2.02%	79.38%	18.60%	16.50%	56.57%	26.93%	48.18%	48.08%	3.74%	30.43%	11.24%	58.33%	
PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	12	516	145	31	99	44	139	152	16	64	19	91	1328
PEAK HR FACTOR :		0.922			0.914			0.890			0.801		0.968

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	0
0	1	0	0
0	0	0	0
0	0	0	0
0	0	0	0
NB	SB	EB	WB
0	2	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

PM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
4:00 PM	5	32	20	22	241	58	11	48	14	24	4	2	482
4:15 PM	2	32	22	22	280	58	10	27	8	25	1	3	490
4:30 PM	4	24	16	19	216	59	9	43	24	36	1	2	452
4:45 PM	3	28	18	20	220	44	9	37	11	21	1	3	414
5:00 PM	5	27	19	21	192	40	5	27	5	27	1	3	373
5:15 PM	2	27	20	16	206	37	5	22	3	20	2	3	362
5:30 PM	3	29	16	14	244	37	7	28	3	19	2	1	403
5:45 PM	1	26	17	17	188	30	3	21	6	11	1	2	325
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25	225	146.3333	149.6667	1786.333	364	60.66667	253.3333	74.33333	183.6667	13	19.33333	3300.67
APPROACH %'s :	6.31%	56.77%	36.92%	6.51%	77.67%	15.83%	15.62%	65.24%	19.14%	85.03%	6.02%	8.95%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	13	116	75	82	957	219	40	155	57	106	7	10	1838
PEAK HR FACTOR :		0.879			0.851			0.819			0.792		0.938

UTURNS	NB	SB	EB	WB
	0	1	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	1	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

AM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
7:00 AM	4	150	19	5	17	4	38	32	2	20	9	39	339
7:15 AM	3	125	21	4	15	10	60	49	3	7	5	27	329
7:30 AM	2	118	32	8	14	3	37	32	1	9	7	34	297
7:45 AM	3	136	43	5	22	7	48	43	1	14	7	20	349
8:00 AM	2	112	31	13	14	14	17	35	5	20	5	16	284
8:15 AM	5	143	34	8	28	15	28	34	7	13	3	20	338
8:30 AM	0	156	26	13	23	11	23	23	3	13	3	13	307
8:45 AM	4	109	21	1	34	19	19	25	5	10	2	11	260
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	23	1049	227	57	167	83	270	273	27	106	41	180	2503
APPROACH %'s :	1.77%	80.75%	17.47%	18.57%	54.40%	27.04%	47.37%	47.89%	4.74%	32.42%	12.54%	55.05%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	12	529	115	22	68	24	183	156	7	50	28	120	1314
PEAK HR FACTOR :		0.901			0.838			0.772			0.728		0.941

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	0
0	1	0	0
0	0	0	0
0	0	0	0
0	0	0	0
NB	SB	EB	WB
0	2	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Tuesday

City: Port of San Diego **Date:** 5/2/2017

AM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
7:00 AM	7	114	15	7	16	4	36	41	1	13	8	39	301
7:15 AM	0	88	22	1	15	6	53	63	1	15	7	45	316
7:30 AM	6	111	23	7	18	16	76	52	1	8	7	30	355
7:45 AM	4	92	33	7	19	11	44	44	6	14	2	40	316
8:00 AM	4	120	30	3	31	13	43	40	4	24	7	44	363
8:15 AM	4	183	29	5	20	10	42	42	5	20	4	23	387
8:30 AM	2	151	21	7	27	11	51	40	3	10	5	19	347
8:45 AM	4	154	32	6	24	13	47	28	5	14	2	19	348
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	31	1013	205	43	170	84	392	350	26	118	42	259	2733
APPROACH %'s :	2.48%	81.10%	16.41%	14.48%	57.24%	28.28%	51.04%	45.57%	3.39%	28.16%	10.02%	61.81%	
PEAK HR START TIME :	800 AM												TOTAL
PEAK HR VOL :	14	608	112	21	102	47	183	150	17	68	18	105	1445
PEAK HR FACTOR :		0.850			0.904			0.931			0.637		0.933

UTURNS				
NB	SB	EB	WB	
0	0	0	0	
0	0	0	0	
0	0	0	0	
0	0	0	0	
1	0	0	0	
0	0	0	0	
0	0	0	0	
1	0	0	0	
NB	SB	EB	WB	
2	0	0	0	

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

AM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
7:00 AM	3	154	22	4	17	6	46	27	0	12	8	40	339
7:15 AM	1	141	8	3	21	10	44	40	0	9	7	32	316
7:30 AM	4	112	19	7	14	13	36	39	3	7	1	23	278
7:45 AM	2	117	28	6	24	7	37	35	1	18	9	29	313
8:00 AM	4	133	49	9	31	7	39	41	3	19	5	23	363
8:15 AM	3	99	48	7	30	11	24	45	6	12	2	17	304
8:30 AM	4	107	62	9	27	14	22	35	3	15	5	9	312
8:45 AM	2	101	41	7	20	13	17	40	3	9	0	11	264
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	23	964	277	52	184	81	265	302	19	101	37	184	2489
APPROACH %'s :	1.82%	76.27%	21.91%	16.40%	58.04%	25.55%	45.22%	51.54%	3.24%	31.37%	11.49%	57.14%	
PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	13	456	187	31	112	39	122	156	13	64	21	78	1292
PEAK HR FACTOR :		0.882			0.910			0.877			0.728		0.890

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
3	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
NB	SB	EB	WB
4	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

PM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
4:00 PM	4	37	19	14	252	58	5	46	17	30	3	2	487
4:15 PM	2	36	21	23	294	48	11	27	5	25	1	3	496
4:30 PM	4	15	10	19	207	55	12	35	25	38	1	3	424
4:45 PM	3	28	13	17	200	47	10	35	11	18	1	2	385
5:00 PM	5	27	18	30	218	52	4	29	2	27	0	2	414
5:15 PM	1	30	23	14	204	33	4	24	2	14	1	5	355
5:30 PM	3	23	14	10	231	27	7	33	2	19	0	1	370
5:45 PM	1	25	13	14	169	24	3	18	6	10	0	1	284
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	23	221	131	141	1775	344	56	247	70	181	7	19	3215
APPROACH %'s :	6.13%	58.93%	34.93%	6.24%	78.54%	15.22%	15.01%	66.22%	18.77%	87.44%	3.38%	9.18%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	13	116	63	73	953	208	38	143	58	111	6	10	1792
PEAK HR FACTOR :		0.800			0.845			0.830			0.756		0.903

UTURNS	NB	SB	EB	WB
	0	1	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
TOTAL VOLUMES :	0	1	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Tuesday

City: Port of San Diego **Date:** 5/2/2017

PM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
4:00 PM	7	35	25	30	218	64	13	51	11	20	3	3	480
4:15 PM	2	36	22	24	322	71	12	29	12	23	1	3	557
4:30 PM	3	33	22	18	226	68	8	42	22	31	1	3	477
4:45 PM	4	33	18	29	294	58	9	38	9	22	1	3	518
5:00 PM	5	27	15	24	215	47	8	27	7	27	2	6	410
5:15 PM	2	32	20	18	264	55	8	18	6	24	2	3	452
5:30 PM	2	43	17	17	270	37	10	27	4	18	2	1	448
5:45 PM	2	24	15	23	202	35	2	27	8	14	2	4	358
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	27	263	154	183	2011	435	70	259	79	179	14	26	3700
APPROACH %'s :	6.08%	59.23%	34.68%	6.96%	76.49%	16.55%	17.16%	63.48%	19.36%	81.74%	6.39%	11.87%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	16	137	87	101	1060	261	42	160	54	96	6	12	2032
PEAK HR FACTOR :		0.896			0.853			0.853			0.814		0.912

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	1	0	0	0
	0	0	0	0
	1	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
TOTAL	NB	SB	EB	WB
	2	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

PM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
4:00 PM	3	25	15	21	253	53	16	48	14	23	6	2	479
4:15 PM	2	24	22	19	223	56	8	26	6	27	0	3	416
4:30 PM	4	24	16	19	215	53	8	51	25	40	0	0	455
4:45 PM	2	22	22	14	166	27	7	38	13	22	2	4	339
5:00 PM	6	26	23	9	143	22	4	25	5	28	2	2	295
5:15 PM	4	18	16	15	149	24	3	23	2	22	2	1	279
5:30 PM	3	22	16	14	231	46	5	25	4	20	4	1	391
5:45 PM	1	30	24	14	193	32	5	18	5	9	2	0	333
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25	191	154	125	1573	313	56	254	74	191	18	13	2987
APPROACH %'s :	6.76%	51.62%	41.62%	6.22%	78.22%	15.56%	14.58%	66.15%	19.27%	86.04%	8.11%	5.86%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	11	95	75	73	857	189	39	163	58	112	8	9	1689
PEAK HR FACTOR :		0.943			0.856			0.774			0.806		0.882

UTURNS				
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
0	0	0	0
NB	SB	EB	WB
1	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

NOON

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

E. Harbor Dr and Civic Center Dr , Port of San Diego

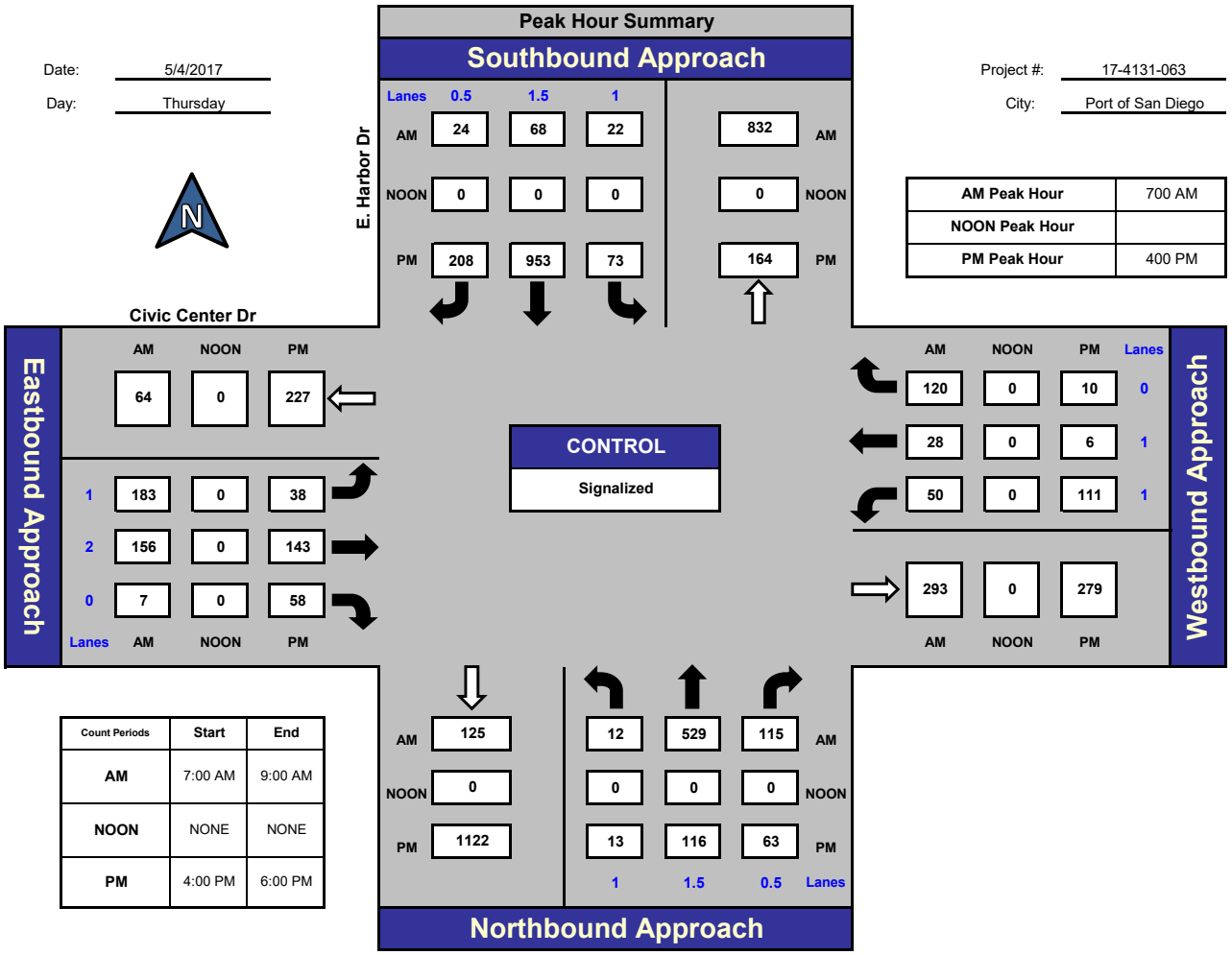
Date: 5/4/2017

Day: Thursday

Project #: 17-4131-063

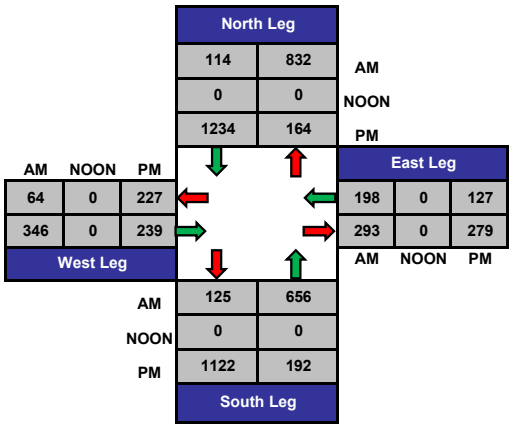
City: Port of San Diego

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

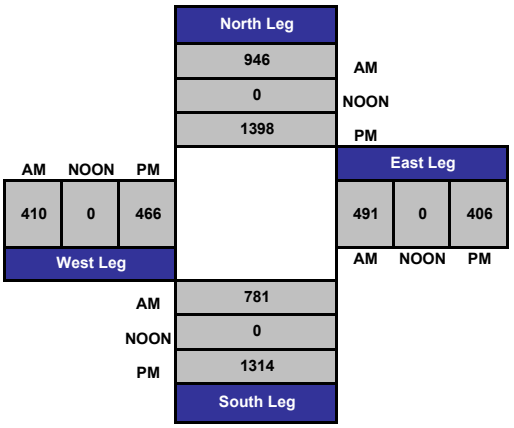


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

AM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
7:00 AM	5	139	19	5	17	5	40	33	1	15	8	39	326
7:15 AM	1	118	17	3	17	9	52	51	1	10	6	35	320
7:30 AM	4	114	25	7	15	11	50	41	2	8	5	29	310
7:45 AM	3	115	35	6	22	8	43	41	3	15	6	30	326
8:00 AM	3	122	37	8	25	11	33	39	4	21	6	28	337
8:15 AM	4	142	37	7	26	12	31	40	6	15	3	20	343
8:30 AM	2	138	36	10	26	12	32	33	3	13	4	14	322
8:45 AM	3	121	31	5	26	15	28	31	4	11	1	14	291
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25.66667	1008.667	236.3333	50.66667	173.6667	82.66667	309	308.3333	24	108.3333	40	207.6667	2575
APPROACH %'s :	2.02%	79.38%	18.60%	16.50%	56.57%	26.93%	48.18%	48.08%	3.74%	30.43%	11.24%	58.33%	
PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	12	516	145	31	99	44	139	152	16	64	19	91	1328
PEAK HR FACTOR :		0.922			0.914			0.890			0.801		0.968

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	1	0	0
	0	1	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	2	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4131-063 **Day:** Thursday

City: Port of San Diego **Date:** 5/4/2017

PM

NS/EW Streets:	E. Harbor Dr			E. Harbor Dr			Civic Center Dr			Civic Center Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1.5	0.5	1	1.5	0.5	1	2	0	1	1	0	
4:00 PM	5	32	20	22	241	58	11	48	14	24	4	2	482
4:15 PM	2	32	22	22	280	58	10	27	8	25	1	3	490
4:30 PM	4	24	16	19	216	59	9	43	24	36	1	2	452
4:45 PM	3	28	18	20	220	44	9	37	11	21	1	3	414
5:00 PM	5	27	19	21	192	40	5	27	5	27	1	3	373
5:15 PM	2	27	20	16	206	37	5	22	3	20	2	3	362
5:30 PM	3	29	16	14	244	37	7	28	3	19	2	1	403
5:45 PM	1	26	17	17	188	30	3	21	6	11	1	2	325
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25	225	146.3333	149.6667	1786.333	364	60.66667	253.3333	74.33333	183.6667	13	19.33333	3300.67
APPROACH %'s :	6.31%	56.77%	36.92%	6.51%	77.67%	15.83%	15.62%	65.24%	19.14%	85.03%	6.02%	8.95%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	13	116	75	82	957	219	40	155	57	106	7	10	1838
PEAK HR FACTOR :	0.879			0.851			0.819			0.792			0.938

UTURNS	NB	SB	EB	WB
	0	1	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	1	0	0

CONTROL : Signalized

ITM Peak Hour Summary

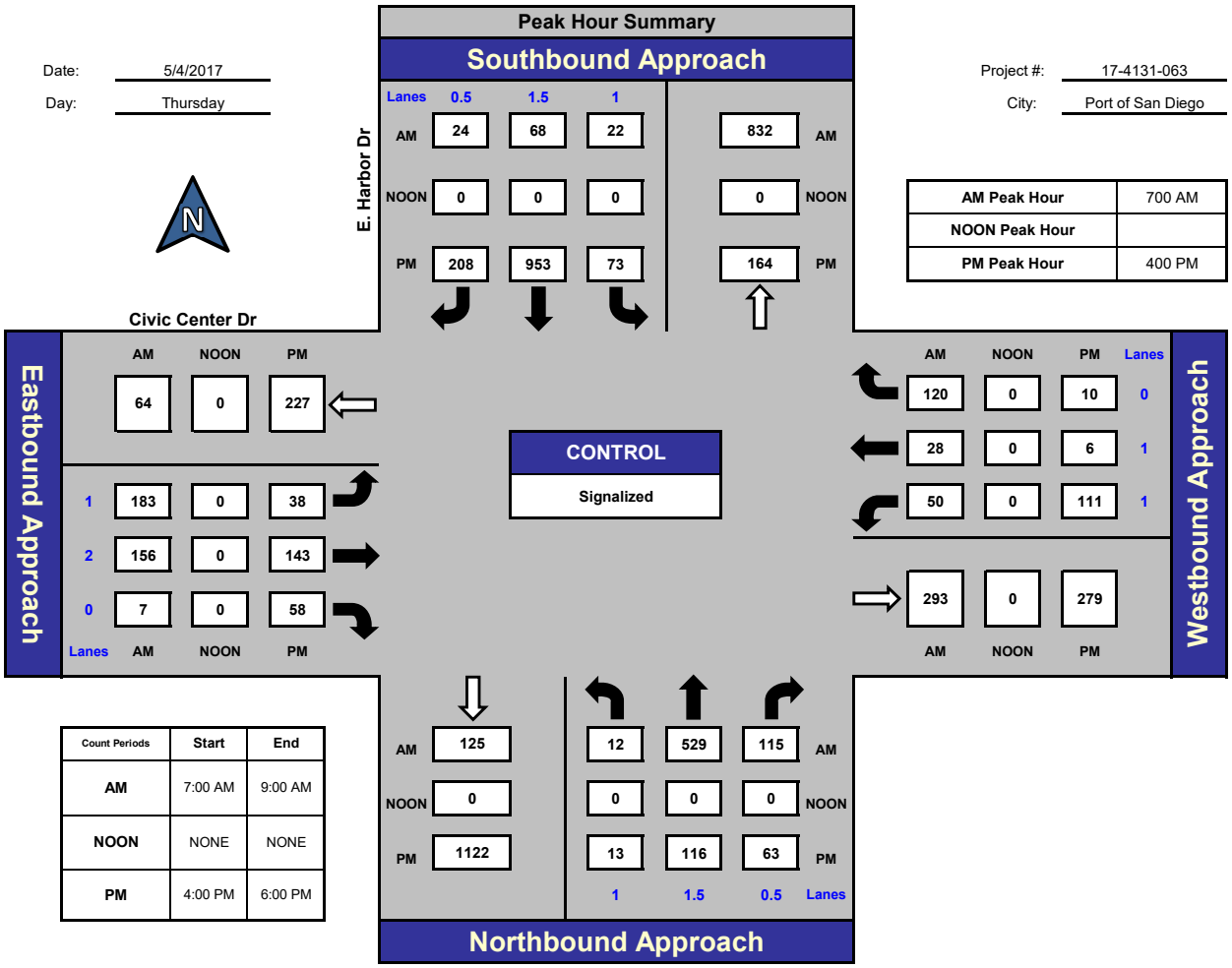
Prepared by:

National Data & Surveying Services

E. Harbor Dr and Civic Center Dr , Port of San Diego

Date: 5/4/2017
Day: Thursday

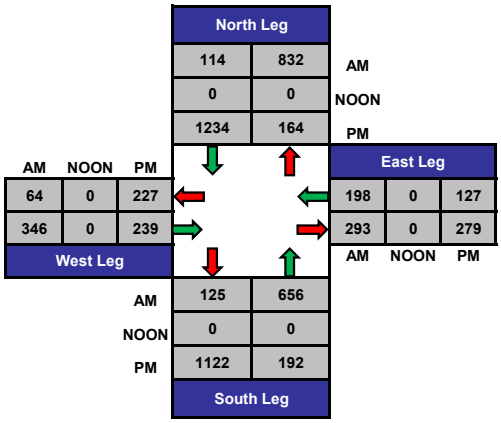
Project #: 17-4131-063
City: Port of San Diego



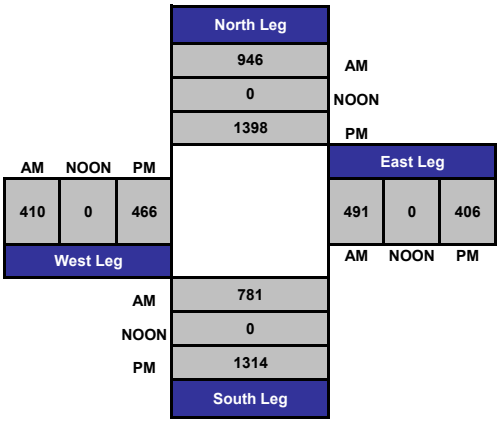
AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-002 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 14th St			W 14th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
7:00 AM	0	43	0	2	56	2	0	0	2	0	0	2	107
7:15 AM	2	58	1	7	50	0	0	0	1	0	0	2	121
7:30 AM	0	75	1	2	39	0	0	0	0	0	0	2	119
7:45 AM	0	56	2	6	47	1	1	0	1	0	0	2	116
8:00 AM	0	49	2	4	43	1	1	0	1	2	0	6	109
8:15 AM	2	49	2	4	42	0	0	0	0	0	0	3	102
8:30 AM	1	44	1	4	32	0	0	0	0	0	1	3	86
8:45 AM	0	47	1	3	31	1	0	0	1	0	0	3	87
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	5	421	10	32	340	5	2	0	6	2	1	23	847
APPROACH %'s :	1.15%	96.56%	2.29%	8.49%	90.19%	1.33%	25.00%	0.00%	75.00%	7.69%	3.85%	88.46%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	2	238	6	19	179	2	2	0	3	2	0	12	465
PEAK HR FACTOR :		0.809			0.877			0.625			0.438		0.961

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
TOTAL VOLUMES :	0	0	0	0

CONTROL : 1-Way Stop(WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-002 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 14th St			W 14th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
4:00 PM	0	6	0	6	91	1	0	0	2	2	0	5	113
4:15 PM	0	17	1	3	96	0	0	0	0	1	0	3	121
4:30 PM	0	11	2	3	79	0	0	0	0	0	0	5	100
4:45 PM	0	16	0	7	74	0	0	0	1	1	0	4	103
5:00 PM	1	11	0	8	66	0	0	0	0	0	0	3	89
5:15 PM	0	8	0	3	54	0	1	0	0	0	0	5	71
5:30 PM	0	7	0	1	51	0	0	0	1	0	0	0	60
5:45 PM	0	3	2	7	51	0	0	0	0	0	0	8	71
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	1	79	5	38	562	1	1	0	4	4	0	33	728
APPROACH %'s :	1.18%	92.94%	5.88%	6.32%	93.51%	0.17%	20.00%	0.00%	80.00%	10.81%	0.00%	89.19%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	0	50	3	19	340	1	0	0	3	4	0	17	437
PEAK HR FACTOR :		0.736			0.909			0.375			0.750		0.903

UTURNS				
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	0
NB	SB	EB	WB
0	1	0	0

CONTROL : 1-Way Stop(WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-002 **Day:** Tuesday

City: National City **Date:** 5/2/2017

NOON

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 14th St			W 14th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS

NB	SB	EB	WB
0	0	0	0

CONTROL : 1-Way Stop(WB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and W 14th St , National City

Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-002

City: National City

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach

Lanes	0	1	0		
AM	2	179	19	252	AM
NOON	0	0	0	0	NOON
PM	1	340	19	67	PM

Cleveland Ave

W 14th St

Eastbound Approach

Lanes	AM	NOON	PM
	4	0	1
0	2	0	0
1	0	0	0
0	3	0	3
	AM	NOON	PM

Westbound Approach

	AM	NOON	PM	Lanes
	12	0	17	0
	0	0	0	1
	2	0	4	0
	25	0	22	
	AM	NOON	PM	

CONTROL

1-Way Stop(WB)

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

AM	184	2	238	6	AM
NOON	0	0	0	0	NOON
PM	347	0	50	3	PM
		0	1	0	Lanes

Northbound Approach

Total Ins & Outs

North Leg		
200	252	AM
0	0	NOON
360	67	PM

West Leg				East Leg			
AM	NOON	PM		AM	NOON	PM	
4	0	1		14	0	21	
5	0	3		25	0	22	

South Leg		
184	246	AM
0	0	NOON
347	53	PM

Total Volume Per Leg

North Leg	
452	AM
0	NOON
427	PM

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
9	0	4	39	0	43

South Leg	
430	AM
0	NOON
400	PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-002 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 14th St			W 14th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	TOTAL
7:00 AM	0	43	0	2	56	2	0	0	2	0	0	2	107
7:15 AM	2	58	1	7	50	0	0	0	1	0	0	2	121
7:30 AM	0	75	1	2	39	0	0	0	0	0	0	2	119
7:45 AM	0	56	2	6	47	1	1	0	1	0	0	2	116
8:00 AM	0	49	2	4	43	1	1	0	1	2	0	6	109
8:15 AM	2	49	2	4	42	0	0	0	0	0	0	3	102
8:30 AM	1	44	1	4	32	0	0	0	0	0	1	3	86
8:45 AM	0	47	1	3	31	1	0	0	1	0	0	3	87
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	5	421	10	32	340	5	2	0	6	2	1	23	847
APPROACH %'s :	1.15%	96.56%	2.29%	8.49%	90.19%	1.33%	25.00%	0.00%	75.00%	7.69%	3.85%	88.46%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	2	238	6	19	179	2	2	0	3	2	0	12	465
PEAK HR FACTOR :	0.809			0.877			0.625			0.438			0.961

UTURNS

NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
NB	SB	EB	WB
0	0	0	0

CONTROL : 1-Way Stop(WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-002 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 14th St			W 14th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
4:00 PM	0	6	0	6	91	1	0	0	2	2	0	5	113
4:15 PM	0	17	1	3	96	0	0	0	0	1	0	3	121
4:30 PM	0	11	2	3	79	0	0	0	0	0	0	5	100
4:45 PM	0	16	0	7	74	0	0	0	1	1	0	4	103
5:00 PM	1	11	0	8	66	0	0	0	0	0	0	3	89
5:15 PM	0	8	0	3	54	0	1	0	0	0	0	5	71
5:30 PM	0	7	0	1	51	0	0	0	1	0	0	0	60
5:45 PM	0	3	2	7	51	0	0	0	0	0	0	8	71
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	1	79	5	38	562	1	1	0	4	4	0	33	728
APPROACH %'s :	1.18%	92.94%	5.88%	6.32%	93.51%	0.17%	20.00%	0.00%	80.00%	10.81%	0.00%	89.19%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	0	50	3	19	340	1	0	0	3	4	0	17	437
PEAK HR FACTOR :	0.736			0.909			0.375			0.750			0.903

UTURNS

NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	0
NB	SB	EB	WB
0	1	0	0

CONTROL : 1-Way Stop(WB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and W 14th St , National City

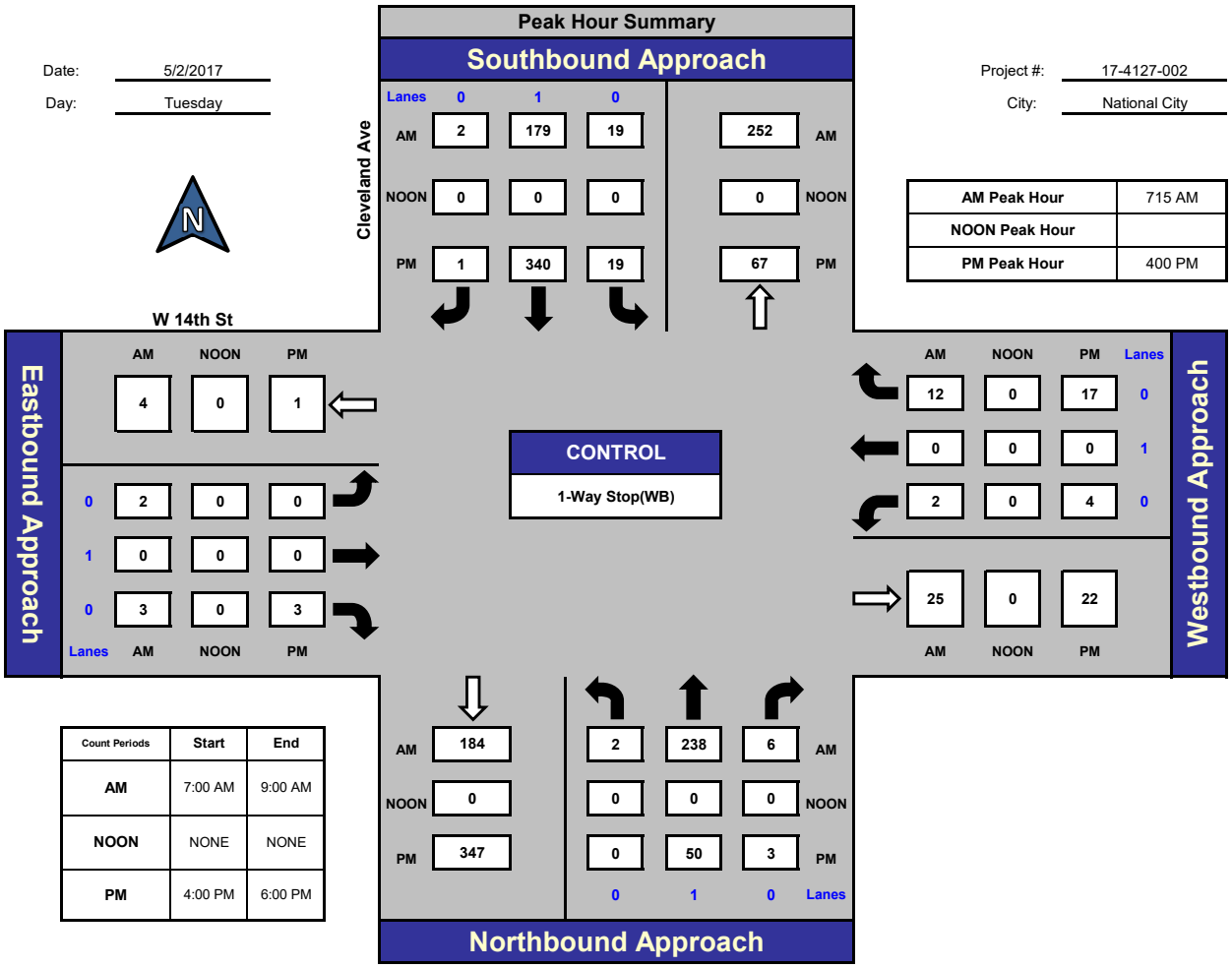
Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-002

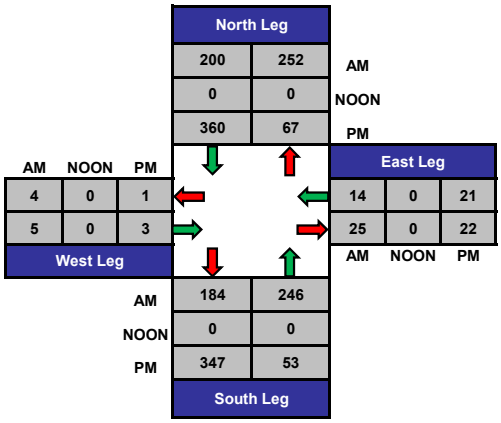
City: National City

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

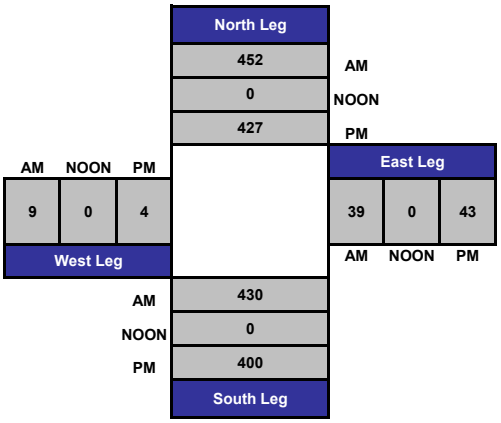


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-003 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	1	1	0	
7:00 AM	2	44	0	0	55	0	0	0	0	18	1	3	123
7:15 AM	1	55	0	0	52	0	0	0	0	17	0	4	129
7:30 AM	0	80	0	0	43	1	0	0	0	12	1	5	142
7:45 AM	1	58	0	0	36	1	0	0	0	19	0	5	120
8:00 AM	0	46	0	0	53	1	0	0	0	15	0	1	116
8:15 AM	1	54	0	2	31	2	0	0	2	23	0	6	121
8:30 AM	0	37	0	1	33	0	0	0	0	11	0	8	90
8:45 AM	0	48	0	0	32	2	0	0	0	7	0	3	92
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	5	422	0	3	335	7	0	0	2	122	2	35	933
APPROACH %'s :	1.17%	98.83%	0.00%	0.87%	97.10%	2.03%	0.00%	0.00%	100.00%	76.73%	1.26%	22.01%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	4	237	0	0	186	2	0	0	0	66	2	17	514
PEAK HR FACTOR :		0.753			0.855			0.000			0.885		0.905

UTURNS	NB	SB	EB	WB
	1	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	2	0	0
	0	1	0	0
	0	0	0	0
	NB	SB	EB	WB
	1	3	0	0

CONTROL : 2-Way Stop(EB/WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-003 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	1	1	0	
4:00 PM	0	10	0	0	93	3	0	0	4	12	0	1	123
4:15 PM	0	10	0	0	95	0	0	0	0	14	0	2	121
4:30 PM	0	6	0	0	92	0	0	0	0	11	1	4	114
4:45 PM	0	8	0	0	75	0	1	0	0	9	0	3	96
5:00 PM	0	7	0	0	69	1	0	0	0	9	0	2	88
5:15 PM	0	4	0	0	60	0	0	0	0	8	0	3	75
5:30 PM	0	6	0	0	50	1	0	0	0	6	0	0	63
5:45 PM	0	6	0	0	53	2	0	0	0	5	0	1	67
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	57	0	0	587	7	1	0	4	74	1	16	747
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	98.82%	1.18%	20.00%	0.00%	80.00%	81.32%	1.10%	17.58%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	0	34	0	0	355	3	1	0	4	46	1	10	454
PEAK HR FACTOR :	0.850			0.932			0.313			0.891			0.923

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : 2-Way Stop(EB/WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-003 **Day:** Tuesday

City: National City **Date:** 5/2/2017

NOON

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	1	1	0	

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS

NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(EB/WB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and W 18th St , National City

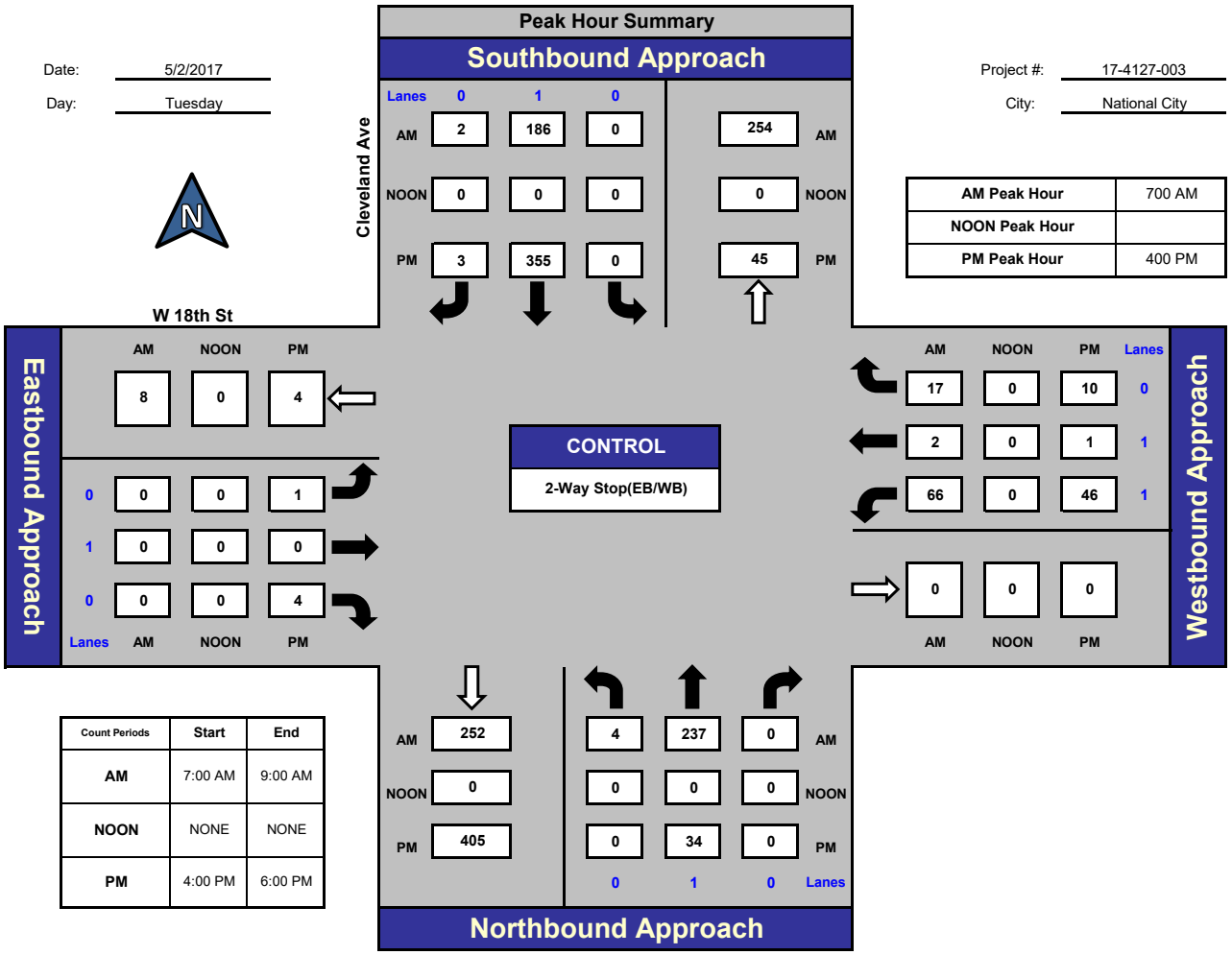
Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-003

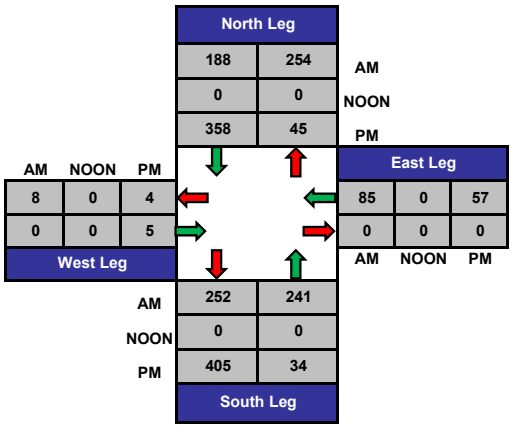
City: National City

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

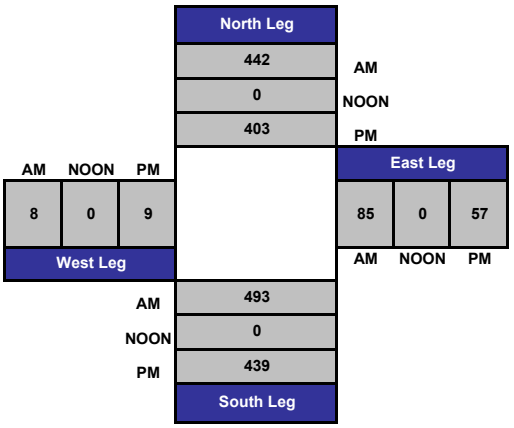


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-003 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	1	1	0	
7:00 AM	2	44	0	0	55	0	0	0	0	18	1	3	123
7:15 AM	1	55	0	0	52	0	0	0	0	17	0	4	129
7:30 AM	0	80	0	0	43	1	0	0	0	12	1	5	142
7:45 AM	1	58	0	0	36	1	0	0	0	19	0	5	120
8:00 AM	0	46	0	0	53	1	0	0	0	15	0	1	116
8:15 AM	1	54	0	2	31	2	0	0	2	23	0	6	121
8:30 AM	0	37	0	1	33	0	0	0	0	11	0	8	90
8:45 AM	0	48	0	0	32	2	0	0	0	7	0	3	92
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	5	422	0	3	335	7	0	0	2	122	2	35	933
APPROACH %'s :	1.17%	98.83%	0.00%	0.87%	97.10%	2.03%	0.00%	0.00%	100.00%	76.73%	1.26%	22.01%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	4	237	0	0	186	2	0	0	0	66	2	17	514
PEAK HR FACTOR :	0.753			0.855			0.000			0.885			0.905

UTURNS

NB	SB	EB	WB
1	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	2	0	0
0	1	0	0
0	0	0	0
NB	SB	EB	WB
1	3	0	0

CONTROL : 2-Way Stop(EB/WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-003 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	1	1	0	
4:00 PM	0	10	0	0	93	3	0	0	4	12	0	1	123
4:15 PM	0	10	0	0	95	0	0	0	0	14	0	2	121
4:30 PM	0	6	0	0	92	0	0	0	0	11	1	4	114
4:45 PM	0	8	0	0	75	0	1	0	0	9	0	3	96
5:00 PM	0	7	0	0	69	1	0	0	0	9	0	2	88
5:15 PM	0	4	0	0	60	0	0	0	0	8	0	3	75
5:30 PM	0	6	0	0	50	1	0	0	0	6	0	0	63
5:45 PM	0	6	0	0	53	2	0	0	0	5	0	1	67
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	57	0	0	587	7	1	0	4	74	1	16	747
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	98.82%	1.18%	20.00%	0.00%	80.00%	81.32%	1.10%	17.58%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	0	34	0	0	355	3	1	0	4	46	1	10	454
PEAK HR FACTOR :	0.850			0.932			0.313			0.891			0.923

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : 2-Way Stop(EB/WB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and W 18th St , National City

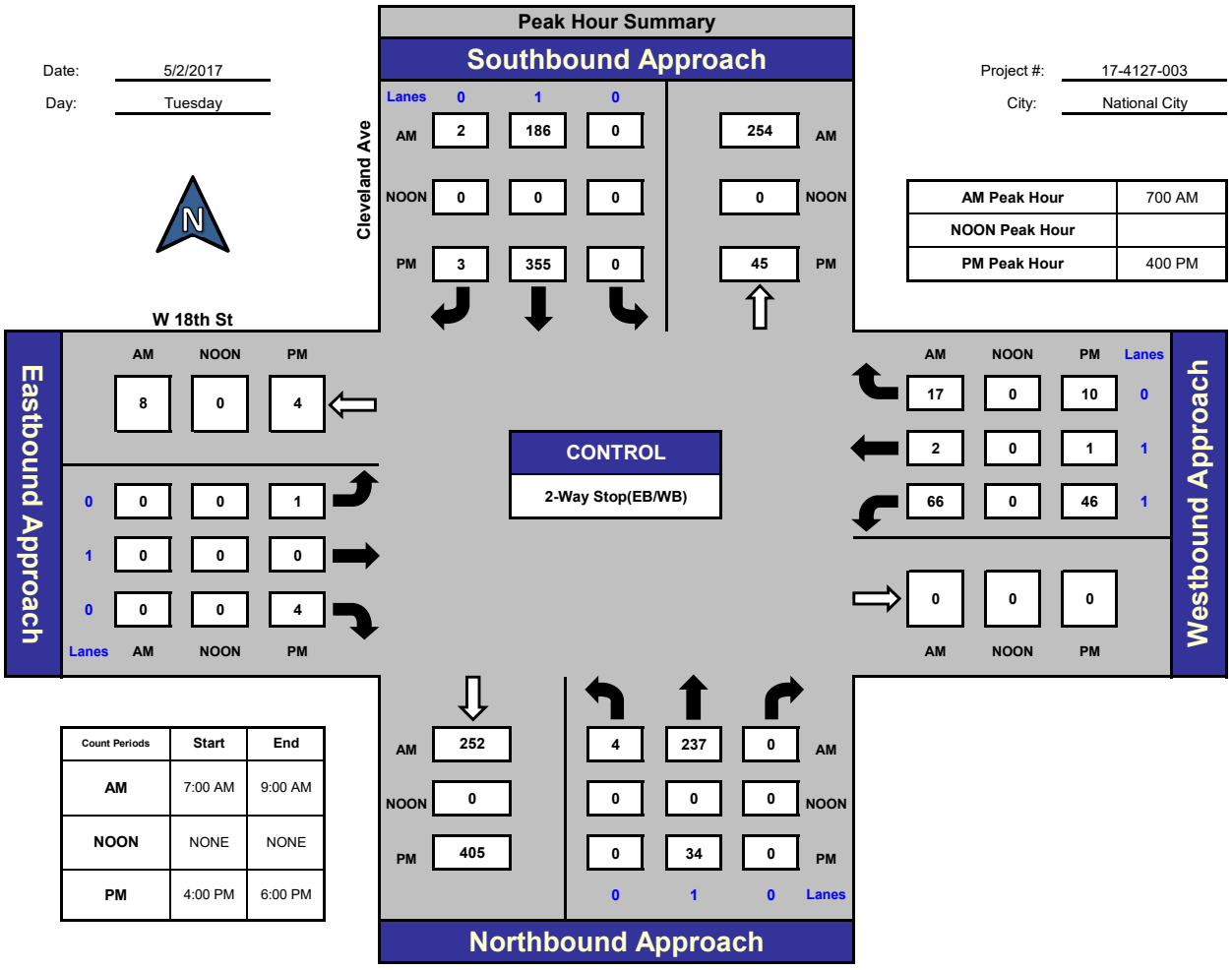
Date: 5/2/2017

Day: Tuesday

Project #: 17-4127-003

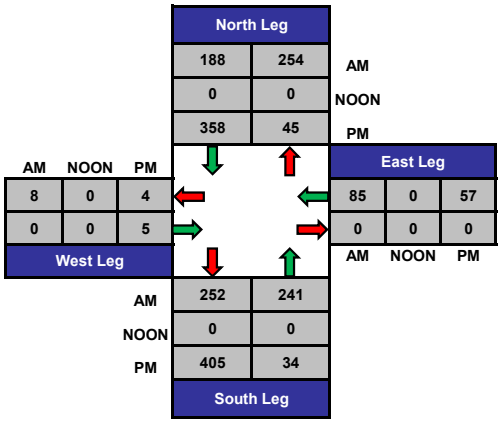
City: National City

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM



Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



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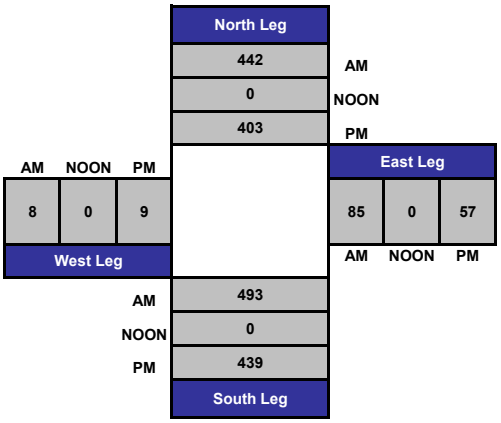


Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-006 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	McKinley Ave			McKinley Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	2	0	
7:00 AM	1	0	0	0	3	2	0	0	0	5	21	3	35
7:15 AM	1	2	0	0	5	1	0	0	0	2	21	2	34
7:30 AM	1	2	0	0	3	1	0	0	0	2	21	2	32
7:45 AM	1	1	0	0	5	4	0	0	0	1	15	8	35
8:00 AM	3	3	0	0	8	1	0	0	0	0	20	2	37
8:15 AM	4	1	0	0	4	3	0	0	0	2	24	6	44
8:30 AM	1	0	0	0	2	1	0	0	0	3	14	3	24
8:45 AM	1	2	0	0	3	2	0	0	0	1	10	1	20
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	13	11	0	0	33	15	0	0	0	16	146	27	261
APPROACH %'s :	54.17%	45.83%	0.00%	0.00%	68.75%	31.25%	#DIV/0!	#DIV/0!	#DIV/0!	8.47%	77.25%	14.29%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	9	7	0	0	20	9	0	0	0	5	80	18	148
PEAK HR FACTOR :	0.667			0.806			0.000			0.805			0.841

UTURNS			
NB	SB	EB	WB
NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-006 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	McKinley Ave			McKinley Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	2	0	
4:00 PM	1	2	0	0	6	1	0	0	0	2	14	3	29
4:15 PM	0	2	0	0	7	1	0	0	0	2	17	5	34
4:30 PM	0	2	0	0	9	5	0	0	0	1	11	4	32
4:45 PM	2	0	0	0	8	5	0	0	0	1	10	4	30
5:00 PM	1	2	0	0	7	0	0	0	0	0	11	2	23
5:15 PM	0	2	0	0	5	1	0	0	0	1	8	2	19
5:30 PM	0	2	0	0	6	0	0	0	0	2	8	3	21
5:45 PM	0	0	0	0	5	0	0	0	0	3	5	3	16
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	4	12	0	0	53	13	0	0	0	12	84	26	204
APPROACH %'s :	25.00%	75.00%	0.00%	0.00%	80.30%	19.70%	#DIV/0!	#DIV/0!	#DIV/0!	9.84%	68.85%	21.31%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	3	6	0	0	30	12	0	0	0	6	52	16	125
PEAK HR FACTOR :	0.750			0.750			0.000			0.771			0.919

UTURNS

NB	SB	EB	WB
NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-006 **Day:** Tuesday

City: National City **Date:** 5/2/2017

NOON

NS/EW Streets:	McKinley Ave			McKinley Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	2	0	

UTURNS			
NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

CONTROL : 2-Way Stop(NB/SB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

McKinley Ave and W 18th St , National City

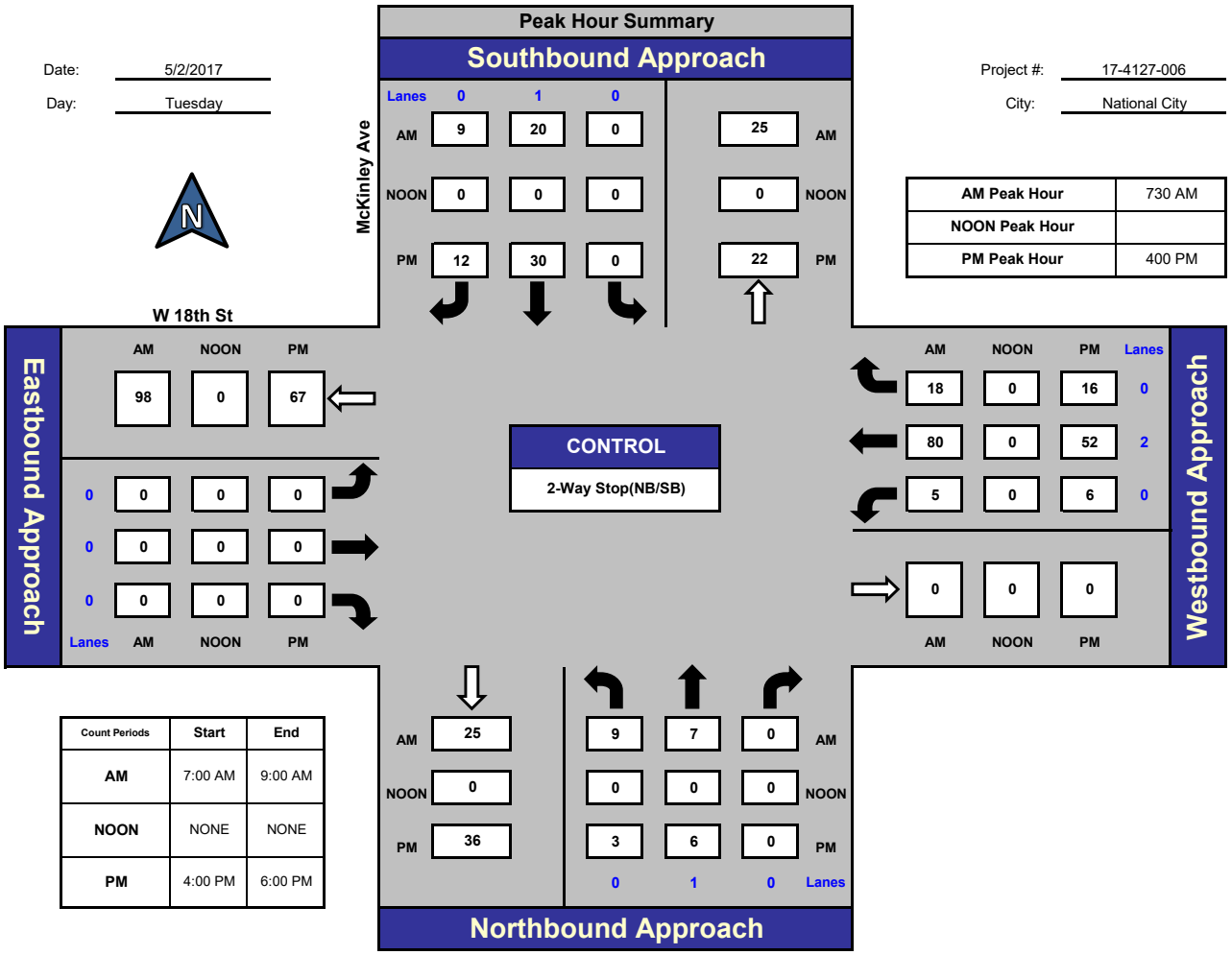
Date: 5/2/2017

Day: Tuesday

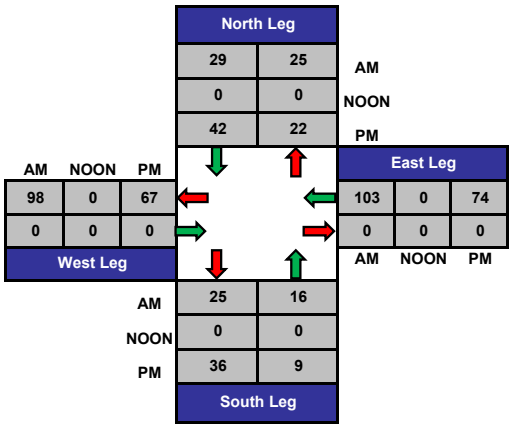
Project #: 17-4127-006

City: National City

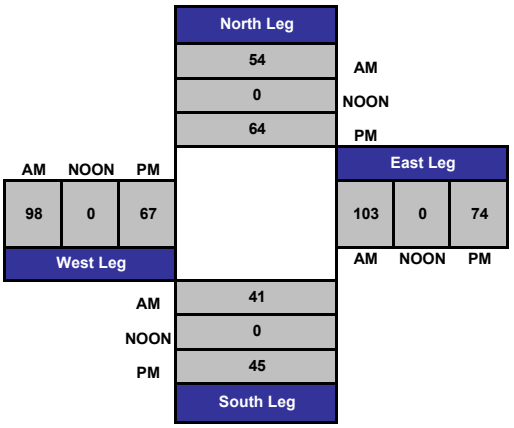
AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	400 PM



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-006 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	McKinley Ave			McKinley Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	2	0	
7:00 AM	1	0	0	0	3	2	0	0	0	5	21	3	35
7:15 AM	1	2	0	0	5	1	0	0	0	2	21	2	34
7:30 AM	1	2	0	0	3	1	0	0	0	2	21	2	32
7:45 AM	1	1	0	0	5	4	0	0	0	1	15	8	35
8:00 AM	3	3	0	0	8	1	0	0	0	0	20	2	37
8:15 AM	4	1	0	0	4	3	0	0	0	2	24	6	44
8:30 AM	1	0	0	0	2	1	0	0	0	3	14	3	24
8:45 AM	1	2	0	0	3	2	0	0	0	1	10	1	20
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	13	11	0	0	33	15	0	0	0	16	146	27	261
APPROACH %'s :	54.17%	45.83%	0.00%	0.00%	68.75%	31.25%	#DIV/0!	#DIV/0!	#DIV/0!	8.47%	77.25%	14.29%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	9	7	0	0	20	9	0	0	0	5	80	18	148
PEAK HR FACTOR :	0.667			0.806			0.000			0.805			0.841

UTURNS

NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(NB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-006 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	McKinley Ave			McKinley Ave			W 18th St			W 18th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	2	0	
4:00 PM	1	2	0	0	6	1	0	0	0	2	14	3	29
4:15 PM	0	2	0	0	7	1	0	0	0	2	17	5	34
4:30 PM	0	2	0	0	9	5	0	0	0	1	11	4	32
4:45 PM	2	0	0	0	8	5	0	0	0	1	10	4	30
5:00 PM	1	2	0	0	7	0	0	0	0	0	11	2	23
5:15 PM	0	2	0	0	5	1	0	0	0	1	8	2	19
5:30 PM	0	2	0	0	6	0	0	0	0	2	8	3	21
5:45 PM	0	0	0	0	5	0	0	0	0	3	5	3	16
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	4	12	0	0	53	13	0	0	0	12	84	26	204
APPROACH %'s :	25.00%	75.00%	0.00%	0.00%	80.30%	19.70%	#DIV/0!	#DIV/0!	#DIV/0!	9.84%	68.85%	21.31%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	3	6	0	0	30	12	0	0	0	6	52	16	125
PEAK HR FACTOR :	0.750			0.750			0.000			0.771			0.919

UTURNS

NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(NB/SB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

McKinley Ave and W 18th St , National City

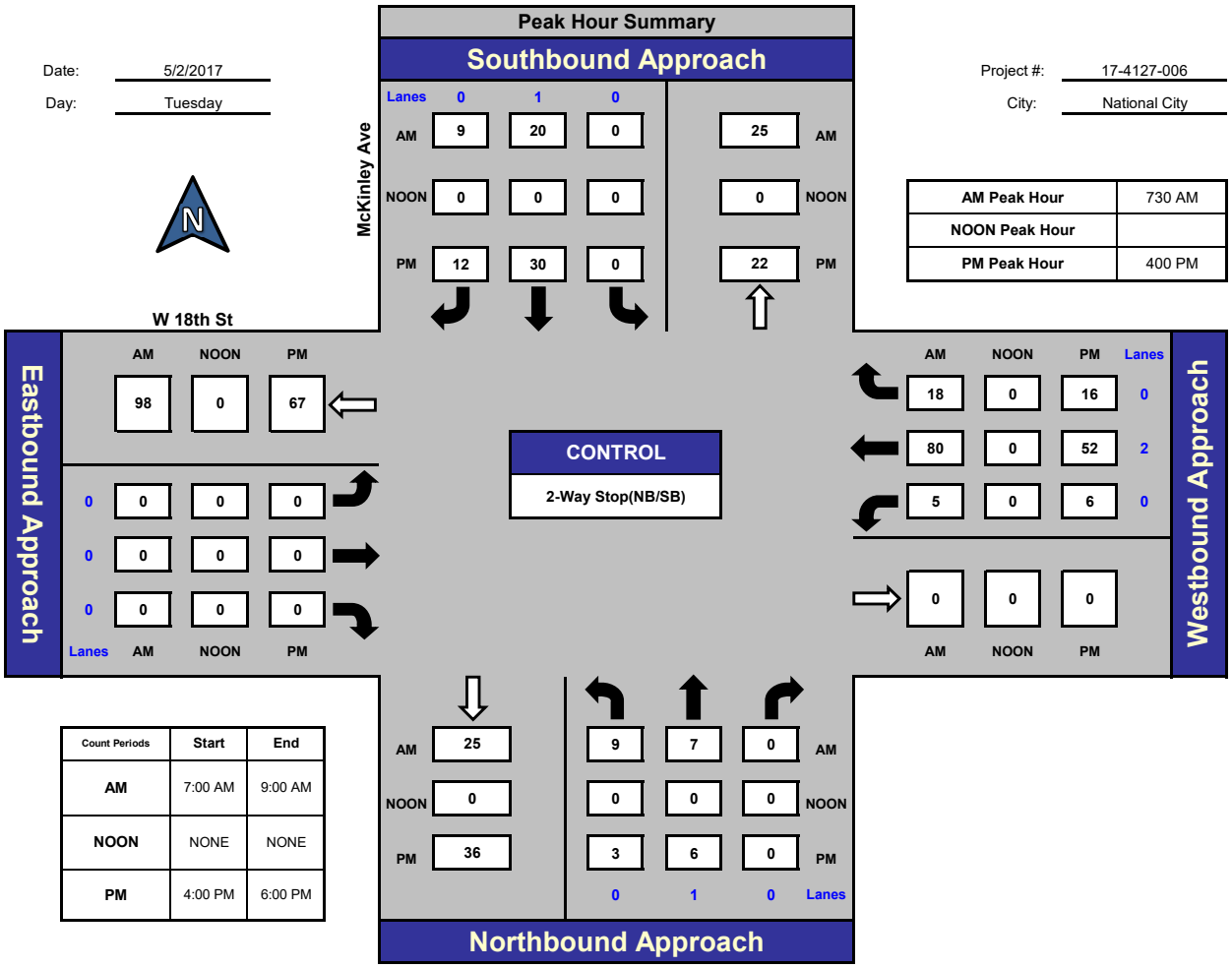
Date: 5/2/2017

Day: Tuesday

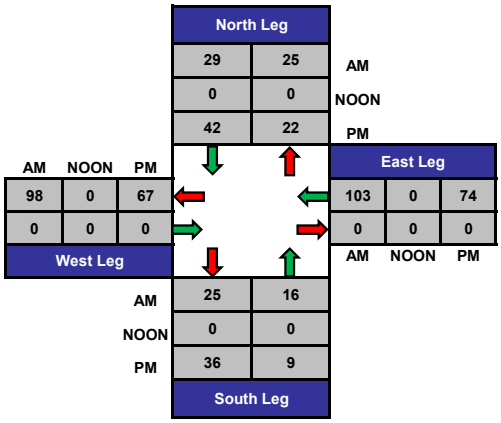
Project #: 17-4127-006

City: National City

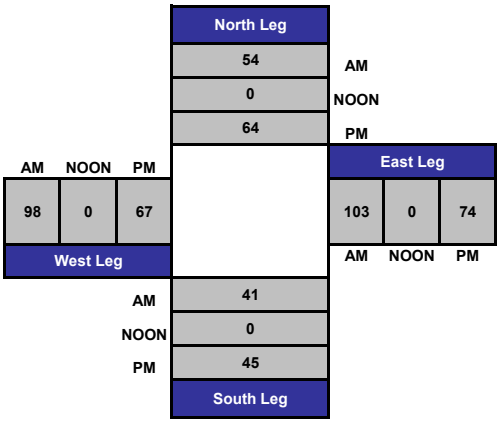
AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	400 PM



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4130-033 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

AM

NS/EW Streets:	Tidelands Ave			Tidelands Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	1	1	0	0	2	0	0	2	0	
7:00 AM	30	7	3	1	5	20	4	3	3	0	44	0	120
7:15 AM	36	10	4	1	17	22	2	1	1	3	41	2	140
7:30 AM	20	10	4	1	10	13	2	5	0	2	39	1	107
7:45 AM	12	18	3	1	11	10	2	6	0	3	32	0	98
8:00 AM	8	17	2	1	6	7	2	3	1	6	20	4	77
8:15 AM	5	10	6	0	3	9	9	7	4	1	17	0	71
8:30 AM	4	8	4	2	3	13	3	4	2	1	16	2	62
8:45 AM	1	5	5	3	4	5	5	5	1	2	12	1	49
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	116	85	31	10	59	99	29	34	12	18	221	10	724
APPROACH %'s :	50.00%	36.64%	13.36%	5.95%	35.12%	58.93%	38.67%	45.33%	16.00%	7.23%	88.76%	4.02%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	98	45	14	4	43	65	10	15	4	8	156	3	465
PEAK HR FACTOR :	0.785			0.700			0.725			0.908			0.830

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4130-033 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

PM

NS/EW Streets:	Tidelands Ave			Tidelands Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	1	1	0	0	2	0	0	2	0	
4:00 PM	1	3	1	3	6	1	11	24	8	0	3	1	62
4:15 PM	1	3	3	2	6	1	10	17	5	2	0	0	50
4:30 PM	0	4	2	7	12	0	8	18	6	1	0	1	59
4:45 PM	0	7	6	2	7	0	2	7	2	3	0	1	37
5:00 PM	0	5	1	2	5	1	1	0	0	1	0	2	18
5:15 PM	0	2	1	2	1	0	1	0	0	1	0	0	8
5:30 PM	0	4	0	1	13	0	0	0	0	3	0	2	23
5:45 PM	1	4	1	1	5	1	1	0	0	3	0	1	18
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	3	32	15	20	55	4	34	66	21	14	3	8	275
APPROACH %'s :	6.00%	64.00%	30.00%	25.32%	69.62%	5.06%	28.10%	54.55%	17.36%	56.00%	12.00%	32.00%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	2	17	12	14	31	2	31	66	21	6	3	3	208
PEAK HR FACTOR :		0.596			0.618			0.686			0.750		0.839

UTURNS				
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
NB	SB	EB	WB
1	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4130-033 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

NOON

NS/EW Streets:	Tidelands Ave			Tidelands Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	1	1	0	0	2	0	0	2	0	
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Tidelands Ave and W 19th St , Port of San Diego

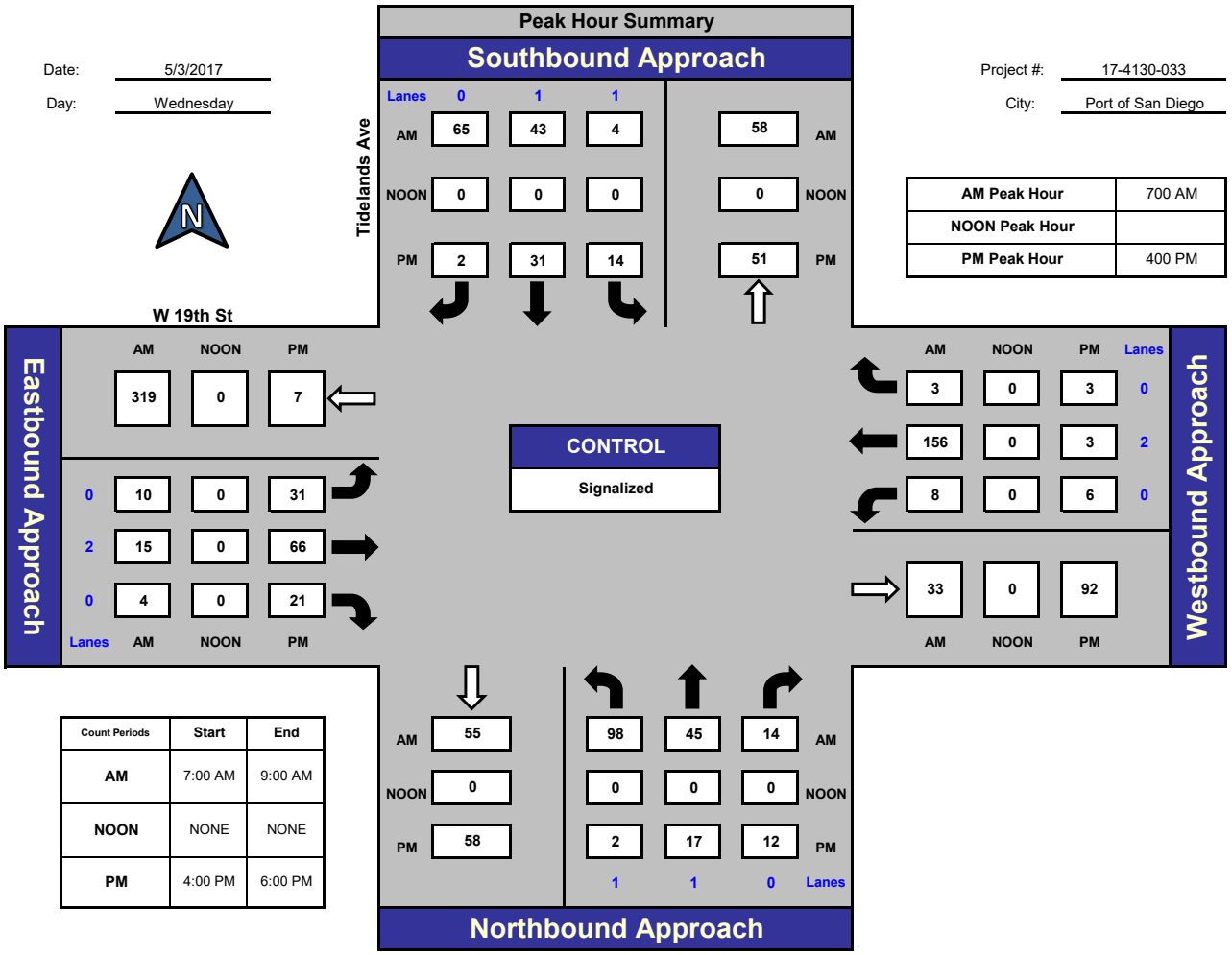
Date: 5/3/2017

Day: Wednesday

Project #: 17-4130-033

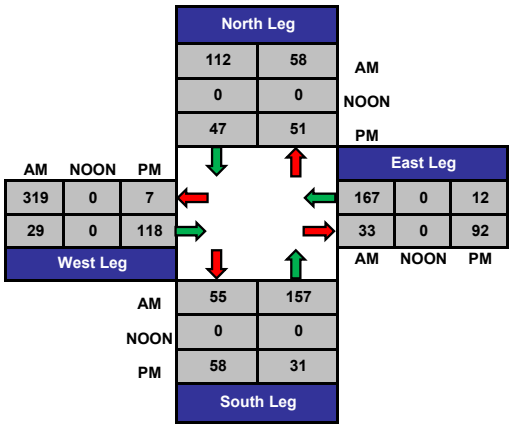
City: Port of San Diego

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

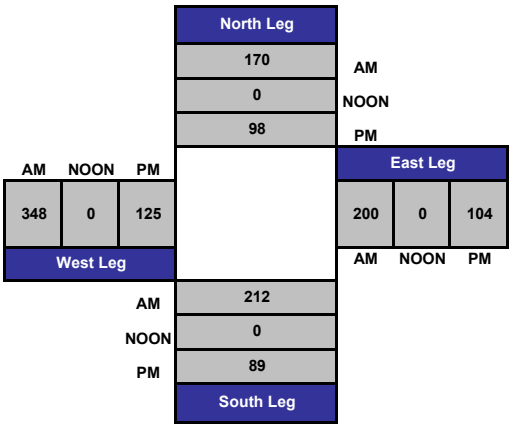


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4130-033 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

AM

NS/EW Streets:	Tidelands Ave			Tidelands Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	1	1	0	0	2	0	0	2	0	
7:00 AM	30	7	3	1	5	20	4	3	3	0	44	0	120
7:15 AM	36	10	4	1	17	22	2	1	1	3	41	2	140
7:30 AM	20	10	4	1	10	13	2	5	0	2	39	1	107
7:45 AM	12	18	3	1	11	10	2	6	0	3	32	0	98
8:00 AM	8	17	2	1	6	7	2	3	1	6	20	4	77
8:15 AM	5	10	6	0	3	9	9	7	4	1	17	0	71
8:30 AM	4	8	4	2	3	13	3	4	2	1	16	2	62
8:45 AM	1	5	5	3	4	5	5	5	1	2	12	1	49
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	116	85	31	10	59	99	29	34	12	18	221	10	724
APPROACH %'s :	50.00%	36.64%	13.36%	5.95%	35.12%	58.93%	38.67%	45.33%	16.00%	7.23%	88.76%	4.02%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	98	45	14	4	43	65	10	15	4	8	156	3	465
PEAK HR FACTOR :	0.785			0.700			0.725			0.908			0.830

UTURNS

	NB	SB	EB	WB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL VOLUMES :	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4130-033 **Day:** Wednesday

City: Port of San Diego **Date:** 5/3/2017

PM

NS/EW Streets:	Tidelands Ave			Tidelands Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	1	1	0	0	2	0	0	2	0	
4:00 PM	1	3	1	3	6	1	11	24	8	0	3	1	62
4:15 PM	1	3	3	2	6	1	10	17	5	2	0	0	50
4:30 PM	0	4	2	7	12	0	8	18	6	1	0	1	59
4:45 PM	0	7	6	2	7	0	2	7	2	3	0	1	37
5:00 PM	0	5	1	2	5	1	1	0	0	1	0	2	18
5:15 PM	0	2	1	2	1	0	1	0	0	1	0	0	8
5:30 PM	0	4	0	1	13	0	0	0	0	3	0	2	23
5:45 PM	1	4	1	1	5	1	1	0	0	3	0	1	18
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	3	32	15	20	55	4	34	66	21	14	3	8	275
APPROACH %'s :	6.00%	64.00%	30.00%	25.32%	69.62%	5.06%	28.10%	54.55%	17.36%	56.00%	12.00%	32.00%	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	2	17	12	14	31	2	31	66	21	6	3	3	208
PEAK HR FACTOR :	0.596			0.618			0.686			0.750			0.839

UTURNS	NB	SB	EB	WB
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	1	0	0	0
TOTAL VOLUMES :	NB	SB	EB	WB
	1	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

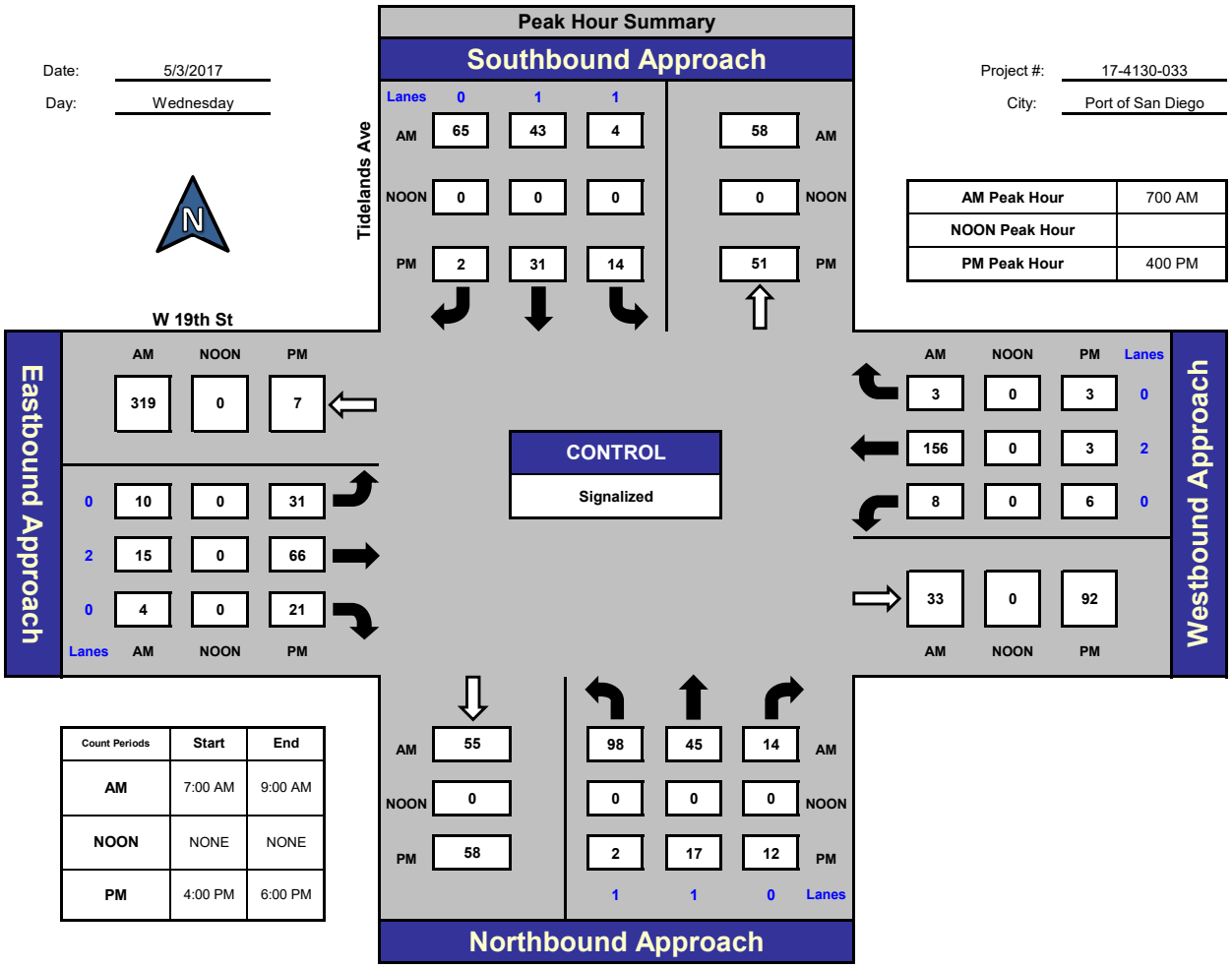
Tidelands Ave and W 19th St , Port of San Diego

Date: 5/3/2017

Day: Wednesday

Project #: 17-4130-033

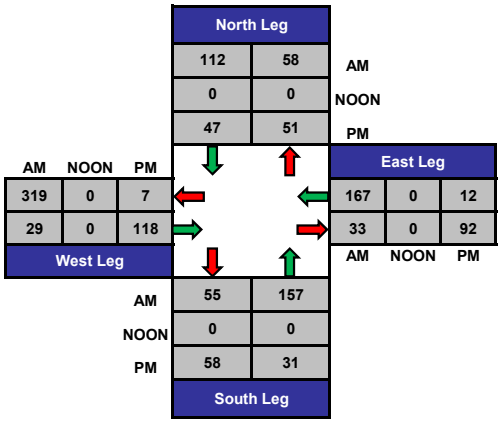
City: Port of San Diego



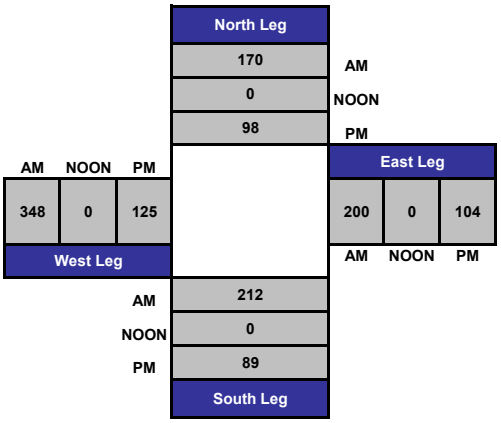
AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-004 **Day:** Tuesday

City: National City **Date:** 5/2/2017

AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0.5	0.5	1	0	0	0	
7:00 AM	30	39	3	13	13	52	4	5	3	0	0	0	162
7:15 AM	27	62	3	13	18	37	6	10	6	0	0	0	182
7:30 AM	23	65	5	15	13	24	2	10	6	0	0	0	163
7:45 AM	27	63	5	16	19	23	4	2	4	0	0	0	163
8:00 AM	18	40	4	16	20	24	6	4	6	0	0	0	138
8:15 AM	18	36	0	11	24	22	8	8	8	0	0	0	135
8:30 AM	10	34	5	14	12	13	7	5	5	0	0	0	105
8:45 AM	6	40	6	10	14	18	4	8	6	0	0	0	112
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	159	379	31	108	133	213	41	52	44	0	0	0	1160
APPROACH %'s :	27.94%	66.61%	5.45%	23.79%	29.30%	46.92%	29.93%	37.96%	32.12%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	107	229	16	57	63	136	16	27	19	0	0	0	670
PEAK HR FACTOR :		0.926			0.821			0.705			0.000		0.920

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : 1-Way Stop(EB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-004 **Day:** Tuesday

City: National City **Date:** 5/2/2017

PM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0.5	0.5	1	0	0	0	
4:00 PM	2	4	8	31	71	12	5	37	34	0	0	0	204
4:15 PM	3	5	4	27	75	8	5	30	20	0	0	0	177
4:30 PM	2	4	7	26	66	2	1	23	17	0	0	0	148
4:45 PM	3	3	8	24	61	5	3	11	8	0	0	0	126
5:00 PM	2	7	12	27	45	5	2	12	20	0	0	0	132
5:15 PM	4	1	9	14	50	1	2	11	25	0	0	0	117
5:30 PM	4	3	2	14	36	1	4	6	5	0	0	0	75
5:45 PM	1	5	4	33	33	5	0	3	7	0	0	0	91
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	21	32	54	196	437	39	22	133	136	0	0	0	1070
APPROACH %'s :	19.63%	29.91%	50.47%	29.17%	65.03%	5.80%	7.56%	45.70%	46.74%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	400 PM												TOTAL
PEAK HR VOL :	10	16	27	108	273	27	14	101	79	0	0	0	655
PEAK HR FACTOR :		0.946			0.895			0.638			0.000		0.803

UTURNS				
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
0	0	0	0
NB	SB	EB	WB
1	0	0	0

CONTROL : 1-Way Stop(EB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-004 **Day:** Tuesday

City: National City **Date:** 5/2/2017

NOON

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0.5	0.5	1	0	0	0	
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	0 AM												TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :		0.000			0.000			0.000			0.000		0.000

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : 1-Way Stop(EB)

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Cleveland Ave and W 19th St , National City

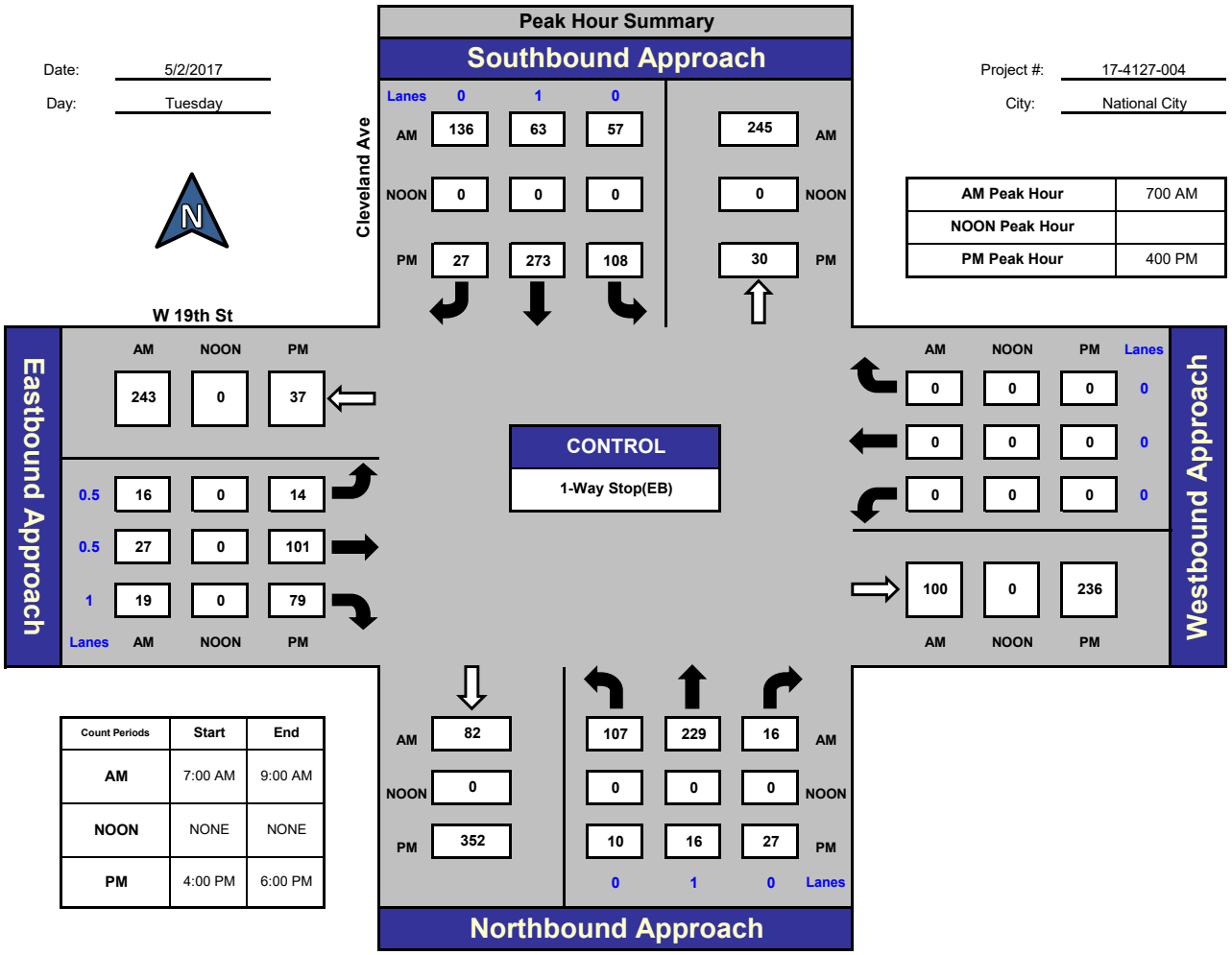
Date: 5/2/2017

Day: Tuesday

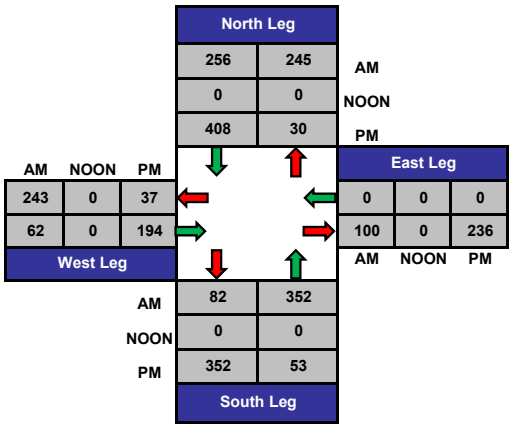
Project #: 17-4127-004

City: National City

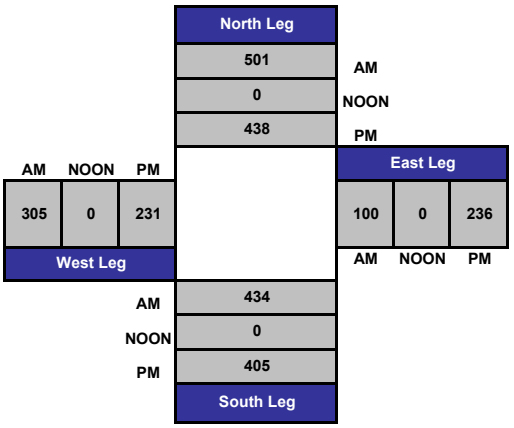
AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4127-004 **Day:** Tuesday

City: National City **Date:** 5/2/2017

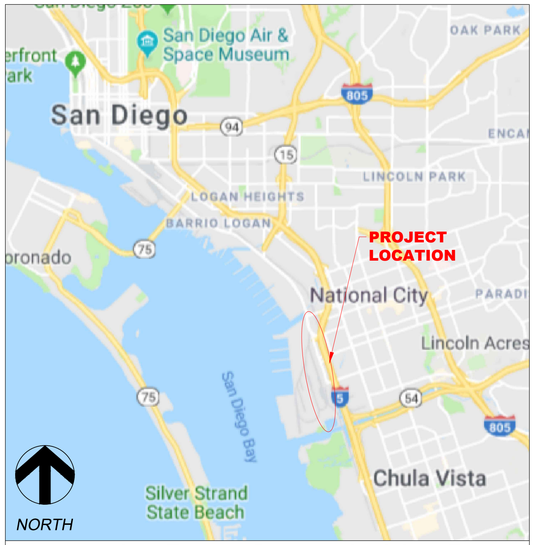
AM

NS/EW Streets:	Cleveland Ave			Cleveland Ave			W 19th St			W 19th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 0.5	ET 0.5	ER 1	WL 0	WT 0	WR 0	TOTAL
7:00 AM	30	39	3	13	13	52	4	5	3	0	0	0	162
7:15 AM	27	62	3	13	18	37	6	10	6	0	0	0	182
7:30 AM	23	65	5	15	13	24	2	10	6	0	0	0	163
7:45 AM	27	63	5	16	19	23	4	2	4	0	0	0	163
8:00 AM	18	40	4	16	20	24	6	4	6	0	0	0	138
8:15 AM	18	36	0	11	24	22	8	8	8	0	0	0	135
8:30 AM	10	34	5	14	12	13	7	5	5	0	0	0	105
8:45 AM	6	40	6	10	14	18	4	8	6	0	0	0	112
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	159	379	31	108	133	213	41	52	44	0	0	0	1160
APPROACH %'s :	27.94%	66.61%	5.45%	23.79%	29.30%	46.92%	29.93%	37.96%	32.12%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	107	229	16	57	63	136	16	27	19	0	0	0	670
PEAK HR FACTOR :	0.926			0.821			0.705			0.000			0.920

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : 1-Way Stop(EB)

Appendix B
Segment 5 Bayshore Bikeway 30% Design Plans



VICINITY MAP – NO SCALE

Bayshore Bikeway Segment 5 Improvement Plan

San Diego, CA - 30% Preliminary Design

August 31, 2018

Client

Port of San Diego
3165 Pacific Hwy
San Diego, CA 92101
(619) 686 - 6200

Plans Prepared By

Chen Ryan Associates, Inc.
3900 Fifth Ave. #310
San Diego, CA 92103
(619) 795 - 6086

Matthew Capuzzi, PE
(619) 468 - 2782

Sheet Index

1 - Title Sheet
2 - Key Map
3-7 - Layout Plans



LOCATION MAP – NO SCALE

PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

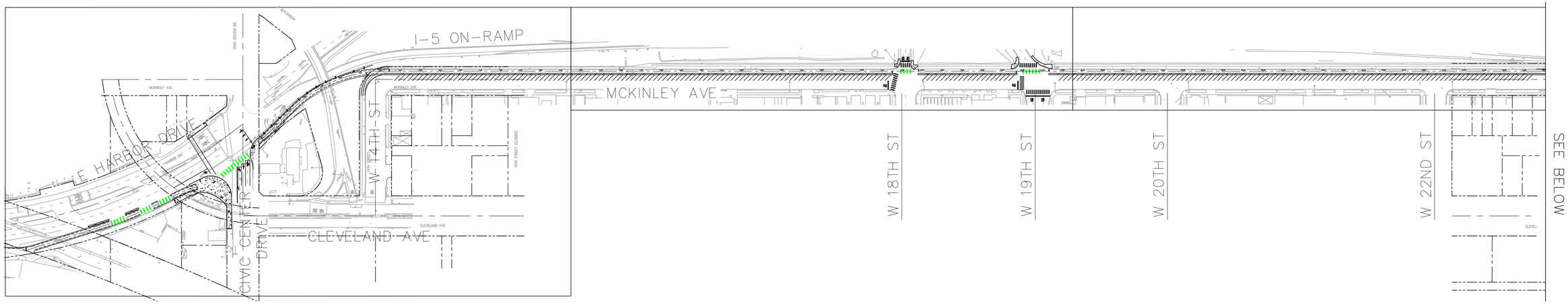
CHEN RYAN

P:\Project\2017.0206_Bayshore Bikeway Segment 5\CADD\Plans\Improvements 30%\MP-Title Sheet and Key Map.dwg Plot: Jonathon U. Sanchez Date: 8/31/2018 3:53:45 PM

SHEET 3

SHEET 4

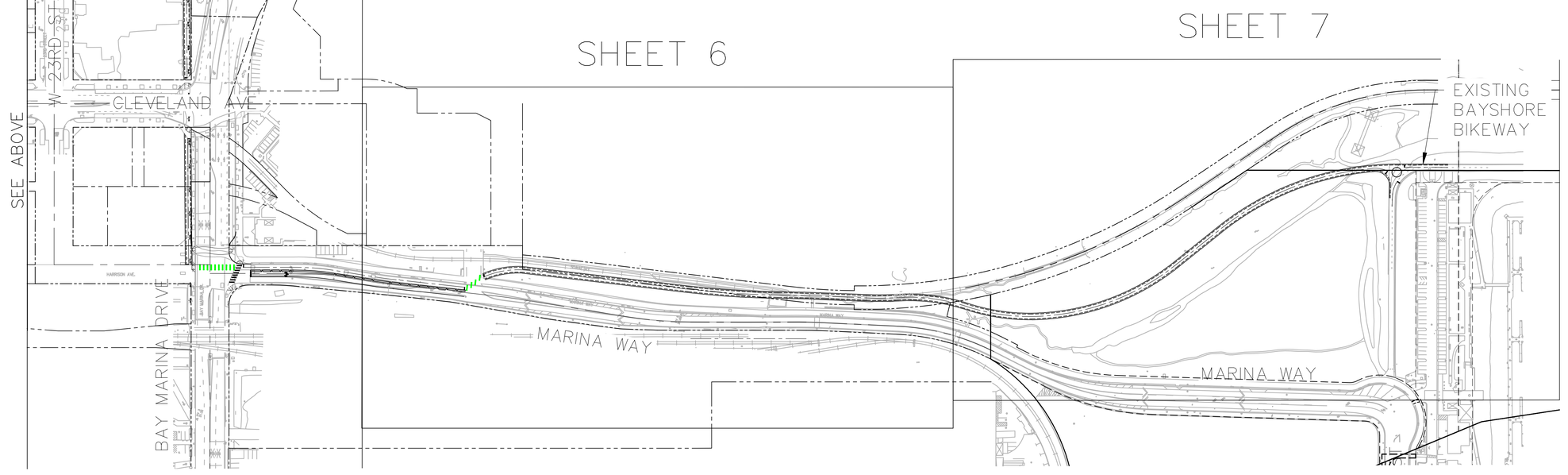
SHEET 4



SHEETS 5A/5B

SHEET 6

SHEET 7



PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

NORTH

0' 120' 240' 360'

SCALE: 1"= 120'

Bayshore Bikeway Segment 5 Improvement Plan

Key Map

SHEET 2 OF 7

8/31/18

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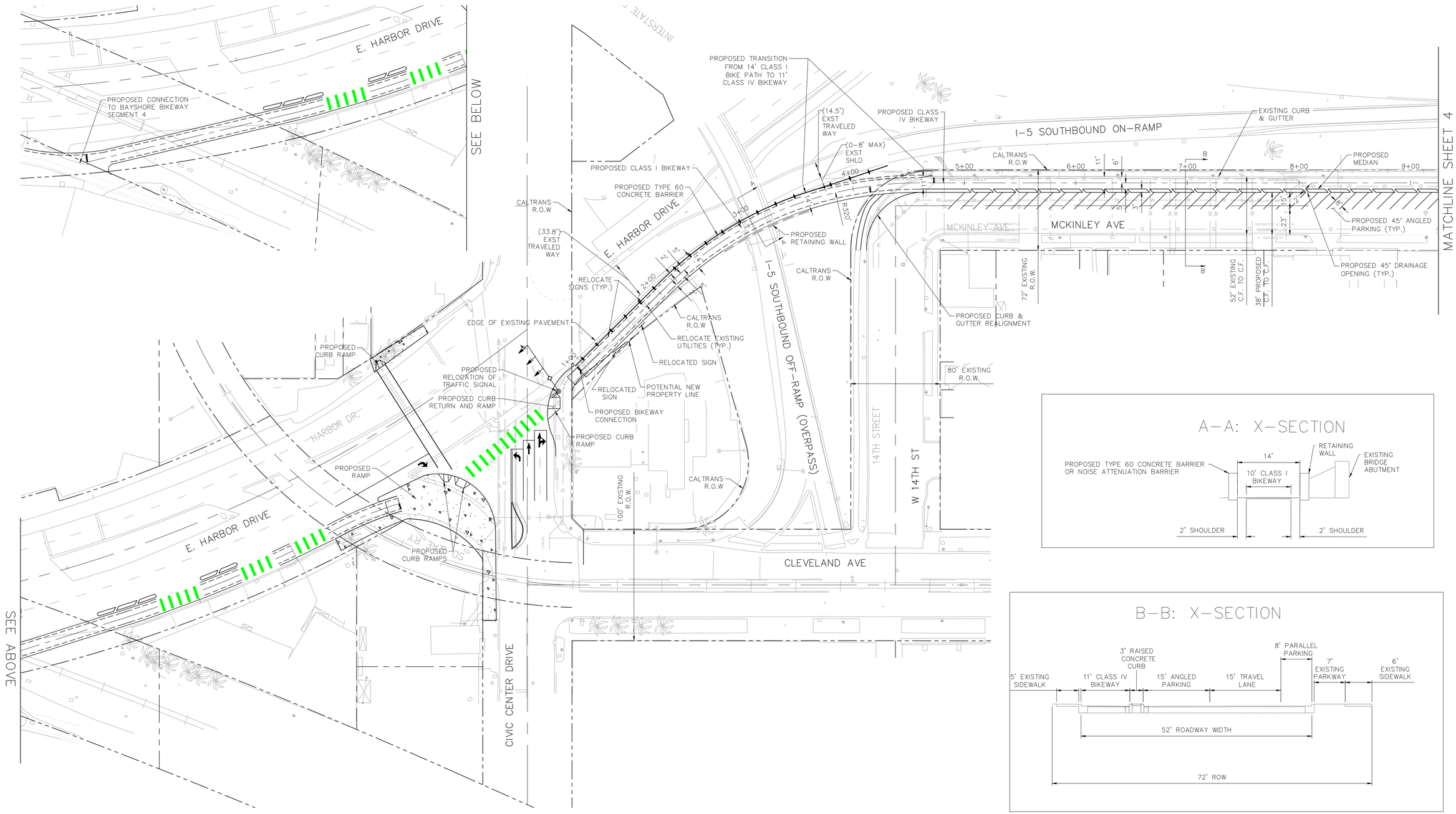

A–A: X–SECTION

B–B: X–SECTION

PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

0' 40 80' 120'
SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

Civic Center Drive to McKinley Avenue

SHEET 3 OF 7

8/31/18

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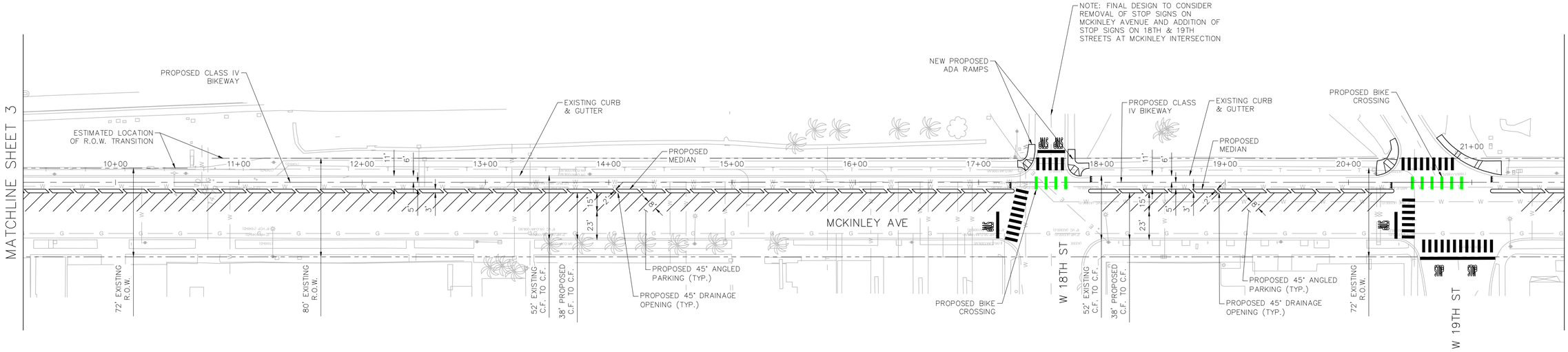

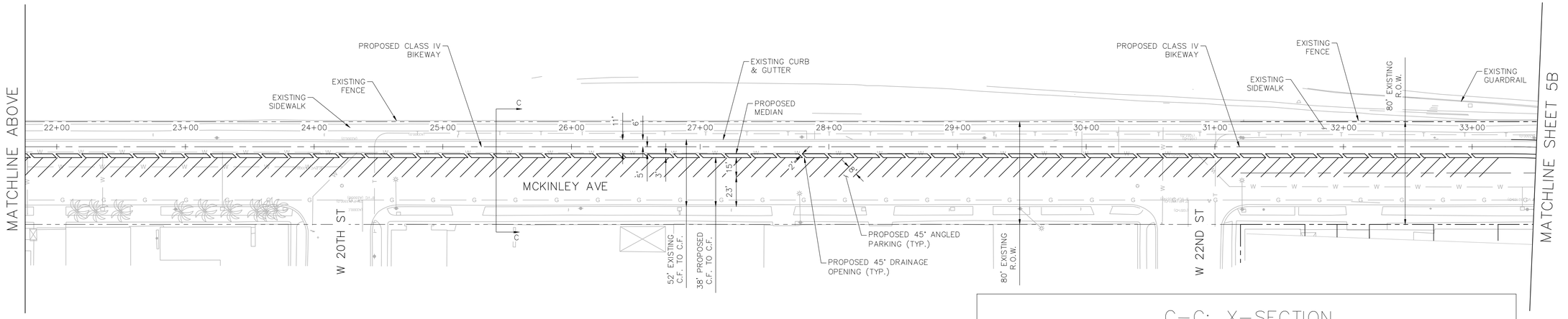

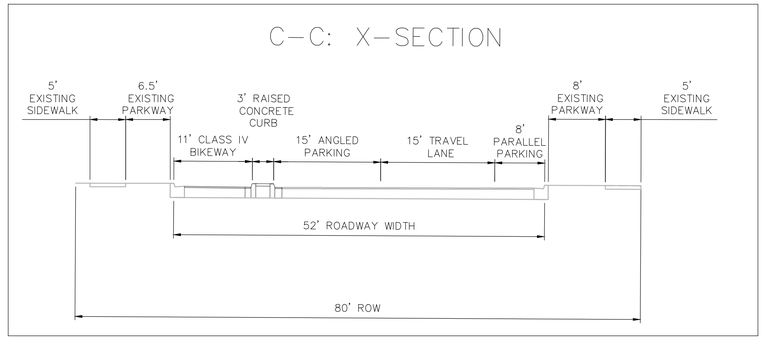

PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

0' 40 80' 120'

SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

McKinley Avenue to 23rd Street

SHEET 4 OF 7

8/31/18

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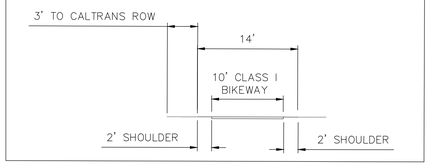

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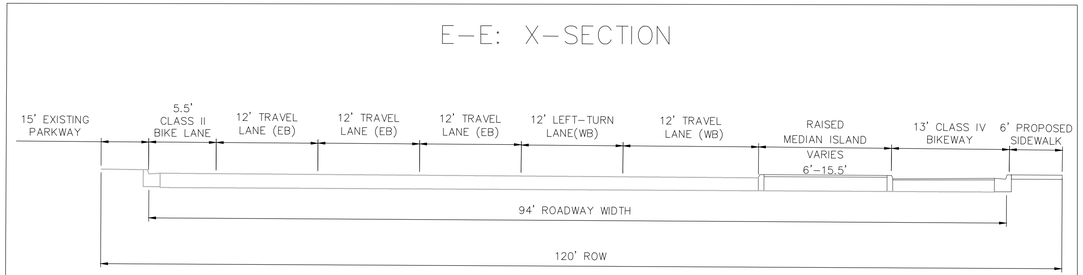

F–F: X–SECTION

G–G: X–SECTION

PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

0' 40 80' 120'
SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

McKinley Avenue to Marina Way

SHEET 5A OF 7

8/31/18

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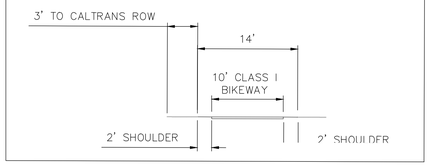

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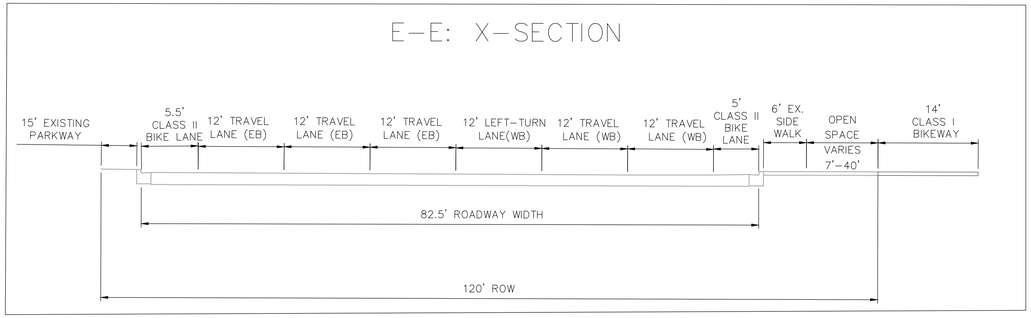
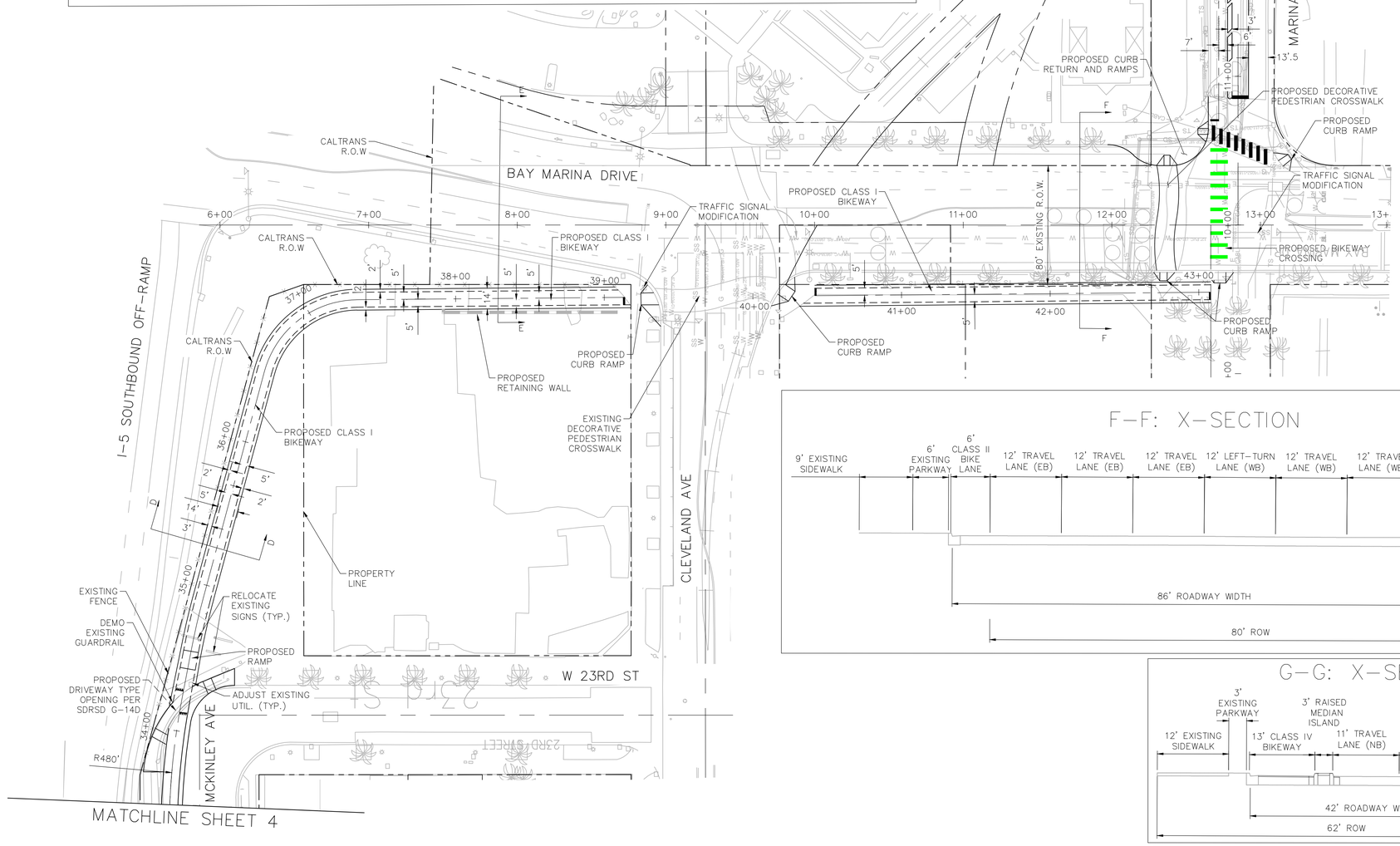


MATCHLINE SHEET 6

NOTE:
R/W ACQUISITION WILL BE REQUIRED FOR THIS ALTERNATIVE. THE CITY OF NATIONAL CITY OWNS THESE PARCELS AND WILL DEDICATE R/W TO THE PROJECT IF THIS ALTERNATIVE IS SELECTED.



MATCHLINE SHEET 4

F–F: X–SECTION

G–G: X–SECTION

PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

0' 40 80' 120'
SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

McKinley Avenue to Marina Way

SHEET 5B OF 7

8/31/18

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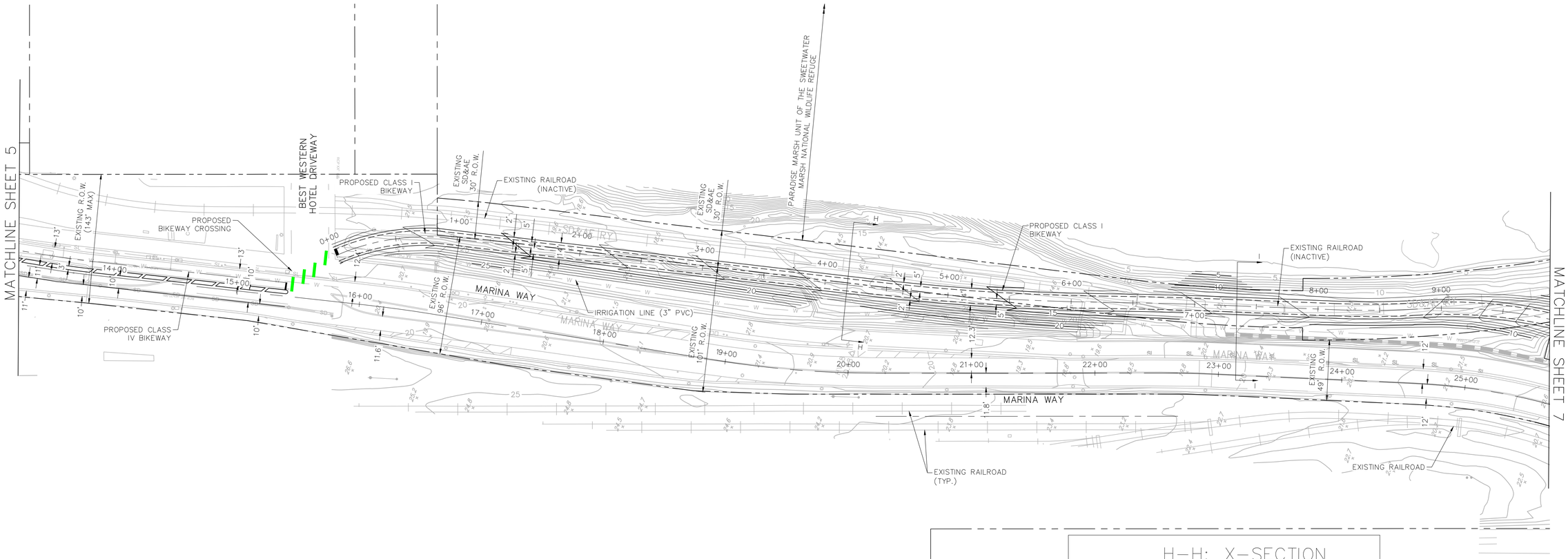
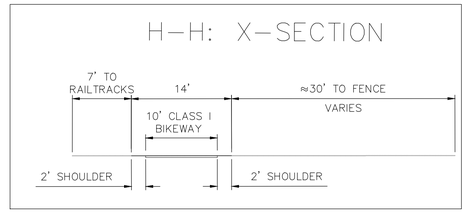
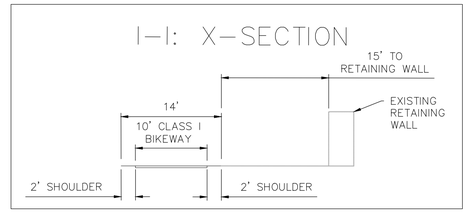


H–H: X–SECTION



I–I: X–SECTION



PORT of SAN DIEGO

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

CHEN RYAN

0' 40 80' 120'
SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

Marina Way to approx. 990' south of Best Western Hotel Dwy

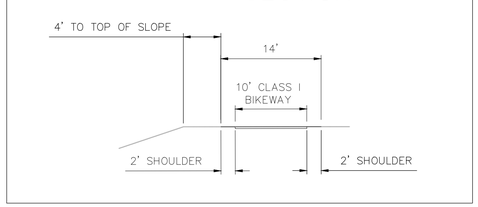
SHEET 6 OF 7

8/31/18

P:\Project\2017\2005_Bayshore Bikeway Segment 5\CADD\Plans\Improvements 30%\MP-North Section.dwg Plot: Jonathon U. Sanchez Date: 9/21/2018 3:48:03 PM



J–J: X–SECTION



0' 40 80' 120'
SCALE: 1"= 40

NORTH

Bayshore Bikeway Segment 5 Improvement Plan

Approx. 990' south of Best Western Hotel Driveway to Ex. Bayshore Bikeway 8/31/18

SHEET 7 OF 7

P:\Project\2017-0206_Bayshore Bikeway Segment 5\CADD\Plans\Improvements 30R\IMP-North Section.dwg Plot: Jonathon U. Sanchez Date: 8/31/2018 3:48:23 PM

Appendix C
Peak Hour Intersection LOS Worksheets – Existing Conditions

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	93	1	7	30	0	55	0	336	0	26	24
Future Vol, veh/h	0	93	1	7	30	0	55	0	336	0	26	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	135	1	10	42	0	63	0	382	0	27	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	136	0	0	224	-	136	-	198	42
Stage 1	-	-	-	-	-	-	136	-	-	-	62	-
Stage 2	-	-	-	-	-	-	88	-	-	-	136	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1400	-	0	715	0	892	0	684	1006
Stage 1	0	-	-	-	-	0	848	0	-	0	828	-
Stage 2	0	-	-	-	-	0	900	0	-	0	769	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1400	-	-	672	-	892	-	679	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	672	-	-	-	679	-
Stage 1	-	-	-	-	-	-	848	-	-	-	822	-
Stage 2	-	-	-	-	-	-	843	-	-	-	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.4	11.8	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	672	892	-	-	1400	-	805
HCM Lane V/C Ratio	0.093	0.428	-	-	0.007	-	0.065
HCM Control Delay (s)	10.9	12	-	-	7.6	0	9.8
HCM Lane LOS	B	B	-	-	A	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0	-	0.2



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	162	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	162	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.6	14.6		16.9	16.9		2.1	34.3		4.3	36.5
Effective Green, g (s)		14.6	14.6		16.9	16.9		2.1	34.3		4.3	36.5
Actuated g/C Ratio		0.15	0.15		0.17	0.17		0.02	0.34		0.04	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		239	472		277	255		34	1089		70	1199
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.68	0.40		0.33	0.62		0.41	0.69		0.50	0.09
Uniform Delay, d1		40.4	38.7		36.5	38.5		48.3	28.2		46.7	20.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.9	0.2		0.3	3.1		2.9	2.4		2.0	0.1
Delay (s)		46.3	38.9		36.8	41.6		51.2	30.6		48.8	20.9
Level of Service		D	D		D	D		D	C		D	C
Approach Delay (s)			42.3			39.8			31.0			27.5
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	4.3	4.3
Effective Green, g (s)	4.3	4.3
Actuated g/C Ratio	0.04	0.04
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	70	63
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.16	0.17
Uniform Delay, d1	46.1	46.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.5
Delay (s)	46.4	46.6
Level of Service	D	D
Approach Delay (s)	46.5	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	2	0	12	2	238	6	19	179	2
Future Vol, veh/h	2	0	3	2	0	12	2	238	6	19	179	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	5	0	27	2	294	7	22	203	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	563	553	204	553	551	298	205	0	0	301	0	0
Stage 1	248	248	-	302	302	-	-	-	-	-	-	-
Stage 2	315	305	-	251	249	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	425	430	817	432	431	723	1320	-	-	1216	-	-
Stage 1	738	687	-	690	650	-	-	-	-	-	-	-
Stage 2	679	648	-	736	686	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	403	421	817	423	422	723	1320	-	-	1216	-	-
Mov Cap-2 Maneuver	403	421	-	423	422	-	-	-	-	-	-	-
Stage 1	737	675	-	689	649	-	-	-	-	-	-	-
Stage 2	652	647	-	718	674	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	10.8	0.1	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1320	-	-	579	656	1216	-	-
HCM Lane V/C Ratio	0.002	-	-	0.014	0.049	0.018	-	-
HCM Control Delay (s)	7.7	-	-	11.3	10.8	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Future Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	74	2	19	5	316	0	0	219	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	557	546	220	546	547	316	221	0	-	-	-	0
Stage 1	220	220	-	326	326	-	-	-	-	-	-	-
Stage 2	337	326	-	220	221	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	429	434	800	436	434	706	1302	-	0	0	-	-
Stage 1	765	706	-	670	634	-	-	-	0	0	-	-
Stage 2	661	634	-	765	706	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	415	432	800	435	432	706	1302	-	-	-	-	-
Mov Cap-2 Maneuver	503	500	-	521	499	-	-	-	-	-	-	-
Stage 1	762	706	-	667	631	-	-	-	-	-	-	-
Stage 2	638	631	-	765	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.5	0.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1302	-	-	521	676	-	-
HCM Lane V/C Ratio	0.004	-	-	0.142	0.032	-	-
HCM Control Delay (s)	7.8	-	0	13.1	10.5	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Future Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	99	22	13	10	0	0	25	11

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	74	133	-	-	122	61
Stage 1	-	-	-	0	0	-	-	122	-
Stage 2	-	-	-	74	133	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	886	739	0	0	749	966
Stage 1	-	-	-	-	-	0	0	775	-
Stage 2	-	-	-	904	767	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	854	739	-	-	749	966
Mov Cap-2 Maneuver	-	-	-	854	739	-	-	749	-
Stage 1	-	-	-	-	-	-	-	775	-
Stage 2	-	-	-	865	767	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	-	-	-	805
HCM Lane V/C Ratio	0.03	-	-	-	0.044
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Future Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	21	6	9	171	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	321	346	103	165	596	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	552	1812	539	80	3127	55	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	25	0	16	98	0	85	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1427	0	1477	1699	0	1562	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	1.2	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.3	0.0	0.2	1.3	0.0	1.2	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.57		0.37	0.09		0.04	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	282	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.05	0.00	0.06	0.21	0.00	0.29	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1544	0	1465	1814	0	1549	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	0.5	0.2	0.0	0.1	0.0	0.0	0.3
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	0.1	0.6	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.7	0.0	8.8	9.3	0.0	9.6	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		41			183			198			151	
Approach Delay, s/veh		8.8			9.4			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.3		3.7		3.3
Green Ext Time (p_c), s		0.8		0.1		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Future Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	27	0	0	0	115	246	17	70	65	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	773	781	148	231	0	0	263	0	0
Stage 1	288	288	-	-	-	-	-	-	-
Stage 2	485	493	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	356	317	878	1291	-	-	1256	-	-
Stage 1	743	659	-	-	-	-	-	-	-
Stage 2	603	534	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	306	0	878	1291	-	-	1256	-	-
Mov Cap-2 Maneuver	306	0	-	-	-	-	-	-	-
Stage 1	639	0	-	-	-	-	-	-	-
Stage 2	603	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	2.5	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	306	878	1256	-	-
HCM Lane V/C Ratio	0.089	-	-	0.201	0.031	0.055	-	-
HCM Control Delay (s)	8.1	-	-	19.7	9.2	8	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Future Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	11	112	12	0	0	0	0	12	12	22	14	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	140	62	84	146	-
Stage 1	-	-	-			-	140	-	0	0	-
Stage 2	-	-	-			-	0	-	84	146	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	732	965	871	726	0
Stage 1	-	-	-			0	761	-	-	-	0
Stage 2	-	-	-			0	-	-	892	756	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	732	965	849	726	-
Mov Cap-2 Maneuver	-	-	-			-	732	-	849	726	-
Stage 1	-	-	-			-	761	-	-	-	-
Stage 2	-	-	-			-	-	-	867	756	-

Approach	EB	NB	SB
HCM Control Delay, s		9.5	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	833	-	-	-	797
HCM Lane V/C Ratio	0.029	-	-	-	0.045
HCM Control Delay (s)	9.5	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	10	0	3	15	343	12	1	85	5
Future Vol, veh/h	0	0	1	10	0	3	15	343	12	1	85	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	429	15	1	127	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	610	615	131	610	611	437	134	0	0	444	0	0
Stage 1	133	133	-	475	475	-	-	-	-	-	-	-
Stage 2	477	482	-	135	136	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	395	396	898	395	398	603	1403	-	-	1075	-	-
Stage 1	852	771	-	556	544	-	-	-	-	-	-	-
Stage 2	554	540	-	849	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	388	390	898	389	392	603	1403	-	-	1075	-	-
Mov Cap-2 Maneuver	388	390	-	389	392	-	-	-	-	-	-	-
Stage 1	840	770	-	548	536	-	-	-	-	-	-	-
Stage 2	543	532	-	844	768	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	13.8	0.3	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	898	424	1075	-	-
HCM Lane V/C Ratio	0.013	-	-	0.004	0.038	0.001	-	-
HCM Control Delay (s)	7.6	-	-	9	13.8	8.4	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	19	3	47	181	149	4	12	14	18	18	37
Future Volume (veh/h)	10	19	3	47	181	149	4	12	14	18	18	37
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	13	24	4	57	218	163	7	21	22	23	23	43
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	499	856	139	690	554	396	487	138	145	507	96	180
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	925	2828	459	1276	1830	1308	1233	774	811	1259	540	1009
Grp Volume(v), veh/h	13	14	14	57	194	187	7	0	43	23	0	66
Grp Sat Flow(s),veh/h/ln	925	1641	1646	1276	1641	1497	1233	0	1584	1259	0	1549
Q Serve(g_s), s	0.3	0.1	0.1	0.8	2.2	2.3	0.1	0.0	0.5	0.4	0.0	0.8
Cycle Q Clear(g_c), s	2.6	0.1	0.1	0.9	2.2	2.3	1.0	0.0	0.5	0.9	0.0	0.8
Prop In Lane	1.00		0.28	1.00		0.87	1.00		0.51	1.00		0.65
Lane Grp Cap(c), veh/h	499	496	498	690	496	453	487	0	283	507	0	277
V/C Ratio(X)	0.03	0.03	0.03	0.08	0.39	0.41	0.01	0.00	0.15	0.05	0.00	0.24
Avail Cap(c_a), veh/h	1419	2128	2135	1959	2128	1941	2292	0	2602	2351	0	2545
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	5.7	5.7	6.0	6.4	6.4	8.6	0.0	8.0	8.4	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.5	0.6	0.0	0.0	0.2	0.0	0.0	0.4
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	0.1	0.1	0.3	1.0	1.0	0.0	0.0	0.2	0.1	0.0	0.4
LnGrp Delay(d),s/veh	7.5	5.7	5.7	6.0	6.9	7.0	8.6	0.0	8.3	8.4	0.0	8.6
LnGrp LOS	A	A	A	A	A	A	A		A	A		A
Approach Vol, veh/h		41			438			50			89	
Approach Delay, s/veh		6.3			6.8			8.3			8.5	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		13.0		10.1		13.0		10.1
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		4.6		3.0		4.3		2.9
Green Ext Time (p_c), s		0.1		0.2		2.6		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	107	2	23	439	3	25
Future Volume (veh/h)	107	2	23	439	3	25
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	137	3	27	510	4	29
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.86	0.86	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1090	24	90	1814	117	191
Arrive On Green	0.33	0.33	0.05	0.55	0.07	0.07
Sat Flow, veh/h	3370	72	1645	3368	1774	1583
Grp Volume(v), veh/h	68	72	27	510	4	29
Grp Sat Flow(s),veh/h/ln	1641	1715	1645	1641	1774	1583
Q Serve(g_s), s	0.7	0.7	0.4	2.0	0.1	0.4
Cycle Q Clear(g_c), s	0.7	0.7	0.4	2.0	0.1	0.4
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	544	569	90	1814	117	191
V/C Ratio(X)	0.13	0.13	0.30	0.28	0.03	0.15
Avail Cap(c_a), veh/h	1729	1806	614	5227	2384	2215
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.6	5.6	10.9	2.9	10.5	9.5
Incr Delay (d2), s/veh	0.1	0.1	0.7	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.2	0.9	0.0	0.2
LnGrp Delay(d),s/veh	5.7	5.7	11.6	2.9	10.6	9.6
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	140			537	33	
Approach Delay, s/veh	5.7			3.4	9.7	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.3	12.6				17.9		6.2
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	9.0	25.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.4	2.7				4.0		2.4
Green Ext Time (p_c), s	0.0	0.7				3.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	4.1
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	121	2	32	426	272	4	6	15	46	1	12
Future Volume (veh/h)	19	121	2	32	426	272	4	6	15	46	1	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	19	122	2	34	458	263	6	9	21	41	36	16
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	32	1842	30	53	803	458	55	16	36	111	77	34
Arrive On Green	0.02	0.39	0.39	0.03	0.40	0.40	0.03	0.03	0.03	0.07	0.07	0.07
Sat Flow, veh/h	1645	4779	78	1645	2015	1150	1645	461	1076	1645	1134	504
Grp Volume(v), veh/h	19	80	44	34	372	349	6	0	30	41	0	52
Grp Sat Flow(s),veh/h/ln	1645	1572	1714	1645	1641	1524	1645	0	1537	1645	0	1638
Q Serve(g_s), s	0.4	0.6	0.6	0.7	6.3	6.4	0.1	0.0	0.7	0.9	0.0	1.1
Cycle Q Clear(g_c), s	0.4	0.6	0.6	0.7	6.3	6.4	0.1	0.0	0.7	0.9	0.0	1.1
Prop In Lane	1.00		0.05	1.00		0.75	1.00		0.70	1.00		0.31
Lane Grp Cap(c), veh/h	32	1212	660	53	653	607	55	0	52	111	0	111
V/C Ratio(X)	0.60	0.07	0.07	0.64	0.57	0.57	0.11	0.00	0.58	0.37	0.00	0.47
Avail Cap(c_a), veh/h	249	2649	1444	295	1428	1327	843	0	787	1519	0	1513
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	6.9	6.9	17.1	8.4	8.4	16.7	0.0	17.0	15.9	0.0	16.0
Incr Delay (d2), s/veh	6.6	0.0	0.1	4.8	0.9	1.0	0.9	0.0	9.9	2.0	0.0	3.1
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	0.2	0.2	0.3	0.4	3.0	2.8	0.1	0.0	0.4	0.5	0.0	0.6
LnGrp Delay(d),s/veh	24.0	7.0	7.0	21.9	9.3	9.4	17.6	0.0	26.9	18.0	0.0	19.1
LnGrp LOS	C	A	A	C	A	A	B		C	B		B
Approach Vol, veh/h		143			755			36			93	
Approach Delay, s/veh		9.2			9.9			25.3			18.6	
Approach LOS		A			A			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	18.4		6.6	4.9	18.8		5.4
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.4	30.1		* 33	* 5.4	31.1		18.3
Max Q Clear Time (g_c+I1), s	2.7	2.6		3.1	2.4	8.4		2.7
Green Ext Time (p_c), s	0.0	0.8		0.4	0.0	5.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	110	117	263	590	0	0	0	0	384	1	149
Future Volume (veh/h)	0	110	117	263	590	0	0	0	0	384	1	149
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	131	0	302	678	0				432	0	134
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1732	775	396	2332	0				533	0	238
Arrive On Green	0.00	0.53	0.00	0.04	0.23	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	131	0	302	678	0				432	0	134
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	1.6	0.0	7.5	13.6	0.0				10.1	0.0	6.7
Cycle Q Clear(g_c), s	0.0	1.6	0.0	7.5	13.6	0.0				10.1	0.0	6.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1732	775	396	2332	0				533	0	238
V/C Ratio(X)	0.00	0.08	0.00	0.76	0.29	0.00				0.81	0.00	0.56
Avail Cap(c_a), veh/h	0	1732	775	798	2332	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.63	0.63	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.3	0.0	37.2	14.1	0.0				32.3	0.0	30.9
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.7	0.2	0.0				1.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.0	3.4	6.2	0.0				4.8	0.0	2.8
LnGrp Delay(d),s/veh	0.0	9.4	0.0	37.9	14.3	0.0				34.1	0.0	31.7
LnGrp LOS		A		D	B					C		C
Approach Vol, veh/h		131			980						566	
Approach Delay, s/veh		9.4			21.5						33.6	
Approach LOS		A			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	47.3		18.0		62.0		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 45		
Max Q Clear Time (g_c+I1), s	9.5	3.6		12.1		15.6		
Green Ext Time (p_c), s	0.4	1.3		0.8		9.6		

Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	422	0	0	434	378	423	254	564	0	0	0
Future Volume (veh/h)	62	422	0	0	434	378	423	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	70	480	0	0	493	388	380	418	185			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	157	2063	0	0	911	716	411	432	367			
Arrive On Green	0.10	1.00	0.00	0.00	0.52	0.52	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1836	1376	1645	1727	1468			
Grp Volume(v), veh/h	70	480	0	0	462	419	380	418	185			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1485	1645	1727	1468			
Q Serve(g_s), s	1.7	0.0	0.0	0.0	15.0	15.1	18.0	19.2	8.7			
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	15.0	15.1	18.0	19.2	8.7			
Prop In Lane	1.00		0.00	0.00		0.93	1.00		1.00			
Lane Grp Cap(c), veh/h	157	2063	0	0	854	773	411	432	367			
V/C Ratio(X)	0.44	0.23	0.00	0.00	0.54	0.54	0.92	0.97	0.50			
Avail Cap(c_a), veh/h	794	2063	0	0	854	773	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	35.0	0.0	0.0	0.0	12.8	12.8	29.3	29.7	25.7			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	2.5	2.7	26.0	34.8	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	0.1	0.0	0.0	7.4	6.7	11.1	13.2	3.5			
LnGrp Delay(d),s/veh	35.7	0.2	0.0	0.0	15.2	15.5	55.3	64.4	26.2			
LnGrp LOS	D	A			B	B	E	E	C			
Approach Vol, veh/h		550			881			983				
Approach Delay, s/veh		4.7			15.4			53.7				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			8.6	46.8		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.7			* 20	25.7		20.0
Max Q Clear Time (g_c+I1), s		2.0			3.7	17.1		21.2
Green Ext Time (p_c), s		5.9			0.1	5.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	22	0	3	4	0	2	0	18	0	13	24	24
Future Vol, veh/h	22	0	3	4	0	2	0	18	0	13	24	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	30	30	30	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	32	0	4	13	0	7	0	24	0	19	35	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	119	115	53	117	132	24	70	0	0	24	0	0
Stage 1	91	91	-	24	24	-	-	-	-	-	-	-
Stage 2	28	24	-	93	108	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	838	760	992	841	744	1030	1481	-	-	1540	-	-
Stage 1	897	804	-	974	860	-	-	-	-	-	-	-
Stage 2	969	860	-	895	791	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	825	750	992	829	734	1030	1481	-	-	1540	-	-
Mov Cap-2 Maneuver	825	750	-	829	734	-	-	-	-	-	-	-
Stage 1	897	794	-	974	860	-	-	-	-	-	-	-
Stage 2	963	860	-	879	781	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	9.2	0	1.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1481	-	-	842	887	1540	-	-
HCM Lane V/C Ratio	-	-	-	0.043	0.023	0.012	-	-
HCM Control Delay (s)	0	-	-	9.5	9.2	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	10	1	1	16	6	2	9	1	3	19	5
Future Vol, veh/h	2	10	1	1	16	6	2	9	1	3	19	5
Peak Hour Factor	0.54	0.54	0.54	0.52	0.52	0.52	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	4	19	2	2	31	12	3	12	1	4	25	7
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	7.7	7.5	7.7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	17%	100%	0%	0%	100%	0%	0%	11%
Vol Thru, %	75%	0%	100%	0%	0%	100%	47%	70%
Vol Right, %	8%	0%	0%	100%	0%	0%	53%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	2	10	1	1	11	11	27
LT Vol	2	2	0	0	1	0	0	3
Through Vol	9	0	10	0	0	11	5	19
RT Vol	1	0	0	1	0	0	6	5
Lane Flow Rate	16	4	19	2	2	21	22	36
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.021	0.005	0.025	0.002	0.003	0.027	0.027	0.047
Departure Headway (Hd)	4.82	5.284	4.784	4.083	5.274	4.774	4.403	4.711
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	738	674	744	870	676	747	809	756
Service Time	2.581	3.039	2.538	1.837	3.025	2.524	2.153	2.466
HCM Lane V/C Ratio	0.022	0.006	0.026	0.002	0.003	0.028	0.027	0.048
HCM Control Delay	7.7	8.1	7.7	6.8	8	7.7	7.3	7.7
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.1	0	0	0.1	0.1	0.1

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	25	17	0	19	1
Future Vol, veh/h	10	25	17	0	19	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	15	37	28	0	27	1

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	83	28	0	0	28	0
Stage 1	28	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	899	1025	-	-	1585	-
Stage 1	974	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	884	1025	-	-	1585	-
Mov Cap-2 Maneuver	829	-	-	-	-	-
Stage 1	957	-	-	-	-	-
Stage 2	947	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	6.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	829	1025	1585	-
HCM Lane V/C Ratio	-	-	0.018	0.036	0.017	-
HCM Control Delay (s)	-	-	8.6	8.6	7.3	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	4	15	10	0	5	0	123	0	244	23
Future Vol, veh/h	0	121	4	15	10	0	5	0	123	0	244	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	205	7	22	14	0	6	0	158	0	280	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	212	0	0	420	-	209	-	270	14
Stage 1	-	-	-	-	-	-	209	-	-	-	58	-
Stage 2	-	-	-	-	-	-	211	-	-	-	212	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1312	-	0	530	0	812	0	623	1043
Stage 1	0	-	-	-	-	0	775	0	-	0	831	-
Stage 2	0	-	-	-	-	0	773	0	-	0	712	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1312	-	-	327	-	812	-	612	1043
Mov Cap-2 Maneuver	-	-	-	-	-	-	327	-	-	-	612	-
Stage 1	-	-	-	-	-	-	775	-	-	-	817	-
Stage 2	-	-	-	-	-	-	486	-	-	-	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.7	10.7	15.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	327	812	-	-	1312	-	635
HCM Lane V/C Ratio	0.02	0.194	-	-	0.017	-	0.483
HCM Control Delay (s)	16.2	10.5	-	-	7.8	0	15.9
HCM Lane LOS	C	B	-	-	A	A	C
HCM 95th %tile Q(veh)	0.1	0.7	-	-	0.1	-	2.6



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	221	0	151	24	0	15	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Effective Green, g (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Actuated g/C Ratio		0.13	0.13		0.17	0.17		0.01	0.29		0.09	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		205	395		274	263		16	897		149	1220
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.56		0.55	0.09		0.94	0.24		0.62	0.89
Uniform Delay, d1		35.8	37.4		34.7	32.0		45.0	24.6		39.8	26.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		1.4	0.1		190.1	0.3		5.7	9.1
Delay (s)		36.0	38.4		36.1	32.1		235.1	24.9		45.5	35.9
Level of Service		D	D		D	C		F	C		D	D
Approach Delay (s)			38.0			35.5			38.5			36.7
Approach LOS			D			D			D			D

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	4.1	4.1
Effective Green, g (s)	4.1	4.1
Actuated g/C Ratio	0.05	0.05
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	74	66
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.15	0.17
Uniform Delay, d1	41.7	41.8
Progression Factor	1.00	1.00
Incremental Delay, d2	0.3	0.4
Delay (s)	42.1	42.2
Level of Service	D	D
Approach Delay (s)	42.1	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Future Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	5	0	23	0	68	4	21	374	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	499	489	375	491	487	70	375	0	0	72	0	0
Stage 1	417	417	-	70	70	-	-	-	-	-	-	-
Stage 2	82	72	-	421	417	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	469	468	654	475	469	971	1141	-	-	1479	-	-
Stage 1	598	578	-	920	821	-	-	-	-	-	-	-
Stage 2	907	820	-	595	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	453	461	654	464	462	971	1141	-	-	1479	-	-
Mov Cap-2 Maneuver	453	461	-	464	462	-	-	-	-	-	-	-
Stage 1	598	570	-	920	821	-	-	-	-	-	-	-
Stage 2	886	820	-	579	570	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	9.6	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	804	1479	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.035	0.014	-	-
HCM Control Delay (s)	0	-	-	10.6	9.6	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Future Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	52	1	11	0	40	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	424	384	430	425	40	385	0	-	-	-	0
Stage 1	384	384	-	40	40	-	-	-	-	-	-	-
Stage 2	46	40	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	522	510	646	522	509	1009	1131	-	0	0	-	-
Stage 1	623	598	-	955	846	-	-	-	0	0	-	-
Stage 2	948	846	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	515	510	646	512	509	1009	1131	-	-	-	-	-
Mov Cap-2 Maneuver	549	529	-	538	528	-	-	-	-	-	-	-
Stage 1	623	598	-	955	846	-	-	-	-	-	-	-
Stage 2	936	846	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.7	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	624	538	932	-	-
HCM Lane V/C Ratio	-	-	0.026	0.096	0.013	-	-
HCM Control Delay (s)	0	-	10.9	12.4	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Future Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	68	21	4	8	0	0	40	16

Major/Minor	Major2			Minor1			Minor2			
Conflicting Flow All	0	0	0	70	105	-	-	95	45	
Stage 1	-	-	-	0	0	-	-	95	-	
Stage 2	-	-	-	70	105	-	-	0	-	
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-	
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-	
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4	
Pot Cap-1 Maneuver	-	-	-	891	766	0	0	776	990	
Stage 1	-	-	-	-	-	0	0	797	-	
Stage 2	-	-	-	909	789	0	0	-	-	
Platoon blocked, %		-	-							
Mov Cap-1 Maneuver	-	-	-	842	766	-	-	776	990	
Mov Cap-2 Maneuver	-	-	-	842	766	-	-	776	-	
Stage 1	-	-	-	-	-	-	-	797	-	
Stage 2	-	-	-	849	789	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	-	-	-	827
HCM Lane V/C Ratio	0.015	-	-	-	0.068
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Future Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	92	26	7	3	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	350	461	131	510	184	204	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	471	2003	570	884	800	888	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	94	0	67	8	0	5	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1573	0	1471	1157	0	1415	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.8	0.8	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.46		0.39	0.85		0.63	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	604	0	339	573	0	326	577	0	352	584	0	372
V/C Ratio(X)	0.16	0.00	0.20	0.01	0.00	0.01	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2056	0	1761	1767	0	1694	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.7	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	6.9	0.0	7.0	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		161			13			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.8
Green Ext Time (p_c), s		0.1		0.8		0.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Future Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	123	0	0	0	11	17	28	120	303	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	611	625	318			333	0	0	45	0	0
Stage 1	558	558	-			-	-	-	-	-	-
Stage 2	53	67	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	444	391	704			1183	-	-	1513	-	-
Stage 1	557	499	-			-	-	-	-	-	-
Stage 2	949	824	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	405	0	704			1183	-	-	1513	-	-
Mov Cap-2 Maneuver	405	0	-			-	-	-	-	-	-
Stage 1	509	0	-			-	-	-	-	-	-
Stage 2	949	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	1.5	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1183	-	-	405	704	1513	-	-
HCM Lane V/C Ratio	0.009	-	-	0.444	0.175	0.079	-	-
HCM Control Delay (s)	8.1	-	-	20.8	11.2	7.6	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Future Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	312	5	0	0	0	0	9	23	40	16	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	327	159	173	329	-
Stage 1	-	-	-	-	327	-	0	0	-
Stage 2	-	-	-	-	0	-	173	329	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	572	833	752	571	0
Stage 1	-	-	-	0	627	-	-	-	0
Stage 2	-	-	-	0	-	-	789	625	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	572	833	723	571	-
Mov Cap-2 Maneuver	-	-	-	-	572	-	723	571	-
Stage 1	-	-	-	-	627	-	-	-	-
Stage 2	-	-	-	-	-	-	756	625	-

Approach	EB	NB	SB
HCM Control Delay, s		10.1	10.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	734	-	-	-	673
HCM Lane V/C Ratio	0.044	-	-	-	0.083
HCM Control Delay (s)	10.1	-	-	-	10.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Future Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	57	9	1	435	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	510	514	436	520	511	62	437	0	0	66	0	0
Stage 1	438	438	-	72	72	-	-	-	-	-	-	-
Stage 2	72	76	-	448	439	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	461	453	604	454	455	981	1081	-	-	1486	-	-
Stage 1	582	565	-	918	820	-	-	-	-	-	-	-
Stage 2	918	816	-	575	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	459	450	604	438	452	981	1081	-	-	1486	-	-
Mov Cap-2 Maneuver	459	450	-	438	452	-	-	-	-	-	-	-
Stage 1	579	564	-	913	816	-	-	-	-	-	-	-
Stage 2	914	812	-	556	564	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14	0.6	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1081	-	-	570	438	1486	-	-
HCM Lane V/C Ratio	0.005	-	-	0.042	0.082	0.001	-	-
HCM Control Delay (s)	8.3	-	-	11.6	14	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	181	1	25	38	22	3	10	50	52	12	8
Future Volume (veh/h)	10	181	1	25	38	22	3	10	50	52	12	8
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	13	229	1	30	46	25	5	17	77	66	15	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	636	976	4	554	616	310	552	57	259	488	203	135
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1228	3351	15	1063	2114	1066	1280	273	1236	1202	968	645
Grp Volume(v), veh/h	13	112	118	30	35	36	5	0	94	66	0	25
Grp Sat Flow(s),veh/h/ln	1228	1641	1725	1063	1641	1539	1280	0	1509	1202	0	1613
Q Serve(g_s), s	0.2	1.2	1.2	0.5	0.4	0.4	0.1	0.0	1.3	1.2	0.0	0.3
Cycle Q Clear(g_c), s	0.6	1.2	1.2	1.8	0.4	0.4	0.4	0.0	1.3	2.4	0.0	0.3
Prop In Lane	1.00		0.01	1.00		0.69	1.00		0.82	1.00		0.40
Lane Grp Cap(c), veh/h	636	478	502	554	478	448	552	0	316	488	0	338
V/C Ratio(X)	0.02	0.23	0.23	0.05	0.07	0.08	0.01	0.00	0.30	0.14	0.00	0.07
Avail Cap(c_a), veh/h	1811	2049	2153	1571	2049	1922	2308	0	2386	2138	0	2551
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	6.5	6.5	7.2	6.2	6.2	7.8	0.0	8.0	9.0	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.0	0.1	0.1	0.0	0.0	0.5	0.1	0.0	0.1
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	0.6	0.6	0.2	0.2	0.2	0.0	0.0	0.6	0.4	0.0	0.1
LnGrp Delay(d),s/veh	6.4	6.7	6.7	7.2	6.2	6.3	7.8	0.0	8.5	9.2	0.0	7.7
LnGrp LOS	A	A	A	A	A	A	A		A	A		A
Approach Vol, veh/h		243			101			99			91	
Approach Delay, s/veh		6.7			6.5			8.5			8.8	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		13.0		11.0		13.0		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		3.2		3.3		3.8		4.4
Green Ext Time (p_c), s		1.4		0.6		0.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	374	0	28	97	0	50
Future Volume (veh/h)	374	0	28	97	0	50
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	479	0	30	105	0	74
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.92	0.92	0.54	0.54
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1031	0	98	1724	225	296
Arrive On Green	0.31	0.00	0.06	0.53	0.00	0.13
Sat Flow, veh/h	3455	0	1645	3368	1774	1583
Grp Volume(v), veh/h	479	0	30	105	0	74
Grp Sat Flow(s),veh/h/ln	1641	0	1645	1641	1774	1583
Q Serve(g_s), s	3.1	0.0	0.5	0.4	0.0	1.1
Cycle Q Clear(g_c), s	3.1	0.0	0.5	0.4	0.0	1.1
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1031	0	98	1724	225	296
V/C Ratio(X)	0.46	0.00	0.30	0.06	0.00	0.25
Avail Cap(c_a), veh/h	3275	0	498	4764	2173	2034
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.3	0.0	11.9	3.1	0.0	9.2
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.2	0.2	0.0	0.5
LnGrp Delay(d),s/veh	7.6	0.0	12.5	3.1	0.0	9.3
LnGrp LOS	A		B	A		A
Approach Vol, veh/h	479			135	74	
Approach Delay, s/veh	7.6			5.2	9.3	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	12.9				18.5		8.0
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.5	5.1				2.4		3.1
Green Ext Time (p_c), s	0.0	3.2				0.7		0.1

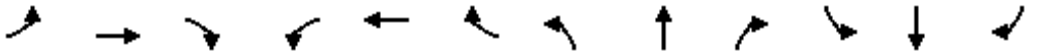
Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	393	4	70	130	51	0	1	36	359	11	15
Future Volume (veh/h)	12	393	4	70	130	51	0	1	36	359	11	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	15	479	5	78	144	51	0	1	43	447	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	25	1110	12	97	659	225	64	1	56	714	375	0
Arrive On Green	0.02	0.23	0.23	0.06	0.27	0.27	0.00	0.04	0.04	0.22	0.00	0.00
Sat Flow, veh/h	1645	4812	50	1645	2403	820	1645	33	1440	3290	1727	0
Grp Volume(v), veh/h	15	313	171	78	97	98	0	0	44	447	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1718	1645	1641	1583	1645	0	1473	1645	1727	0
Q Serve(g_s), s	0.3	3.2	3.2	1.8	1.7	1.8	0.0	0.0	1.1	4.7	0.0	0.0
Cycle Q Clear(g_c), s	0.3	3.2	3.2	1.8	1.7	1.8	0.0	0.0	1.1	4.7	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.52	1.00		0.98	1.00		0.00
Lane Grp Cap(c), veh/h	25	725	396	97	450	434	64	0	58	714	375	0
V/C Ratio(X)	0.59	0.43	0.43	0.80	0.21	0.23	0.00	0.00	0.76	0.63	0.00	0.00
Avail Cap(c_a), veh/h	230	2058	1125	473	1317	1270	795	0	712	2935	1541	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.5	12.4	12.5	17.6	10.6	10.6	0.0	0.0	18.0	13.4	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.5	0.9	5.7	0.3	0.3	0.0	0.0	18.5	0.9	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	0.2	1.4	1.6	0.9	0.8	0.8	0.0	0.0	0.7	2.2	0.0	0.0
LnGrp Delay(d),s/veh	26.4	12.9	13.3	23.3	10.9	11.0	0.0	0.0	36.6	14.3	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			D	B		
Approach Vol, veh/h		499			273			44			447	
Approach Delay, s/veh		13.5			14.4			36.6			14.3	
Approach LOS		B			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	13.3		12.4	4.8	15.0		5.7
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 11	24.8		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	3.8	5.2		6.7	2.3	3.8		3.1
Green Ext Time (p_c), s	0.0	3.5		1.6	0.0	1.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Notes

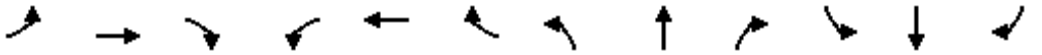


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	263	425	523	154	0	0	0	0	502	4	42
Future Volume (veh/h)	0	263	425	523	154	0	0	0	0	502	4	42
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	313	0	601	177	0				567	0	38
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1307	585	689	2208	0				657	0	293
Arrive On Green	0.00	0.40	0.00	0.14	0.45	0.00				0.20	0.00	0.20
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	313	0	601	177	0				567	0	38
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.1	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Cycle Q Clear(g_c), s	0.0	5.1	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1307	585	689	2208	0				657	0	293
V/C Ratio(X)	0.00	0.24	0.00	0.87	0.08	0.00				0.86	0.00	0.13
Avail Cap(c_a), veh/h	0	1307	585	798	2208	0				806	0	360
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.00	0.73	0.73	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	16.0	0.0	33.1	7.9	0.0				31.0	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.4	0.0	6.4	0.1	0.0				7.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.0	7.1	1.1	0.0				6.7	0.0	0.7
LnGrp Delay(d),s/veh	0.0	16.4	0.0	39.5	7.9	0.0				38.0	0.0	26.4
LnGrp LOS		B		D	A					D		C
Approach Vol, veh/h		313			778						605	
Approach Delay, s/veh		16.4			32.3						37.3	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.0	37.0		21.1		58.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.5		19.6		* 51		
Max Q Clear Time (g_c+I1), s	16.7	7.1		15.3		4.5		
Green Ext Time (p_c), s	0.5	3.3		0.6		2.4		

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	621	0	0	588	503	97	3	454	0	0	0
Future Volume (veh/h)	131	621	0	0	588	503	97	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	149	706	0	0	668	515	74	0	449			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	221	2287	0	0	1007	772	299	0	534			
Arrive On Green	0.14	1.00	0.00	0.00	0.57	0.57	0.18	0.00	0.18			
Sat Flow, veh/h	3191	3368	0	0	1858	1357	1645	0	2936			
Grp Volume(v), veh/h	149	706	0	0	619	564	74	0	449			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1488	1645	0	1468			
Q Serve(g_s), s	3.5	0.0	0.0	0.0	20.9	21.1	3.1	0.0	11.8			
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	20.9	21.1	3.1	0.0	11.8			
Prop In Lane	1.00		0.00	0.00		0.91	1.00		1.00			
Lane Grp Cap(c), veh/h	221	2287	0	0	933	846	299	0	534			
V/C Ratio(X)	0.67	0.31	0.00	0.00	0.66	0.67	0.25	0.00	0.84			
Avail Cap(c_a), veh/h	798	2287	0	0	933	846	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.83	0.83	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	33.6	0.0	0.0	0.0	11.9	12.0	28.0	0.0	31.6			
Incr Delay (d2), s/veh	1.1	0.3	0.0	0.0	3.7	4.1	0.2	0.0	4.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.1	0.0	0.0	10.2	9.4	1.4	0.0	5.2			
LnGrp Delay(d),s/veh	34.7	0.3	0.0	0.0	15.6	16.1	28.2	0.0	36.4			
LnGrp LOS	C	A			B	B	C		D			
Approach Vol, veh/h		855			1183			523				
Approach Delay, s/veh		6.3			15.9			35.2				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.9			10.2	50.6		19.1
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.2			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			5.5	23.1		13.8
Green Ext Time (p_c), s		9.0			0.2	2.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.6
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	0	4	4	0	4	2	34	36	4	39	12
Future Vol, veh/h	19	0	4	4	0	4	2	34	36	4	39	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	67	67	67	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	0	5	6	0	6	3	45	48	6	57	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	156	177	66	155	161	69	74	0	0	93	0	0
Stage 1	78	78	-	75	75	-	-	-	-	-	-	-
Stage 2	78	99	-	80	86	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	793	702	976	794	717	972	1476	-	-	1453	-	-
Stage 1	911	815	-	915	817	-	-	-	-	-	-	-
Stage 2	911	798	-	909	808	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	784	698	976	786	713	972	1476	-	-	1453	-	-
Mov Cap-2 Maneuver	784	698	-	786	713	-	-	-	-	-	-	-
Stage 1	909	812	-	913	815	-	-	-	-	-	-	-
Stage 2	904	796	-	901	805	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	9.2	0.2	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1476	-	-	812	869	1453	-	-
HCM Lane V/C Ratio	0.002	-	-	0.035	0.014	0.004	-	-
HCM Control Delay (s)	7.4	0	-	9.6	9.2	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	8	0	1	11	2	0	6	3	16	12	3
Future Vol, veh/h	4	8	0	1	11	2	0	6	3	16	12	3
Peak Hour Factor	0.50	0.50	0.50	0.44	0.44	0.44	0.56	0.56	0.56	0.97	0.97	0.97
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	16	0	2	25	5	0	11	5	16	12	3
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	7.8	7.5	7.4	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	0%	100%	0%	0%	100%	0%	0%	52%
Vol Thru, %	67%	0%	100%	100%	0%	100%	65%	39%
Vol Right, %	33%	0%	0%	0%	0%	0%	35%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	4	8	0	1	7	6	31
LT Vol	0	4	0	0	1	0	0	16
Through Vol	6	0	8	0	0	7	4	12
RT Vol	3	0	0	0	0	0	2	3
Lane Flow Rate	16	8	16	0	2	17	13	32
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.02	0.012	0.021	0	0.003	0.022	0.016	0.044
Departure Headway (Hd)	4.543	5.27	4.769	4.769	5.265	4.765	4.518	4.959
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	783	677	747	0	677	748	788	719
Service Time	2.298	3.022	2.521	2.521	3.016	2.516	2.268	2.708
HCM Lane V/C Ratio	0.02	0.012	0.021	0	0.003	0.023	0.016	0.045
HCM Control Delay	7.4	8.1	7.6	7.5	8	7.6	7.3	7.9
HCM Lane LOS	A	A	A	N	A	A	A	A
HCM 95th-tile Q	0.1	0	0.1	0	0	0.1	0	0.1

Intersection	
Int Delay, s/veh	7.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	22	12	0	36	1
Future Vol, veh/h	20	22	12	0	36	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	42	46	16	0	71	2

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	160	16	0	0	16	0
Stage 1	16	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	813	1040	-	-	1602	-
Stage 1	986	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	777	1040	-	-	1602	-
Mov Cap-2 Maneuver	723	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	7.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	723	1040	1602	-
HCM Lane V/C Ratio	-	-	0.058	0.044	0.044	-
HCM Control Delay (s)	-	-	7.4	6.6	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Appendix D
Caltrans 2017 Volumes

2017 Traffic Volumes : Route 5-6

Jump to Route: 1 | 2-4 | 5-6 | 7-10 | 11-15 | 16-20 | 22-33 | 34-43 | 44-50 | 51-59 | 60-70 | 71-80 | 82-86 | 87-91 | 92-98 | 99 | 101 | 103-116 | 118-133 | 134-161 | 162-163 | 164-178 | 180-197 | 198-220 | 221-275 | 280-405 | 505-980

Dist	Rte	Rte Suffix	CO	Post Mile Prefix	Post Mile	Post Mile Suffix	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
11	005		SD	R	0.306		SAN DIEGO, CAMINO DE LA PLAZA, INT'NL BDRY				7500	89000	88000
11	005		SD	R	0.878		SOUTH JCT. RTE. 805	7500	89000	88000	3650	46000	44500
11	005		SD	R	1.198		VIA SAN YSIDRO	3650	46000	44500	5300	64000	59000
11	005		SD		2.312		SAN DIEGO, DAIRY MART ROAD	5300	64000	59000	6500	80000	79000
11	005		SD		3.100		SAN DIEGO, JCT. RTE. 905	6500	80000	79000	9200	119000	118000
11	005		SD		4.042		SAN DIEGO, CORONADO AVENUE	9700	126000	125000	10700	141000	140000
11	005		SD		4.632		JCT. RTE. 75 WEST	10700	141000	140000	15800	165000	160000
11	005		SD		5.404		SAN DIEGO, MAIN STREET	15800	165000	160000	13800	164000	162000
11	005		SD		6.056		CHULA VISTA, PALOMAR STREET	13800	164000	162000	13500	160000	158000
11	005		SD		6.807		CHULA VISTA, L STREET	13500	160000	158000	14600	172000	171000
11	005		SD		7.300		CHULA VISTA, J STREET	14600	172000	171000	14600	176000	175000
11	005		SD		7.812		CHULA VISTA, H STREET	14600	176000	175000	13800	181000	177000
11	005		SD		8.562		E STREET	13800	181000	177000	11800	144000	137000
11	005		SD		9.396		JCT. RTE. 54	11800	144000	137000	16800	205000	198000
11	005		SD	R	10.042		NATIONAL CITY, 24TH STREET	16800	205000	198000	16700	203000	197000
11	005		SD	R	10.749		NATIONAL CITY, 9TH STREET	16700	203000	197000	15700	196000	187000
11	005		SD	R	11.129		8TH STREET	15700	196000	187000	15700	214000	205000

Appendix E
Peak Hour Intersection LOS Worksheets – Existing Plus Project Conditions

Intersection	
Int Delay, s/veh	8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	1	33	54	55	336
Future Vol, veh/h	93	1	33	54	55	336
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	135	1	46	76	63	382

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	136	0	304	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1400	-	671	892
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1400	-	648	892
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	843	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	892	-	-	1400	-
HCM Lane V/C Ratio	0.096	0.428	-	-	0.033	-
HCM Control Delay (s)	11.1	12	-	-	7.7	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0.1	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	162	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	162	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.6	14.6		16.9	16.9		2.1	34.3		4.3	36.5
Effective Green, g (s)		14.6	14.6		16.9	16.9		2.1	34.3		4.3	36.5
Actuated g/C Ratio		0.15	0.15		0.17	0.17		0.02	0.34		0.04	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		239	472		277	255		34	1089		70	1199
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.68	0.40		0.33	0.62		0.41	0.69		0.50	0.09
Uniform Delay, d1		40.4	38.7		36.5	38.5		48.3	28.2		46.7	20.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.9	0.2		0.3	3.1		2.9	2.4		2.0	0.1
Delay (s)		46.3	38.9		36.8	41.6		51.2	30.6		48.8	20.9
Level of Service		D	D		D	D		D	C		D	C
Approach Delay (s)			42.3			39.8			31.0			25.5
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	50	10	10
Future Volume (vph)	50	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	57	11	11
RTOR Reduction (vph)	36	0	0
Lane Group Flow (vph)	21	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	36.5	4.3	4.3
Effective Green, g (s)	36.5	4.3	4.3
Actuated g/C Ratio	0.37	0.04	0.04
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	536	70	63
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.01		
v/c Ratio	0.04	0.16	0.17
Uniform Delay, d1	20.4	46.1	46.1
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.4	0.5
Delay (s)	20.5	46.4	46.6
Level of Service	C	D	D
Approach Delay (s)		46.5	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	0	0	0	2	264	33	19	179	2
Future Vol, veh/h	2	0	3	0	0	0	2	264	33	19	179	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	0	0	0	2	326	41	22	203	2

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	599	619	204	205	0	0	367	0	0
Stage 1	248	248	-	-	-	-	-	-	-
Stage 2	351	371	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	452	394	817	1320	-	-	1149	-	-
Stage 1	775	687	-	-	-	-	-	-	-
Stage 2	695	606	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	443	0	817	1320	-	-	1149	-	-
Mov Cap-2 Maneuver	443	0	-	-	-	-	-	-	-
Stage 1	759	0	-	-	-	-	-	-	-
Stage 2	695	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.1	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1320	-	-	611	1149	-	-
HCM Lane V/C Ratio	0.002	-	-	0.013	0.019	-	-
HCM Control Delay (s)	7.7	-	-	11	8.2	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	2	47	13	260	0	0	186	2
Future Vol, veh/h	0	0	0	76	2	47	13	260	0	0	186	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	85	2	53	17	347	0	0	219	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	629	601	220	601	602	347	221	0	-	-	-	0
Stage 1	220	220	-	381	381	-	-	-	-	-	-	-
Stage 2	409	381	-	220	221	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	384	404	800	401	403	678	1302	-	0	0	-	-
Stage 1	765	706	-	625	600	-	-	-	0	0	-	-
Stage 2	604	600	-	765	706	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	349	399	800	397	398	678	1302	-	-	-	-	-
Mov Cap-2 Maneuver	441	472	-	486	470	-	-	-	-	-	-	-
Stage 1	755	706	-	617	592	-	-	-	-	-	-	-
Stage 2	548	592	-	765	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.8	0.4	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1302	-	-	486	666	-	-
HCM Lane V/C Ratio	0.013	-	-	0.176	0.083	-	-
HCM Control Delay (s)	7.8	-	0	14	10.9	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	-	-

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Future Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	131	0	0	0	0	0	25	28
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	0%	0%
Vol Thru, %	88%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	71	43
LT Vol	5	0	0
Through Vol	35	71	20
RT Vol	0	0	23
Lane Flow Rate	50	87	53
Geometry Grp	7	7	2
Degree of Util (X)	0.067	0.115	0.06
Departure Headway (Hd)	4.825	4.763	4.087
Convergence, Y/N	Yes	Yes	Yes
Cap	743	753	882
Service Time	2.551	2.489	2.087
HCM Lane V/C Ratio	0.067	0.116	0.06
HCM Control Delay	7.9	8.1	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Future Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	32	6	9	179	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	277	417	79	164	598	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	402	2186	415	77	3133	52	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	30	0	22	102	0	89	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1504	0	1499	1699	0	1563	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.3	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.4	0.0	0.3	1.3	0.0	1.3	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.46		0.28	0.09		0.03	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	286	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.06	0.00	0.08	0.21	0.00	0.30	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1589	0	1487	1814	0	1550	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.2	0.0	0.6	0.2	0.0	0.1	0.0	0.0	0.3
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	0.2	0.0	0.1	0.7	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.8	0.0	8.8	9.3	0.0	9.7	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		52			191			198			151	
Approach Delay, s/veh		8.8			9.5			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.4		3.7		3.3
Green Ext Time (p_c), s		0.8		0.2		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	27	0	0	0	114	261	42	58	61	136
Future Vol, veh/h	16	27	27	0	0	0	114	261	42	58	61	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	39	0	0	0	123	281	45	71	74	166

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	849	871	157			240	0	0	326	0	0
Stage 1	299	299	-			-	-	-	-	-	-
Stage 2	550	572	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	321	281	868			1281	-	-	1190	-	-
Stage 1	734	652	-			-	-	-	-	-	-
Stage 2	562	492	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	273	0	868			1281	-	-	1190	-	-
Mov Cap-2 Maneuver	273	0	-			-	-	-	-	-	-
Stage 1	624	0	-			-	-	-	-	-	-
Stage 2	562	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	2.2	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1281	-	-	273	868	1190	-	-
HCM Lane V/C Ratio	0.096	-	-	0.225	0.044	0.059	-	-
HCM Control Delay (s)	8.1	-	-	22	9.3	8.2	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Future Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	130	27	0	0	0	0	0	0	22	14	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	7.9	7.8
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	62%
Vol Thru, %	100%	61%	38%
Vol Right, %	0%	39%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	70	57	26
LT Vol	0	0	16
Through Vol	70	35	10
RT Vol	0	22	0
Lane Flow Rate	86	70	36
Geometry Grp	7	7	2
Degree of Util (X)	0.114	0.087	0.046
Departure Headway (Hd)	4.733	4.463	4.565
Convergence, Y/N	Yes	Yes	Yes
Cap	757	803	789
Service Time	2.461	2.191	2.565
HCM Lane V/C Ratio	0.114	0.087	0.046
HCM Control Delay	8.1	7.6	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.3	0.1

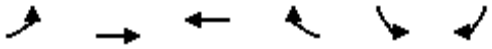
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	10	0	3	15	399	0	0	101	5
Future Vol, veh/h	0	0	1	10	0	3	15	399	0	0	101	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	499	0	0	151	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	694	692	155	694	695	499	158	0	-	-	-	0
Stage 1	155	155	-	537	537	-	-	-	-	-	-	-
Stage 2	539	537	-	157	158	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	347	357	870	347	356	556	1374	-	0	0	-	-
Stage 1	829	754	-	514	510	-	-	-	0	0	-	-
Stage 2	512	510	-	827	752	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	341	352	870	342	351	556	1374	-	-	-	-	-
Mov Cap-2 Maneuver	421	422	-	423	420	-	-	-	-	-	-	-
Stage 1	817	754	-	507	503	-	-	-	-	-	-	-
Stage 2	502	503	-	823	752	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	13.3	0.3	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1374	-	870	448	-	-
HCM Lane V/C Ratio	0.014	-	0.005	0.036	-	-
HCM Control Delay (s)	7.7	-	9.2	13.3	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	0.1	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	41	225	155	30	43
Future Volume (veh/h)	22	41	225	155	30	43
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	28	52	271	169	38	49
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	516	1090	653	394	215	192
Arrive On Green	0.33	0.33	0.33	0.33	0.13	0.13
Sat Flow, veh/h	875	3368	2052	1187	1645	1468
Grp Volume(v), veh/h	28	52	225	215	38	49
Grp Sat Flow(s),veh/h/ln	875	1641	1641	1511	1645	1468
Q Serve(g_s), s	0.6	0.2	2.4	2.5	0.5	0.7
Cycle Q Clear(g_c), s	3.1	0.2	2.4	2.5	0.5	0.7
Prop In Lane	1.00			0.79	1.00	1.00
Lane Grp Cap(c), veh/h	516	1090	545	502	215	192
V/C Ratio(X)	0.05	0.05	0.41	0.43	0.18	0.26
Avail Cap(c_a), veh/h	1283	3967	1984	1827	1915	1709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.0	5.1	5.8	5.8	8.6	8.7
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.6	0.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	1.1	1.1	0.2	0.3
LnGrp Delay(d),s/veh	7.0	5.1	6.3	6.4	9.0	9.4
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		80	440		87	
Approach Delay, s/veh		5.8	6.3		9.3	
Approach LOS		A	A		A	

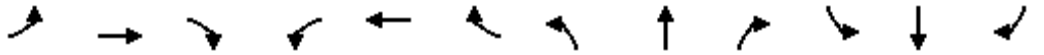
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.4				13.4		8.9
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		5.1				4.5		2.7
Green Ext Time (p_c), s		0.4				2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.7
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	110	14	146	436	9	176
Future Volume (vph)	110	14	146	436	9	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	4.6
Lane Util. Factor	0.95		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3226		1641	1727	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3226		1641	1727	1770	1583
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	141	18	170	507	13	251
RTOR Reduction (vph)	10	0	0	0	0	0
Lane Group Flow (vph)	149	0	170	507	13	251
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	11.3		8.5	23.8	13.5	13.5
Effective Green, g (s)	11.3		8.5	23.8	13.5	13.5
Actuated g/C Ratio	0.24		0.18	0.51	0.29	0.29
Clearance Time (s)	4.6		4.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0		2.0	3.0	1.5	1.5
Lane Grp Cap (vph)	783		299	883	513	459
v/s Ratio Prot	0.05		0.10	c0.29	0.01	
v/s Ratio Perm						c0.16
v/c Ratio	0.19		0.57	0.57	0.03	0.55
Uniform Delay, d1	14.0		17.3	7.8	11.8	13.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		1.5	0.9	0.0	0.7
Delay (s)	14.1		18.8	8.8	11.8	14.6
Level of Service	B		B	A	B	B
Approach Delay (s)	14.1			11.3	14.5	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	17.7
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

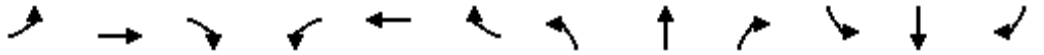


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	267	2	32	539	479	4	6	15	234	1	19
Future Volume (veh/h)	27	267	2	32	539	479	4	6	15	234	1	19
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	27	270	2	34	580	468	6	9	21	357	0	0
Adj No. of Lanes	1	2	0	1	1	0	1	1	0	2	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	34	2188	16	41	585	472	42	12	27	444	233	0
Arrive On Green	0.02	0.66	0.66	0.03	0.66	0.66	0.03	0.03	0.03	0.13	0.00	0.00
Sat Flow, veh/h	1645	3339	25	1645	886	715	1645	461	1076	3290	1727	0
Grp Volume(v), veh/h	27	133	139	34	0	1048	6	0	30	357	0	0
Grp Sat Flow(s),veh/h/ln	1645	1641	1723	1645	0	1601	1645	0	1537	1645	1727	0
Q Serve(g_s), s	1.8	3.3	3.3	2.2	0.0	69.6	0.4	0.0	2.1	11.4	0.0	0.0
Cycle Q Clear(g_c), s	1.8	3.3	3.3	2.2	0.0	69.6	0.4	0.0	2.1	11.4	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.45	1.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	34	1075	1129	41	0	1056	42	0	39	444	233	0
V/C Ratio(X)	0.80	0.12	0.12	0.83	0.00	0.99	0.14	0.00	0.77	0.80	0.00	0.00
Avail Cap(c_a), veh/h	81	1075	1129	116	0	1056	279	0	261	1006	528	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.6	7.0	7.0	52.4	0.0	18.1	51.4	0.0	52.3	45.3	0.0	0.0
Incr Delay (d2), s/veh	14.5	0.1	0.1	14.1	0.0	25.7	1.5	0.0	25.9	3.5	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	0.9	1.5	1.6	1.2	0.0	37.8	0.2	0.0	1.2	5.4	0.0	0.0
LnGrp Delay(d),s/veh	67.2	7.0	7.0	66.5	0.0	43.8	53.0	0.0	78.2	48.8	0.0	0.0
LnGrp LOS	E	A	A	E		D	D		E	D		
Approach Vol, veh/h		299			1082			36			357	
Approach Delay, s/veh		12.5			44.5			74.0			48.8	
Approach LOS		B			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.9	75.3		18.8	6.4	75.8		7.0
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 7.6	68.9		* 33	* 5.3	71.2		18.3
Max Q Clear Time (g_c+I1), s	4.2	5.3		13.4	3.8	71.6		4.1
Green Ext Time (p_c), s	0.0	2.1		1.2	0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	40.6
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	415	139	263	655	0	0	0	0	384	1	404
Future Volume (veh/h)	0	415	139	263	655	0	0	0	0	384	1	404
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	494	0	302	753	0				432	0	378
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2140	957	396	2740	0				823	0	367
Arrive On Green	0.00	0.65	0.00	0.04	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	494	0	302	753	0				432	0	378
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	4.9	0.0	7.5	14.4	0.0				9.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	4.9	0.0	7.5	14.4	0.0				9.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2140	957	396	2740	0				823	0	367
V/C Ratio(X)	0.00	0.23	0.00	0.76	0.27	0.00				0.53	0.00	1.03
Avail Cap(c_a), veh/h	0	2140	957	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.00	0.38	0.38	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.7	0.0	37.2	10.0	0.0				25.9	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.4	0.1	0.0				0.3	0.0	54.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	0.0	3.3	6.6	0.0				4.1	0.0	13.6
LnGrp Delay(d),s/veh	0.0	5.9	0.0	37.6	10.1	0.0				26.2	0.0	84.9
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		494			1055						810	
Approach Delay, s/veh		5.9			18.0						53.6	
Approach LOS		A			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	57.8		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.5	6.9		22.0		16.4		
Green Ext Time (p_c), s	0.4	5.4		0.0		11.4		

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	336	458	0	0	470	378	452	254	564	0	0	0
Future Volume (veh/h)	336	458	0	0	470	378	452	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	382	520	0	0	534	388	434	459	434			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	460	2063	0	0	774	562	411	432	367			
Arrive On Green	0.29	1.00	0.00	0.00	0.43	0.43	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1903	1319	1645	1727	1468			
Grp Volume(v), veh/h	382	520	0	0	482	440	434	459	434			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1494	1645	1727	1468			
Q Serve(g_s), s	9.0	0.0	0.0	0.0	19.1	19.1	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	9.0	0.0	0.0	0.0	19.1	19.1	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.88	1.00		1.00			
Lane Grp Cap(c), veh/h	460	2063	0	0	699	637	411	432	367			
V/C Ratio(X)	0.83	0.25	0.00	0.00	0.69	0.69	1.06	1.06	1.18			
Avail Cap(c_a), veh/h	798	2063	0	0	699	637	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.6	0.0	0.0	0.0	18.7	18.7	30.0	30.0	30.0			
Incr Delay (d2), s/veh	1.4	0.3	0.0	0.0	5.5	6.0	59.7	61.0	106.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	0.1	0.0	0.0	9.6	8.9	15.8	16.8	18.9			
LnGrp Delay(d),s/veh	28.9	0.3	0.0	0.0	24.2	24.7	89.7	91.0	136.6			
LnGrp LOS	C	A			C	C	F	F	F			
Approach Vol, veh/h		902			922			1327				
Approach Delay, s/veh		12.4			24.4			105.5				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.2	39.2		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.0	21.1		22.0
Green Ext Time (p_c), s		7.9			0.6	3.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.4
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	7.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	171	29	0	132	20
Future Vol, veh/h	10	171	29	0	132	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	15	255	48	0	186	28

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	448	48	0	0	48	0
Stage 1	48	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	554	999	-	-	1559	-
Stage 1	954	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	488	999	-	-	1559	-
Mov Cap-2 Maneuver	432	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	6.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	432	999	1559	-
HCM Lane V/C Ratio	-	-	0.035	0.255	0.119	-
HCM Control Delay (s)	-	-	13.6	9.8	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	1	0.4	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	121	4	259	33	5	123
Future Vol, veh/h	121	4	259	33	5	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	205	7	375	48	6	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	1007	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	798	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1312	-	258	812
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	182	812
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.8	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	812	-	-	1312	-
HCM Lane V/C Ratio	0.035	0.194	-	-	0.286	-
HCM Control Delay (s)	25.5	10.5	-	-	8.8	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.7	-	-	1.2	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	221	0	151	24	0	15	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Effective Green, g (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Actuated g/C Ratio		0.13	0.13		0.17	0.17		0.01	0.29		0.09	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		205	395		274	263		16	897		149	1220
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.56		0.55	0.09		0.94	0.24		0.62	0.89
Uniform Delay, d1		35.8	37.4		34.7	32.0		45.0	24.6		39.8	26.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		1.4	0.1		190.1	0.3		5.7	9.1
Delay (s)		36.0	38.4		36.1	32.1		235.1	24.9		45.5	35.9
Level of Service		D	D		D	C		F	C		D	D
Approach Delay (s)			38.0			35.5			38.5			33.6
Approach LOS			D			D			D			C

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	267	10	10
Future Volume (vph)	267	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	303	11	11
RTOR Reduction (vph)	99	0	0
Lane Group Flow (vph)	204	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	33.8	4.1	4.1
Effective Green, g (s)	33.8	4.1	4.1
Actuated g/C Ratio	0.37	0.05	0.05
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	545	74	66
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.14		
v/c Ratio	0.38	0.15	0.17
Uniform Delay, d1	20.8	41.7	41.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	0.4
Delay (s)	21.7	42.1	42.2
Level of Service	C	D	D
Approach Delay (s)		42.1	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Future Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	0	0	0	0	105	32	21	374	1

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	538	554	375			375	0	0	137	0	0
Stage 1	417	417	-			-	-	-	-	-	-
Stage 2	121	137	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	491	430	654			1141	-	-	1399	-	-
Stage 1	648	578	-			-	-	-	-	-	-
Stage 2	885	768	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	484	0	654			1141	-	-	1399	-	-
Mov Cap-2 Maneuver	484	0	-			-	-	-	-	-	-
Stage 1	638	0	-			-	-	-	-	-	-
Stage 2	885	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	1399	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.015	-	-
HCM Control Delay (s)	0	-	-	10.6	7.6	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Future Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	63	1	48	4	59	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	451	384	457	452	59	385	0	-	-	-	0
Stage 1	384	384	-	67	67	-	-	-	-	-	-	-
Stage 2	92	67	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	486	492	646	501	491	985	1131	-	0	0	-	-
Stage 1	623	598	-	924	824	-	-	-	0	0	-	-
Stage 2	896	824	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	460	490	646	489	489	985	1131	-	-	-	-	-
Mov Cap-2 Maneuver	524	522	-	528	519	-	-	-	-	-	-	-
Stage 1	621	598	-	920	821	-	-	-	-	-	-	-
Stage 2	848	821	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11	0.5	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	617	528	965	-	-
HCM Lane V/C Ratio	0.003	-	0.026	0.119	0.051	-	-
HCM Control Delay (s)	8.2	-	11	12.7	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.4	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Future Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	101	0	0	0	0	0	40	44
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.4
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	0%
Vol Thru, %	81%	100%	48%
Vol Right, %	0%	0%	52%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	32	52	63
LT Vol	6	0	0
Through Vol	26	52	30
RT Vol	0	0	33
Lane Flow Rate	42	68	84
Geometry Grp	7	7	2
Degree of Util (X)	0.057	0.09	0.092
Departure Headway (Hd)	4.912	4.818	3.939
Convergence, Y/N	Yes	Yes	Yes
Cap	729	743	895
Service Time	2.646	2.552	2.031
HCM Lane V/C Ratio	0.058	0.092	0.094
HCM Control Delay	7.9	8	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Future Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	106	26	7	12	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	337	483	120	373	448	115	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	440	2098	521	515	1945	500	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	101	0	74	13	0	9	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1579	0	1480	1476	0	1484	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.9	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.9	0.1	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.43		0.35	0.53		0.34	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	600	0	341	594	0	341	577	0	352	584	0	372
V/C Ratio(X)	0.17	0.00	0.22	0.02	0.00	0.03	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2060	0	1771	1919	0	1776	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.8	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	7.0	0.0	7.1	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		175			22			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.1
Green Ext Time (p_c), s		0.1		0.9		0.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Future Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	139	0	0	0	19	37	57	121	314	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	675	703	329			344	0	0	94	0	0
Stage 1	571	571	-			-	-	-	-	-	-
Stage 2	104	132	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	407	352	694			1172	-	-	1451	-	-
Stage 1	550	492	-			-	-	-	-	-	-
Stage 2	901	772	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	367	0	694			1172	-	-	1451	-	-
Mov Cap-2 Maneuver	367	0	-			-	-	-	-	-	-
Stage 1	496	0	-			-	-	-	-	-	-
Stage 2	901	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	1.4	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	367	694	1451	-	-
HCM Lane V/C Ratio	0.016	-	-	0.49	0.2	0.083	-	-
HCM Control Delay (s)	8.1	-	-	23.9	11.5	7.7	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	0.7	0.3	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Future Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	338	14	0	0	0	0	0	0	40	16	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	9.2	8.4
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	72%
Vol Thru, %	100%	89%	28%
Vol Right, %	0%	11%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	98	39
LT Vol	0	0	28
Through Vol	173	87	11
RT Vol	0	11	0
Lane Flow Rate	225	127	56
Geometry Grp	7	7	2
Degree of Util (X)	0.298	0.165	0.078
Departure Headway (Hd)	4.769	4.69	5.018
Convergence, Y/N	Yes	Yes	Yes
Cap	750	761	718
Service Time	2.524	2.445	3.018
HCM Lane V/C Ratio	0.3	0.167	0.078
HCM Control Delay	9.6	8.4	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	0.6	0.3

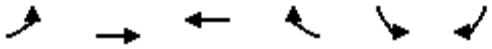
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Future Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	123	0	0	458	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	592	592	459	602	593	123	460	0	-	-	-	0
Stage 1	459	459	-	133	133	-	-	-	-	-	-	-
Stage 2	133	133	-	469	460	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	406	408	586	400	408	907	1060	-	0	0	-	-
Stage 1	567	553	-	852	771	-	-	-	0	0	-	-
Stage 2	852	771	-	560	553	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	404	406	586	386	406	907	1060	-	-	-	-	-
Mov Cap-2 Maneuver	476	466	-	456	464	-	-	-	-	-	-	-
Stage 1	564	553	-	848	767	-	-	-	-	-	-	-
Stage 2	848	767	-	542	553	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	13.6	0.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1060	-	561	456	-	-
HCM Lane V/C Ratio	0.005	-	0.043	0.079	-	-
HCM Control Delay (s)	8.4	-	11.7	13.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	241	58	25	67	5
Future Volume (veh/h)	20	241	58	25	67	5
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	25	305	70	28	85	6
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	682	1045	741	281	223	199
Arrive On Green	0.32	0.32	0.32	0.32	0.14	0.14
Sat Flow, veh/h	1198	3368	2415	884	1645	1468
Grp Volume(v), veh/h	25	305	48	50	85	6
Grp Sat Flow(s),veh/h/ln	1198	1641	1641	1571	1645	1468
Q Serve(g_s), s	0.3	1.5	0.5	0.5	1.0	0.1
Cycle Q Clear(g_c), s	0.8	1.5	0.5	0.5	1.0	0.1
Prop In Lane	1.00			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	682	1045	522	500	223	199
V/C Ratio(X)	0.04	0.29	0.09	0.10	0.38	0.03
Avail Cap(c_a), veh/h	1772	4031	2015	1930	1945	1736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.6	5.6	5.3	5.3	8.7	8.2
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.1	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.7	0.2	0.2	0.5	0.0
LnGrp Delay(d),s/veh	5.6	5.8	5.3	5.4	9.7	8.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		330	98		91	
Approach Delay, s/veh		5.8	5.3		9.6	
Approach LOS		A	A		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.0				13.0		9.0
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		3.5				2.5		3.0
Green Ext Time (p_c), s		2.1				0.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	381	15	346	92	3	155
Future Volume (vph)	381	15	346	92	3	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	4.6
Lane Util. Factor	0.95		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3263		1641	1727	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3263		1641	1727	1770	1583
Peak-hour factor, PHF	0.78	0.78	0.92	0.92	0.54	1.00
Adj. Flow (vph)	488	19	376	100	6	155
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	504	0	376	100	6	155
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	15.7		20.6	40.3	12.4	12.4
Effective Green, g (s)	15.7		20.6	40.3	12.4	12.4
Actuated g/C Ratio	0.25		0.33	0.65	0.20	0.20
Clearance Time (s)	4.6		4.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0		2.0	3.0	1.5	1.5
Lane Grp Cap (vph)	827		546	1124	354	317
v/s Ratio Prot	c0.15		c0.23	0.06	0.00	
v/s Ratio Perm						c0.10
v/c Ratio	0.61		0.69	0.09	0.02	0.49
Uniform Delay, d1	20.4		17.9	4.0	19.9	21.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3		2.9	0.0	0.0	0.4
Delay (s)	21.7		20.8	4.0	19.9	22.4
Level of Service	C		C	A	B	C
Approach Delay (s)	21.7			17.2	22.3	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	17.7
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	495	4	70	435	321	0	1	36	586	11	23
Future Volume (veh/h)	22	495	4	70	435	321	0	1	36	586	11	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	27	604	5	78	483	329	0	1	43	721	0	0
Adj No. of Lanes	1	2	0	1	1	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	35	1589	13	98	493	336	59	1	51	832	437	0
Arrive On Green	0.02	0.48	0.48	0.06	0.51	0.51	0.00	0.04	0.04	0.25	0.00	0.00
Sat Flow, veh/h	1645	3336	28	1645	959	653	1645	33	1440	3290	1727	0
Grp Volume(v), veh/h	27	297	312	78	0	812	0	0	44	721	0	0
Grp Sat Flow(s),veh/h/ln	1645	1641	1722	1645	0	1612	1645	0	1473	1645	1727	0
Q Serve(g_s), s	1.6	11.3	11.3	4.6	0.0	48.3	0.0	0.0	2.9	20.5	0.0	0.0
Cycle Q Clear(g_c), s	1.6	11.3	11.3	4.6	0.0	48.3	0.0	0.0	2.9	20.5	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.41	1.00		0.98	1.00		0.00
Lane Grp Cap(c), veh/h	35	782	821	98	0	830	59	0	53	832	437	0
V/C Ratio(X)	0.77	0.38	0.38	0.80	0.00	0.98	0.00	0.00	0.84	0.87	0.00	0.00
Avail Cap(c_a), veh/h	91	782	821	217	0	831	307	0	275	1128	592	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	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	47.7	16.4	16.4	45.5	0.0	23.2	0.0	0.0	46.9	35.0	0.0	0.0
Incr Delay (d2), s/veh	12.5	0.4	0.4	5.5	0.0	26.0	0.0	0.0	27.4	5.6	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	0.8	5.2	5.5	2.2	0.0	27.2	0.0	0.0	1.6	10.0	0.0	0.0
LnGrp Delay(d),s/veh	60.2	16.8	16.8	50.9	0.0	49.2	0.0	0.0	74.3	40.6	0.0	0.0
LnGrp LOS	E	B	B	D		D			E	D		
Approach Vol, veh/h		636			890			44			721	
Approach Delay, s/veh		18.6			49.4			74.3			40.6	
Approach LOS		B			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	51.3		29.0	6.3	55.0		7.7
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 13	43.0		* 34	* 5.4	50.5		18.3
Max Q Clear Time (g_c+I1), s	6.6	13.3		22.5	3.6	50.3		4.9
Green Ext Time (p_c), s	0.0	4.9		2.2	0.0	0.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	38.6
HCM 2010 LOS	D

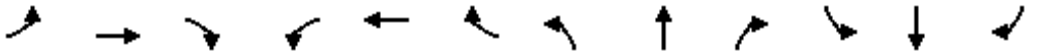
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Future Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	670	0	601	294	0				567	0	497
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1833	820	695	2740	0				823	0	367
Arrive On Green	0.00	0.56	0.00	0.07	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	670	0	601	294	0				567	0	497
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1833	820	695	2740	0				823	0	367
V/C Ratio(X)	0.00	0.37	0.00	0.87	0.11	0.00				0.69	0.00	1.35
Avail Cap(c_a), veh/h	0	1833	820	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.80	0.00	0.49	0.49	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	36.0	6.7	0.0				27.2	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	4.1	0.0	0.0				2.1	0.0	176.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0	7.0	2.4	0.0				5.9	0.0	26.0
LnGrp Delay(d),s/veh	0.0	10.2	0.0	40.1	6.8	0.0				29.2	0.0	206.3
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		670			895						1064	
Approach Delay, s/veh		10.2			29.1						111.9	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.1	50.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.9	11.1		22.0		7.4		
Green Ext Time (p_c), s	0.5	6.3		0.0		4.1		

Intersection Summary	
HCM 2010 Ctrl Delay	57.8
HCM 2010 LOS	E

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Future Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	448	748	0	0	732	515	108	0	467			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	523	2266	0	0	866	604	310	0	553			
Arrive On Green	0.33	1.00	0.00	0.00	0.47	0.47	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1937	1290	1645	0	2936			
Grp Volume(v), veh/h	448	748	0	0	648	599	108	0	467			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1500	1645	0	1468			
Q Serve(g_s), s	10.5	0.0	0.0	0.0	27.8	28.3	4.6	0.0	12.3			
Cycle Q Clear(g_c), s	10.5	0.0	0.0	0.0	27.8	28.3	4.6	0.0	12.3			
Prop In Lane	1.00		0.00	0.00		0.86	1.00		1.00			
Lane Grp Cap(c), veh/h	523	2266	0	0	768	702	310	0	553			
V/C Ratio(X)	0.86	0.33	0.00	0.00	0.84	0.85	0.35	0.00	0.85			
Avail Cap(c_a), veh/h	798	2266	0	0	768	702	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.73	0.73	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.0	0.0	0.0	0.0	18.7	18.9	28.2	0.0	31.3			
Incr Delay (d2), s/veh	2.8	0.3	0.0	0.0	11.0	12.5	0.2	0.0	5.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	14.8	14.1	2.1	0.0	5.4			
LnGrp Delay(d),s/veh	28.8	0.3	0.0	0.0	29.7	31.4	28.5	0.0	36.8			
LnGrp LOS	C	A			C	C	C		D			
Approach Vol, veh/h		1196			1247			575				
Approach Delay, s/veh		11.0			30.5			35.2				
Approach LOS		B			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.3			17.8	42.5		19.7
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.5	30.3		14.3
Green Ext Time (p_c), s		12.5			0.6	0.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	8.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	124	21	0	341	13
Future Vol, veh/h	20	124	21	0	341	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	42	258	28	0	669	25

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1391	28	0	0	28	0
Stage 1	28	-	-	-	-	-
Stage 2	1363	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	150	1025	-	-	1585	-
Stage 1	974	-	-	-	-	-
Stage 2	229	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	87	1025	-	-	1585	-
Mov Cap-2 Maneuver	4559	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	229	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	8.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	4559	1025	1585	-
HCM Lane V/C Ratio	-	-	0.009	0.252	0.422	-
HCM Control Delay (s)	-	-	5.8	9.7	8.9	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0	1	2.1	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	93	1	8	30	0	55	0	337	0	26	24
Future Vol, veh/h	0	93	1	8	30	0	55	0	337	0	26	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	135	1	11	42	0	63	0	383	0	27	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	136	0	0	226	-	136	-	200	42
Stage 1	-	-	-	-	-	-	136	-	-	-	64	-
Stage 2	-	-	-	-	-	-	90	-	-	-	136	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1400	-	0	713	0	892	0	682	1006
Stage 1	0	-	-	-	-	0	848	0	-	0	826	-
Stage 2	0	-	-	-	-	0	898	0	-	0	769	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1400	-	-	670	-	892	-	677	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	670	-	-	-	677	-
Stage 1	-	-	-	-	-	-	848	-	-	-	819	-
Stage 2	-	-	-	-	-	-	840	-	-	-	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	11.8	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	670	892	-	-	1400	-	803
HCM Lane V/C Ratio	0.093	0.429	-	-	0.008	-	0.065
HCM Control Delay (s)	10.9	12	-	-	7.6	0	9.8
HCM Lane LOS	B	B	-	-	A	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0	-	0.2



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3278
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3278
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	163	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	163	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.7	14.7		17.0	17.0		2.1	34.3		4.3	36.5
Effective Green, g (s)		14.7	14.7		17.0	17.0		2.1	34.3		4.3	36.5
Actuated g/C Ratio		0.15	0.15		0.17	0.17		0.02	0.34		0.04	0.36
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		240	474		278	256		34	1087		70	1195
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.68	0.40		0.33	0.61		0.41	0.69		0.50	0.09
Uniform Delay, d1		40.5	38.7		36.5	38.5		48.4	28.3		46.8	20.9
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.9	0.2		0.3	3.0		2.9	2.4		2.0	0.1
Delay (s)		46.4	38.9		36.8	41.6		51.3	30.8		48.9	21.0
Level of Service		D	D		D	D		D	C		D	C
Approach Delay (s)			42.3			39.8			31.1			27.6
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	1	10	10
Future Volume (vph)	1	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)		5.1	5.1
Lane Util. Factor		1.00	1.00
Frt		1.00	0.85
Flt Protected		0.95	1.00
Satd. Flow (prot)		1641	1468
Flt Permitted		0.95	1.00
Satd. Flow (perm)		1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	1	11	11
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	0	11	11
Turn Type		Prot	Prot
Protected Phases		4	4
Permitted Phases			
Actuated Green, G (s)		4.3	4.3
Effective Green, g (s)		4.3	4.3
Actuated g/C Ratio		0.04	0.04
Clearance Time (s)		5.1	5.1
Vehicle Extension (s)		2.0	2.0
Lane Grp Cap (vph)		70	63
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm			
v/c Ratio		0.16	0.17
Uniform Delay, d1		46.2	46.2
Progression Factor		1.00	1.00
Incremental Delay, d2		0.4	0.5
Delay (s)		46.5	46.7
Level of Service		D	D
Approach Delay (s)		46.6	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	2	0	12	2	239	6	19	180	2
Future Vol, veh/h	2	0	3	2	0	12	2	239	6	19	180	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	5	0	27	2	295	7	22	205	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	566	556	206	556	554	299	207	0	0	302	0	0
Stage 1	250	250	-	303	303	-	-	-	-	-	-	-
Stage 2	316	306	-	253	251	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	423	428	815	430	430	722	1318	-	-	1215	-	-
Stage 1	737	685	-	690	649	-	-	-	-	-	-	-
Stage 2	678	647	-	734	685	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	401	419	815	421	421	722	1318	-	-	1215	-	-
Mov Cap-2 Maneuver	401	419	-	421	421	-	-	-	-	-	-	-
Stage 1	736	673	-	689	648	-	-	-	-	-	-	-
Stage 2	651	646	-	716	673	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	10.8	0.1	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1318	-	-	577	655	1215	-	-
HCM Lane V/C Ratio	0.002	-	-	0.014	0.049	0.018	-	-
HCM Control Delay (s)	7.7	-	-	11.3	10.8	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	2	17	4	238	0	0	187	2
Future Vol, veh/h	0	0	0	66	2	17	4	238	0	0	187	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	74	2	19	5	317	0	0	220	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	559	548	221	548	549	317	222	0	-	-	-	0
Stage 1	221	221	-	327	327	-	-	-	-	-	-	-
Stage 2	338	327	-	221	222	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	428	433	799	435	432	705	1301	-	0	0	-	-
Stage 1	764	706	-	669	634	-	-	-	0	0	-	-
Stage 2	660	634	-	764	705	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	414	431	799	434	430	705	1301	-	-	-	-	-
Mov Cap-2 Maneuver	502	499	-	520	498	-	-	-	-	-	-	-
Stage 1	761	706	-	666	631	-	-	-	-	-	-	-
Stage 2	637	631	-	764	705	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.5	0.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1301	-	-	520	675	-	-
HCM Lane V/C Ratio	0.004	-	-	0.143	0.032	-	-
HCM Control Delay (s)	7.8	-	0	13.1	10.5	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Future Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	99	22	13	10	0	0	25	11

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	74	133	-	-	122	61
Stage 1	-	-	-	0	0	-	-	122	-
Stage 2	-	-	-	74	133	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	886	739	0	0	749	966
Stage 1	-	-	-	-	-	0	0	775	-
Stage 2	-	-	-	904	767	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	854	739	-	-	749	966
Mov Cap-2 Maneuver	-	-	-	854	739	-	-	749	-
Stage 1	-	-	-	-	-	-	-	775	-
Stage 2	-	-	-	865	767	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	-	-	-	805
HCM Lane V/C Ratio	0.03	-	-	-	0.044
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Future Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	21	6	9	171	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	321	346	103	165	596	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	552	1812	539	80	3127	55	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	25	0	16	98	0	85	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1427	0	1477	1699	0	1562	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	1.2	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.3	0.0	0.2	1.3	0.0	1.2	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.57		0.37	0.09		0.04	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	282	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.05	0.00	0.06	0.21	0.00	0.29	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1544	0	1465	1814	0	1549	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	0.5	0.2	0.0	0.1	0.0	0.0	0.3
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	0.1	0.6	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.7	0.0	8.8	9.3	0.0	9.6	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		41			183			198			151	
Approach Delay, s/veh		8.8			9.4			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.3		3.7		3.3
Green Ext Time (p_c), s		0.8		0.1		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	19	0	0	0	107	230	16	57	54	136
Future Vol, veh/h	16	27	19	0	0	0	107	230	16	57	54	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	27	0	0	0	115	247	17	70	66	166

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	775	783	149			232	0	0	264	0	0
Stage 1	289	289	-			-	-	-	-	-	-
Stage 2	486	494	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	355	316	877			1290	-	-	1255	-	-
Stage 1	742	659	-			-	-	-	-	-	-
Stage 2	602	533	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	305	0	877			1290	-	-	1255	-	-
Mov Cap-2 Maneuver	305	0	-			-	-	-	-	-	-
Stage 1	638	0	-			-	-	-	-	-	-
Stage 2	602	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.6	2.4	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1290	-	-	305	877	1255	-	-
HCM Lane V/C Ratio	0.089	-	-	0.201	0.031	0.055	-	-
HCM Control Delay (s)	8.1	-	-	19.8	9.2	8	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Future Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	11	112	12	0	0	0	0	12	12	22	14	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	140	62	84	146	-
Stage 1	-	-	-			-	140	-	0	0	-
Stage 2	-	-	-			-	0	-	84	146	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	732	965	871	726	0
Stage 1	-	-	-			0	761	-	-	-	0
Stage 2	-	-	-			0	-	-	892	756	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	732	965	849	726	-
Mov Cap-2 Maneuver	-	-	-			-	732	-	849	726	-
Stage 1	-	-	-			-	761	-	-	-	-
Stage 2	-	-	-			-	-	-	867	756	-

Approach	EB	NB	SB
HCM Control Delay, s		9.5	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	833	-	-	-	797
HCM Lane V/C Ratio	0.029	-	-	-	0.045
HCM Control Delay (s)	9.5	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	10	0	3	15	344	12	1	86	5
Future Vol, veh/h	0	0	1	10	0	3	15	344	12	1	86	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	430	15	1	128	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	612	617	132	612	613	438	135	0	0	445	0	0
Stage 1	134	134	-	476	476	-	-	-	-	-	-	-
Stage 2	478	483	-	136	137	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	394	395	896	394	397	602	1401	-	-	1074	-	-
Stage 1	851	770	-	555	543	-	-	-	-	-	-	-
Stage 2	553	540	-	848	768	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	387	389	896	388	391	602	1401	-	-	1074	-	-
Mov Cap-2 Maneuver	387	389	-	388	391	-	-	-	-	-	-	-
Stage 1	839	769	-	547	535	-	-	-	-	-	-	-
Stage 2	542	532	-	843	767	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	13.8	0.3	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1401	-	-	896	423	1074	-	-
HCM Lane V/C Ratio	0.013	-	-	0.004	0.038	0.001	-	-
HCM Control Delay (s)	7.6	-	-	9	13.8	8.4	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	19	3	47	181	149	4	12	14	18	18	37
Future Volume (veh/h)	10	19	3	47	181	149	4	12	14	18	18	37
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	13	24	4	57	218	163	7	21	22	23	23	43
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	499	856	139	690	554	396	487	138	145	507	96	180
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	925	2828	459	1276	1830	1308	1233	774	811	1259	540	1009
Grp Volume(v), veh/h	13	14	14	57	194	187	7	0	43	23	0	66
Grp Sat Flow(s),veh/h/ln	925	1641	1646	1276	1641	1497	1233	0	1584	1259	0	1549
Q Serve(g_s), s	0.3	0.1	0.1	0.8	2.2	2.3	0.1	0.0	0.5	0.4	0.0	0.8
Cycle Q Clear(g_c), s	2.6	0.1	0.1	0.9	2.2	2.3	1.0	0.0	0.5	0.9	0.0	0.8
Prop In Lane	1.00		0.28	1.00		0.87	1.00		0.51	1.00		0.65
Lane Grp Cap(c), veh/h	499	496	498	690	496	453	487	0	283	507	0	277
V/C Ratio(X)	0.03	0.03	0.03	0.08	0.39	0.41	0.01	0.00	0.15	0.05	0.00	0.24
Avail Cap(c_a), veh/h	1419	2128	2135	1959	2128	1941	2292	0	2602	2351	0	2545
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	5.7	5.7	6.0	6.4	6.4	8.6	0.0	8.0	8.4	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.5	0.6	0.0	0.0	0.2	0.0	0.0	0.4
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	0.1	0.1	0.3	1.0	1.0	0.0	0.0	0.2	0.1	0.0	0.4
LnGrp Delay(d),s/veh	7.5	5.7	5.7	6.0	6.9	7.0	8.6	0.0	8.3	8.4	0.0	8.6
LnGrp LOS	A	A	A	A	A	A	A		A	A		A
Approach Vol, veh/h		41			438			50			89	
Approach Delay, s/veh		6.3			6.8			8.3			8.5	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		13.0		10.1		13.0		10.1
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		4.6		3.0		4.3		2.9
Green Ext Time (p_c), s		0.1		0.2		2.6		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	107	2	32	439	3	34
Future Volume (veh/h)	107	2	32	439	3	34
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	137	3	37	510	4	42
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.86	0.86	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1041	23	119	1798	155	253
Arrive On Green	0.32	0.32	0.07	0.55	0.09	0.09
Sat Flow, veh/h	3370	72	1645	3368	1774	1583
Grp Volume(v), veh/h	68	72	37	510	4	42
Grp Sat Flow(s),veh/h/ln	1641	1715	1645	1641	1774	1583
Q Serve(g_s), s	0.7	0.8	0.5	2.1	0.1	0.6
Cycle Q Clear(g_c), s	0.7	0.8	0.5	2.1	0.1	0.6
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	520	544	119	1798	155	253
V/C Ratio(X)	0.13	0.13	0.31	0.28	0.03	0.17
Avail Cap(c_a), veh/h	1652	1726	587	4994	2278	2148
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	6.1	11.1	3.1	10.5	9.1
Incr Delay (d2), s/veh	0.1	0.1	0.5	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.3	0.9	0.0	0.3
LnGrp Delay(d),s/veh	6.3	6.3	11.6	3.1	10.6	9.3
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	140			547	46	
Approach Delay, s/veh	6.3			3.7	9.4	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.8	12.6				18.4		6.8
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	9.0	25.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.5	2.8				4.1		2.6
Green Ext Time (p_c), s	0.0	0.7				3.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	4.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	129	2	32	434	272	4	6	15	46	1	13
Future Volume (veh/h)	20	129	2	32	434	272	4	6	15	46	1	13
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	20	130	2	34	467	263	6	9	21	42	34	18
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	33	1860	28	53	813	455	55	15	36	111	72	38
Arrive On Green	0.02	0.39	0.39	0.03	0.40	0.40	0.03	0.03	0.03	0.07	0.07	0.07
Sat Flow, veh/h	1645	4785	73	1645	2031	1137	1645	461	1076	1645	1064	563
Grp Volume(v), veh/h	20	85	47	34	377	353	6	0	30	42	0	52
Grp Sat Flow(s),veh/h/ln	1645	1572	1714	1645	1641	1527	1645	0	1537	1645	0	1628
Q Serve(g_s), s	0.4	0.6	0.6	0.7	6.4	6.5	0.1	0.0	0.7	0.9	0.0	1.1
Cycle Q Clear(g_c), s	0.4	0.6	0.6	0.7	6.4	6.5	0.1	0.0	0.7	0.9	0.0	1.1
Prop In Lane	1.00		0.04	1.00		0.74	1.00		0.70	1.00		0.35
Lane Grp Cap(c), veh/h	33	1222	666	53	657	612	55	0	52	111	0	110
V/C Ratio(X)	0.60	0.07	0.07	0.65	0.57	0.58	0.11	0.00	0.58	0.38	0.00	0.47
Avail Cap(c_a), veh/h	247	2629	1434	293	1418	1319	837	0	782	1508	0	1493
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	6.9	6.9	17.2	8.4	8.4	16.9	0.0	17.1	16.0	0.0	16.2
Incr Delay (d2), s/veh	6.4	0.0	0.1	4.8	1.0	1.0	0.9	0.0	9.9	2.1	0.0	3.1
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	0.3	0.3	0.3	0.4	3.0	2.8	0.1	0.0	0.4	0.5	0.0	0.6
LnGrp Delay(d),s/veh	23.9	6.9	7.0	22.1	9.3	9.5	17.7	0.0	27.1	18.1	0.0	19.3
LnGrp LOS	C	A	A	C	A	A	B		C	B		B
Approach Vol, veh/h		152			764			36			94	
Approach Delay, s/veh		9.2			10.0			25.5			18.8	
Approach LOS		A			A			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	18.6		6.6	4.9	19.0		5.4
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.4	30.1		* 33	* 5.4	31.1		18.3
Max Q Clear Time (g_c+I1), s	2.7	2.6		3.1	2.4	8.5		2.7
Green Ext Time (p_c), s	0.0	0.9		0.4	0.0	5.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	117	118	263	597	0	0	0	0	384	1	150
Future Volume (veh/h)	0	117	118	263	597	0	0	0	0	384	1	150
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	139	0	302	686	0				432	0	136
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1732	775	396	2332	0				533	0	238
Arrive On Green	0.00	0.53	0.00	0.04	0.23	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	139	0	302	686	0				432	0	136
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	1.7	0.0	7.5	13.7	0.0				10.1	0.0	6.8
Cycle Q Clear(g_c), s	0.0	1.7	0.0	7.5	13.7	0.0				10.1	0.0	6.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1732	775	396	2332	0				533	0	238
V/C Ratio(X)	0.00	0.08	0.00	0.76	0.29	0.00				0.81	0.00	0.57
Avail Cap(c_a), veh/h	0	1732	775	798	2332	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.62	0.62	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.3	0.0	37.2	14.1	0.0				32.3	0.0	31.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.7	0.2	0.0				1.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.0	3.4	6.3	0.0				4.8	0.0	2.8
LnGrp Delay(d),s/veh	0.0	9.4	0.0	37.9	14.3	0.0				34.1	0.0	31.8
LnGrp LOS		A		D	B					C		C
Approach Vol, veh/h		139			988						568	
Approach Delay, s/veh		9.4			21.5						33.6	
Approach LOS		A			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	47.3		18.1		61.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 45		
Max Q Clear Time (g_c+I1), s	9.5	3.7		12.1		15.7		
Green Ext Time (p_c), s	0.4	1.4		0.8		9.7		

Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	428	0	0	440	378	424	254	564	0	0	0
Future Volume (veh/h)	63	428	0	0	440	378	424	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	72	486	0	0	500	388	380	419	185			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	159	2063	0	0	916	710	411	432	367			
Arrive On Green	0.10	1.00	0.00	0.00	0.52	0.52	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1848	1366	1645	1727	1468			
Grp Volume(v), veh/h	72	486	0	0	466	422	380	419	185			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1486	1645	1727	1468			
Q Serve(g_s), s	1.7	0.0	0.0	0.0	15.2	15.2	18.0	19.2	8.7			
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	15.2	15.2	18.0	19.2	8.7			
Prop In Lane	1.00		0.00	0.00		0.92	1.00		1.00			
Lane Grp Cap(c), veh/h	159	2063	0	0	853	773	411	432	367			
V/C Ratio(X)	0.45	0.24	0.00	0.00	0.55	0.55	0.92	0.97	0.50			
Avail Cap(c_a), veh/h	794	2063	0	0	853	773	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	35.0	0.0	0.0	0.0	12.9	12.9	29.3	29.7	25.7			
Incr Delay (d2), s/veh	0.7	0.2	0.0	0.0	2.5	2.8	26.0	35.3	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.8	0.1	0.0	0.0	7.4	6.8	11.1	13.3	3.5			
LnGrp Delay(d),s/veh	35.6	0.2	0.0	0.0	15.4	15.6	55.3	65.0	26.2			
LnGrp LOS	D	A			B	B	E	E	C			
Approach Vol, veh/h		558			888			984				
Approach Delay, s/veh		4.8			15.5			54.0				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			8.7	46.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.7			* 20	25.7		20.0
Max Q Clear Time (g_c+I1), s		2.0			3.7	17.2		21.2
Green Ext Time (p_c), s		6.0			0.1	5.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	4.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	25	26	0	19	10
Future Vol, veh/h	10	25	26	0	19	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	15	37	43	0	27	14

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	111	43	0	0	43	0
Stage 1	43	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	867	1005	-	-	1566	-
Stage 1	959	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	852	1005	-	-	1566	-
Mov Cap-2 Maneuver	852	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	935	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	4.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	852	1005	1566	-
HCM Lane V/C Ratio	-	-	0.018	0.037	0.017	-
HCM Control Delay (s)	-	-	9.3	8.7	7.3	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	4	16	10	0	5	0	124	0	244	23
Future Vol, veh/h	0	121	4	16	10	0	5	0	124	0	244	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	205	7	23	14	0	6	0	159	0	280	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	212	0	0	422	-	209	-	272	14
Stage 1	-	-	-	-	-	-	209	-	-	-	60	-
Stage 2	-	-	-	-	-	-	213	-	-	-	212	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1312	-	0	528	0	812	0	621	1043
Stage 1	0	-	-	-	-	0	775	0	-	0	829	-
Stage 2	0	-	-	-	-	0	771	0	-	0	712	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1312	-	-	325	-	812	-	610	1043
Mov Cap-2 Maneuver	-	-	-	-	-	-	325	-	-	-	610	-
Stage 1	-	-	-	-	-	-	775	-	-	-	814	-
Stage 2	-	-	-	-	-	-	484	-	-	-	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.8	10.7	15.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	325	812	-	-	1312	-	633
HCM Lane V/C Ratio	0.02	0.196	-	-	0.018	-	0.485
HCM Control Delay (s)	16.3	10.5	-	-	7.8	0	15.9
HCM Lane LOS	C	B	-	-	A	A	C
HCM 95th %tile Q(veh)	0.1	0.7	-	-	0.1	-	2.7



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	41	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	41	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3281
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3281
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	48	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	48	221	0	151	24	0	15	217	0	93	1089
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Effective Green, g (s)		11.4	11.4		15.2	15.2		0.9	26.4		8.3	33.8
Actuated g/C Ratio		0.13	0.13		0.17	0.17		0.01	0.29		0.09	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		205	395		274	263		16	897		149	1219
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.56		0.55	0.09		0.94	0.24		0.62	0.89
Uniform Delay, d1		35.8	37.4		34.7	32.0		45.0	24.6		39.8	26.9
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		1.4	0.1		190.1	0.3		5.7	9.2
Delay (s)		36.0	38.4		36.1	32.1		235.1	24.9		45.5	36.1
Level of Service		D	D		D	C		F	C		D	D
Approach Delay (s)			38.0			35.5			38.5			36.8
Approach LOS			D			D			D			D

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	1	10	10
Future Volume (vph)	1	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)		5.1	5.1
Lane Util. Factor		1.00	1.00
Frt		1.00	0.85
Flt Protected		0.95	1.00
Satd. Flow (prot)		1641	1468
Flt Permitted		0.95	1.00
Satd. Flow (perm)		1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	1	11	11
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	0	11	11
Turn Type		Prot	Prot
Protected Phases		4	4
Permitted Phases			
Actuated Green, G (s)		4.1	4.1
Effective Green, g (s)		4.1	4.1
Actuated g/C Ratio		0.05	0.05
Clearance Time (s)		5.1	5.1
Vehicle Extension (s)		2.0	2.0
Lane Grp Cap (vph)		74	66
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm			
v/c Ratio		0.15	0.17
Uniform Delay, d1		41.7	41.8
Progression Factor		1.00	1.00
Incremental Delay, d2		0.3	0.4
Delay (s)		42.1	42.2
Level of Service		D	D
Approach Delay (s)		42.1	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	0	0	3	4	0	17	0	51	3	19	341	1
Future Vol, veh/h	0	0	3	4	0	17	0	51	3	19	341	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	5	0	23	0	69	4	21	375	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	501	491	376	493	489	71	376	0	0	73	0	0
Stage 1	418	418	-	71	71	-	-	-	-	-	-	-
Stage 2	83	73	-	422	418	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	468	467	653	474	468	970	1140	-	-	1477	-	-
Stage 1	597	577	-	919	820	-	-	-	-	-	-	-
Stage 2	906	819	-	594	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	452	460	653	463	461	970	1140	-	-	1477	-	-
Mov Cap-2 Maneuver	452	460	-	463	461	-	-	-	-	-	-	-
Stage 1	597	569	-	919	820	-	-	-	-	-	-	-
Stage 2	885	819	-	578	569	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	9.6	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1140	-	-	653	803	1477	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.035	0.014	-	-
HCM Control Delay (s)	0	-	-	10.6	9.6	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	46	1	10	0	35	0	0	356	3
Future Vol, veh/h	1	0	4	46	1	10	0	35	0	0	356	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	52	1	11	0	41	0	0	383	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	432	426	385	432	427	41	386	0	-	-	-	0
Stage 1	385	385	-	41	41	-	-	-	-	-	-	-
Stage 2	47	41	-	391	386	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	520	508	645	520	508	1008	1130	-	0	0	-	-
Stage 1	622	597	-	954	845	-	-	-	0	0	-	-
Stage 2	947	845	-	618	596	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	513	508	645	510	508	1008	1130	-	-	-	-	-
Mov Cap-2 Maneuver	547	528	-	538	528	-	-	-	-	-	-	-
Stage 1	622	597	-	954	845	-	-	-	-	-	-	-
Stage 2	935	845	-	606	596	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.7	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1130	-	623	538	931	-	-
HCM Lane V/C Ratio	-	-	0.026	0.096	0.013	-	-
HCM Control Delay (s)	0	-	10.9	12.4	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Future Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	68	21	4	8	0	0	40	16

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	70	105	-	-	95	45
Stage 1	-	-	-	0	0	-	-	95	-
Stage 2	-	-	-	70	105	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	891	766	0	0	776	990
Stage 1	-	-	-	-	-	0	0	797	-
Stage 2	-	-	-	909	789	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	842	766	-	-	776	990
Mov Cap-2 Maneuver	-	-	-	842	766	-	-	776	-
Stage 1	-	-	-	-	-	-	-	797	-
Stage 2	-	-	-	849	789	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	-	-	-	827
HCM Lane V/C Ratio	0.015	-	-	-	0.068
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Future Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	92	26	7	3	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	350	461	131	510	184	204	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	471	2003	570	884	800	888	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	94	0	67	8	0	5	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1573	0	1471	1157	0	1415	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.8	0.8	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.46		0.39	0.85		0.63	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	604	0	339	573	0	326	577	0	352	584	0	372
V/C Ratio(X)	0.16	0.00	0.20	0.01	0.00	0.01	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2056	0	1761	1767	0	1694	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.7	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	6.9	0.0	7.0	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		161			13			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.8
Green Ext Time (p_c), s		0.1		0.8		0.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	79	0	0	0	10	17	27	108	274	27
Future Vol, veh/h	14	101	79	0	0	0	10	17	27	108	274	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	123	0	0	0	11	18	28	120	304	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	613	627	319			334	0	0	46	0	0
Stage 1	559	559	-			-	-	-	-	-	-
Stage 2	54	68	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	443	390	703			1182	-	-	1512	-	-
Stage 1	557	498	-			-	-	-	-	-	-
Stage 2	948	823	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	404	0	703			1182	-	-	1512	-	-
Mov Cap-2 Maneuver	404	0	-			-	-	-	-	-	-
Stage 1	509	0	-			-	-	-	-	-	-
Stage 2	948	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17	1.5	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1182	-	-	404	703	1512	-	-
HCM Lane V/C Ratio	0.009	-	-	0.445	0.176	0.079	-	-
HCM Control Delay (s)	8.1	-	-	20.9	11.2	7.6	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Future Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	312	5	0	0	0	0	9	23	40	16	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	327	159	173	329	-
Stage 1	-	-	-	-	327	-	0	0	-
Stage 2	-	-	-	-	0	-	173	329	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	572	833	752	571	0
Stage 1	-	-	-	0	627	-	-	-	0
Stage 2	-	-	-	0	-	-	789	625	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	572	833	723	571	-
Mov Cap-2 Maneuver	-	-	-	-	572	-	723	571	-
Stage 1	-	-	-	-	627	-	-	-	-
Stage 2	-	-	-	-	-	-	756	625	-

Approach	EB	NB	SB
HCM Control Delay, s		10.1	10.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	734	-	-	-	673
HCM Lane V/C Ratio	0.044	-	-	-	0.083
HCM Control Delay (s)	10.1	-	-	-	10.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

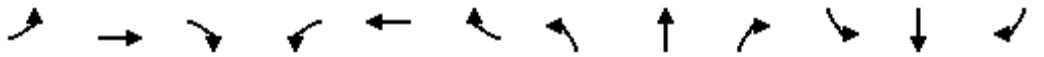
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	43	7	1	375	2
Future Vol, veh/h	4	0	17	24	0	0	4	43	7	1	375	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	58	9	1	436	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	512	516	437	522	513	63	438	0	0	67	0	0
Stage 1	439	439	-	73	73	-	-	-	-	-	-	-
Stage 2	73	77	-	449	440	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	460	452	603	453	453	980	1081	-	-	1485	-	-
Stage 1	581	565	-	917	819	-	-	-	-	-	-	-
Stage 2	917	815	-	574	564	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	458	449	603	437	450	980	1081	-	-	1485	-	-
Mov Cap-2 Maneuver	458	449	-	437	450	-	-	-	-	-	-	-
Stage 1	578	564	-	912	815	-	-	-	-	-	-	-
Stage 2	913	811	-	555	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14	0.6	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1081	-	-	569	437	1485	-	-
HCM Lane V/C Ratio	0.005	-	-	0.042	0.082	0.001	-	-
HCM Control Delay (s)	8.3	-	-	11.6	14	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	181	1	25	38	22	3	10	50	52	12	8
Future Volume (veh/h)	10	181	1	25	38	22	3	10	50	52	12	8
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	13	229	1	30	46	25	5	17	77	66	15	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	636	976	4	554	616	310	552	57	259	488	203	135
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1228	3351	15	1063	2114	1066	1280	273	1236	1202	968	645
Grp Volume(v), veh/h	13	112	118	30	35	36	5	0	94	66	0	25
Grp Sat Flow(s),veh/h/ln	1228	1641	1725	1063	1641	1539	1280	0	1509	1202	0	1613
Q Serve(g_s), s	0.2	1.2	1.2	0.5	0.4	0.4	0.1	0.0	1.3	1.2	0.0	0.3
Cycle Q Clear(g_c), s	0.6	1.2	1.2	1.8	0.4	0.4	0.4	0.0	1.3	2.4	0.0	0.3
Prop In Lane	1.00		0.01	1.00		0.69	1.00		0.82	1.00		0.40
Lane Grp Cap(c), veh/h	636	478	502	554	478	448	552	0	316	488	0	338
V/C Ratio(X)	0.02	0.23	0.23	0.05	0.07	0.08	0.01	0.00	0.30	0.14	0.00	0.07
Avail Cap(c_a), veh/h	1811	2049	2153	1571	2049	1922	2308	0	2386	2138	0	2551
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	6.5	6.5	7.2	6.2	6.2	7.8	0.0	8.0	9.0	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.0	0.1	0.1	0.0	0.0	0.5	0.1	0.0	0.1
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	0.6	0.6	0.2	0.2	0.2	0.0	0.0	0.6	0.4	0.0	0.1
LnGrp Delay(d),s/veh	6.4	6.7	6.7	7.2	6.2	6.3	7.8	0.0	8.5	9.2	0.0	7.7
LnGrp LOS	A	A	A	A	A	A	A		A	A		A
Approach Vol, veh/h		243			101			99			91	
Approach Delay, s/veh		6.7			6.5			8.5			8.8	
Approach LOS		A			A			A			A	

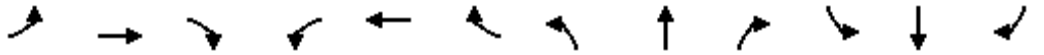
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		13.0		11.0		13.0		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		3.2		3.3		3.8		4.4
Green Ext Time (p_c), s		1.4		0.6		0.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	374	0	35	97	0	57
Future Volume (veh/h)	374	0	35	97	0	57
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	479	0	38	105	0	87
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.92	0.92	0.54	0.54
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1008	0	121	1724	250	339
Arrive On Green	0.31	0.00	0.07	0.53	0.00	0.14
Sat Flow, veh/h	3455	0	1645	3368	1774	1583
Grp Volume(v), veh/h	479	0	38	105	0	87
Grp Sat Flow(s),veh/h/ln	1641	0	1645	1641	1774	1583
Q Serve(g_s), s	3.3	0.0	0.6	0.4	0.0	1.3
Cycle Q Clear(g_c), s	3.3	0.0	0.6	0.4	0.0	1.3
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1008	0	121	1724	250	339
V/C Ratio(X)	0.48	0.00	0.32	0.06	0.00	0.26
Avail Cap(c_a), veh/h	3141	0	477	4568	2084	1976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	12.1	3.2	0.0	9.0
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.3	0.2	0.0	0.6
LnGrp Delay(d),s/veh	8.1	0.0	12.7	3.2	0.0	9.2
LnGrp LOS	A		B	A		A
Approach Vol, veh/h	479			143	87	
Approach Delay, s/veh	8.1			5.7	9.2	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.0	13.1				19.1		8.5
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.6	5.3				2.4		3.3
Green Ext Time (p_c), s	0.0	3.2				0.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	399	4	70	136	51	0	1	36	359	11	16
Future Volume (veh/h)	13	399	4	70	136	51	0	1	36	359	11	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	16	487	5	78	151	51	0	1	43	448	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	27	1121	11	97	671	219	64	1	56	714	375	0
Arrive On Green	0.02	0.23	0.23	0.06	0.28	0.28	0.00	0.04	0.04	0.22	0.00	0.00
Sat Flow, veh/h	1645	4813	49	1645	2434	794	1645	33	1440	3290	1727	0
Grp Volume(v), veh/h	16	318	174	78	100	102	0	0	44	448	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1719	1645	1641	1587	1645	0	1473	1645	1727	0
Q Serve(g_s), s	0.4	3.3	3.3	1.8	1.8	1.9	0.0	0.0	1.1	4.7	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.3	3.3	1.8	1.8	1.9	0.0	0.0	1.1	4.7	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.50	1.00		0.98	1.00		0.00
Lane Grp Cap(c), veh/h	27	732	400	97	452	437	64	0	58	714	375	0
V/C Ratio(X)	0.59	0.43	0.44	0.80	0.22	0.23	0.00	0.00	0.76	0.63	0.00	0.00
Avail Cap(c_a), veh/h	229	2048	1120	471	1311	1268	791	0	708	2922	1534	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	12.5	12.5	17.7	10.6	10.7	0.0	0.0	18.1	13.5	0.0	0.0
Incr Delay (d2), s/veh	7.6	0.5	0.9	5.7	0.3	0.3	0.0	0.0	18.6	0.9	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	0.2	1.5	1.6	1.0	0.8	0.9	0.0	0.0	0.7	2.2	0.0	0.0
LnGrp Delay(d),s/veh	26.2	12.9	13.4	23.4	10.9	11.0	0.0	0.0	36.7	14.4	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			D	B		
Approach Vol, veh/h		508			280			44			448	
Approach Delay, s/veh		13.5			14.4			36.7			14.4	
Approach LOS		B			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	13.5		12.5	4.8	15.1		5.7
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 11	24.8		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	3.8	5.3		6.7	2.4	3.9		3.1
Green Ext Time (p_c), s	0.0	3.6		1.6	0.0	1.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

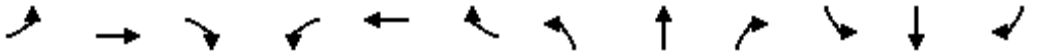
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	268	426	523	159	0	0	0	0	502	4	43
Future Volume (veh/h)	0	268	426	523	159	0	0	0	0	502	4	43
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	319	0	601	183	0				567	0	39
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1307	585	689	2208	0				657	0	293
Arrive On Green	0.00	0.40	0.00	0.14	0.45	0.00				0.20	0.00	0.20
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	319	0	601	183	0				567	0	39
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.2	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Cycle Q Clear(g_c), s	0.0	5.2	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1307	585	689	2208	0				657	0	293
V/C Ratio(X)	0.00	0.24	0.00	0.87	0.08	0.00				0.86	0.00	0.13
Avail Cap(c_a), veh/h	0	1307	585	798	2208	0				806	0	360
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.00	0.72	0.72	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	16.0	0.0	33.1	7.9	0.0				31.0	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.4	0.0	6.3	0.1	0.0				7.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.0	7.1	1.2	0.0				6.7	0.0	0.7
LnGrp Delay(d),s/veh	0.0	16.4	0.0	39.5	7.9	0.0				38.0	0.0	26.4
LnGrp LOS		B		D	A					D		C
Approach Vol, veh/h		319			784						606	
Approach Delay, s/veh		16.4			32.1						37.3	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.0	37.0		21.1		58.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.5		19.6		* 51		
Max Q Clear Time (g_c+I1), s	16.7	7.2		15.3		4.5		
Green Ext Time (p_c), s	0.5	3.3		0.6		2.4		

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	625	0	0	592	503	98	3	454	0	0	0
Future Volume (veh/h)	132	625	0	0	592	503	98	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	150	710	0	0	673	515	74	0	449			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	222	2287	0	0	1011	768	299	0	534			
Arrive On Green	0.14	1.00	0.00	0.00	0.57	0.57	0.18	0.00	0.18			
Sat Flow, veh/h	3191	3368	0	0	1864	1352	1645	0	2936			
Grp Volume(v), veh/h	150	710	0	0	621	567	74	0	449			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1489	1645	0	1468			
Q Serve(g_s), s	3.6	0.0	0.0	0.0	21.0	21.2	3.1	0.0	11.8			
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.0	21.0	21.2	3.1	0.0	11.8			
Prop In Lane	1.00		0.00	0.00		0.91	1.00		1.00			
Lane Grp Cap(c), veh/h	222	2287	0	0	933	846	299	0	534			
V/C Ratio(X)	0.67	0.31	0.00	0.00	0.67	0.67	0.25	0.00	0.84			
Avail Cap(c_a), veh/h	798	2287	0	0	933	846	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.83	0.83	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	33.6	0.0	0.0	0.0	12.0	12.0	28.0	0.0	31.6			
Incr Delay (d2), s/veh	1.1	0.3	0.0	0.0	3.7	4.2	0.2	0.0	4.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.1	0.0	0.0	10.5	9.7	1.4	0.0	5.2			
LnGrp Delay(d),s/veh	34.7	0.3	0.0	0.0	15.7	16.2	28.2	0.0	36.4			
LnGrp LOS	C	A			B	B	C		D			
Approach Vol, veh/h		860			1188			523				
Approach Delay, s/veh		6.3			16.0			35.2				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.9			10.3	50.6		19.1
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.2			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			5.6	23.2		13.8
Green Ext Time (p_c), s		9.0			0.2	2.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.7
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	6.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	22	19	0	36	8
Future Vol, veh/h	20	22	19	0	36	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	42	46	25	0	71	16

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	183	25	0	0	25	0
Stage 1	25	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	788	1029	-	-	1589	-
Stage 1	977	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	753	1029	-	-	1589	-
Mov Cap-2 Maneuver	753	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	851	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	753	1029	1589	-
HCM Lane V/C Ratio	-	-	0.055	0.045	0.044	-
HCM Control Delay (s)	-	-	10.1	8.7	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	1	34	54	55	337
Future Vol, veh/h	93	1	34	54	55	337
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	135	1	48	76	63	383

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	136	0	308	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	172	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1400	-	668	892
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1400	-	644	892
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	839	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	644	892	-	-	1400	-
HCM Lane V/C Ratio	0.097	0.429	-	-	0.034	-
HCM Control Delay (s)	11.2	12	-	-	7.7	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0.1	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	163	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	163	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.3	14.3		14.4	14.4		2.1	32.7		4.1	34.7
Effective Green, g (s)		14.3	14.3		14.4	14.4		2.1	32.7		4.1	34.7
Actuated g/C Ratio		0.15	0.15		0.15	0.15		0.02	0.35		0.04	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		252	496		253	234		37	1114		72	1223
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.65	0.38		0.36	0.67		0.38	0.67		0.49	0.09
Uniform Delay, d1		37.0	35.4		35.2	37.1		44.9	25.7		43.5	19.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.2	0.2		0.3	5.8		2.3	2.1		1.9	0.1
Delay (s)		41.3	35.6		35.5	42.9		47.2	27.8		45.3	19.0
Level of Service		D	D		D	D		D	C		D	B
Approach Delay (s)			38.2			40.2			28.1			23.4
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	51	10	10
Future Volume (vph)	51	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	58	11	11
RTOR Reduction (vph)	36	0	0
Lane Group Flow (vph)	22	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	34.7	2.1	2.1
Effective Green, g (s)	34.7	2.1	2.1
Actuated g/C Ratio	0.37	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	547	37	33
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.01		
v/c Ratio	0.04	0.30	0.33
Uniform Delay, d1	18.6	44.8	44.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.6	2.2
Delay (s)	18.7	46.4	47.0
Level of Service	B	D	D
Approach Delay (s)		46.7	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	0	0	0	2	265	33	19	180	2
Future Vol, veh/h	2	0	3	0	0	0	2	265	33	19	180	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	0	0	0	2	327	41	22	205	2

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	602	622	206			207	0	0	368	0	0
Stage 1	250	250	-			-	-	-	-	-	-
Stage 2	352	372	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	450	392	815			1318	-	-	1148	-	-
Stage 1	773	685	-			-	-	-	-	-	-
Stage 2	694	605	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	441	0	815			1318	-	-	1148	-	-
Mov Cap-2 Maneuver	441	0	-			-	-	-	-	-	-
Stage 1	757	0	-			-	-	-	-	-	-
Stage 2	694	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.1	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1318	-	-	609	1148	-	-
HCM Lane V/C Ratio	0.002	-	-	0.013	0.019	-	-
HCM Control Delay (s)	7.7	-	-	11	8.2	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	2	47	13	261	0	0	187	2
Future Vol, veh/h	0	0	0	76	2	47	13	261	0	0	187	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	85	2	53	17	348	0	0	220	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	631	603	221	603	604	348	222	0	-	-	-	0
Stage 1	221	221	-	382	382	-	-	-	-	-	-	-
Stage 2	410	382	-	221	222	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	382	403	799	399	402	677	1301	-	0	0	-	-
Stage 1	764	706	-	625	599	-	-	-	0	0	-	-
Stage 2	603	599	-	764	705	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	347	398	799	395	397	677	1301	-	-	-	-	-
Mov Cap-2 Maneuver	439	472	-	485	469	-	-	-	-	-	-	-
Stage 1	754	706	-	617	591	-	-	-	-	-	-	-
Stage 2	547	591	-	764	705	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.8	0.4	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1301	-	-	485	665	-	-
HCM Lane V/C Ratio	0.013	-	-	0.176	0.083	-	-
HCM Control Delay (s)	7.8	-	0	14	10.9	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	-	-

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Future Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	131	0	0	0	0	0	25	28
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	0%	0%
Vol Thru, %	88%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	71	43
LT Vol	5	0	0
Through Vol	35	71	20
RT Vol	0	0	23
Lane Flow Rate	50	87	53
Geometry Grp	7	7	2
Degree of Util (X)	0.067	0.115	0.06
Departure Headway (Hd)	4.825	4.763	4.087
Convergence, Y/N	Yes	Yes	Yes
Cap	743	753	882
Service Time	2.551	2.489	2.087
HCM Lane V/C Ratio	0.067	0.116	0.06
HCM Control Delay	7.9	8.1	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Future Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	32	6	9	179	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	277	417	79	164	598	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	402	2186	415	77	3133	52	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	30	0	22	102	0	89	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1504	0	1499	1699	0	1563	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.3	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.4	0.0	0.3	1.3	0.0	1.3	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.46		0.28	0.09		0.03	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	286	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.06	0.00	0.08	0.21	0.00	0.30	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1589	0	1487	1814	0	1550	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.2	0.0	0.6	0.2	0.0	0.1	0.0	0.0	0.3
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	0.2	0.0	0.1	0.7	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.8	0.0	8.8	9.3	0.0	9.7	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		52			191			198			151	
Approach Delay, s/veh		8.8			9.5			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.4		3.7		3.3
Green Ext Time (p_c), s		0.8		0.2		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	27	0	0	0	114	262	42	58	62	136
Future Vol, veh/h	16	27	27	0	0	0	114	262	42	58	62	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	39	0	0	0	123	282	45	71	76	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	852	874	159	242	0	0	327	0	0
Stage 1	301	301	-	-	-	-	-	-	-
Stage 2	551	573	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	320	280	866	1279	-	-	1189	-	-
Stage 1	733	651	-	-	-	-	-	-	-
Stage 2	562	491	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	272	0	866	1279	-	-	1189	-	-
Mov Cap-2 Maneuver	272	0	-	-	-	-	-	-	-
Stage 1	623	0	-	-	-	-	-	-	-
Stage 2	562	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	2.2	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	272	866	1189	-	-
HCM Lane V/C Ratio	0.096	-	-	0.226	0.045	0.059	-	-
HCM Control Delay (s)	8.1	-	-	22.1	9.4	8.2	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Future Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	130	27	0	0	0	0	0	0	22	14	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	7.9	7.8
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	62%
Vol Thru, %	100%	61%	38%
Vol Right, %	0%	39%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	70	57	26
LT Vol	0	0	16
Through Vol	70	35	10
RT Vol	0	22	0
Lane Flow Rate	86	70	36
Geometry Grp	7	7	2
Degree of Util (X)	0.114	0.087	0.046
Departure Headway (Hd)	4.733	4.463	4.565
Convergence, Y/N	Yes	Yes	Yes
Cap	757	803	789
Service Time	2.461	2.191	2.565
HCM Lane V/C Ratio	0.114	0.087	0.046
HCM Control Delay	8.1	7.6	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.3	0.1

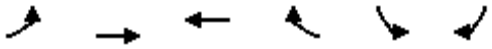
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	0	0	1	10	0	3	15	400	0	0	102	5
Future Vol, veh/h	0	0	1	10	0	3	15	400	0	0	102	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	500	0	0	152	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	696	694	156	696	697	500	159	0	-	-	-	0
Stage 1	156	156	-	538	538	-	-	-	-	-	-	-
Stage 2	540	538	-	158	159	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	346	356	869	346	355	555	1373	-	0	0	-	-
Stage 1	828	754	-	513	509	-	-	-	0	0	-	-
Stage 2	512	509	-	826	751	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	340	351	869	341	350	555	1373	-	-	-	-	-
Mov Cap-2 Maneuver	421	421	-	422	419	-	-	-	-	-	-	-
Stage 1	816	754	-	506	502	-	-	-	-	-	-	-
Stage 2	502	502	-	822	751	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	13.4	0.3	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1373	-	869	447	-	-
HCM Lane V/C Ratio	0.014	-	0.005	0.036	-	-
HCM Control Delay (s)	7.7	-	9.2	13.4	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	0.1	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	41	225	155	30	43
Future Volume (veh/h)	22	41	225	155	30	43
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	28	52	271	169	38	49
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	516	1090	653	394	215	192
Arrive On Green	0.33	0.33	0.33	0.33	0.13	0.13
Sat Flow, veh/h	875	3368	2052	1187	1645	1468
Grp Volume(v), veh/h	28	52	225	215	38	49
Grp Sat Flow(s),veh/h/ln	875	1641	1641	1511	1645	1468
Q Serve(g_s), s	0.6	0.2	2.4	2.5	0.5	0.7
Cycle Q Clear(g_c), s	3.1	0.2	2.4	2.5	0.5	0.7
Prop In Lane	1.00			0.79	1.00	1.00
Lane Grp Cap(c), veh/h	516	1090	545	502	215	192
V/C Ratio(X)	0.05	0.05	0.41	0.43	0.18	0.26
Avail Cap(c_a), veh/h	1283	3967	1984	1827	1915	1709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.0	5.1	5.8	5.8	8.6	8.7
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.6	0.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	1.1	1.1	0.2	0.3
LnGrp Delay(d),s/veh	7.0	5.1	6.3	6.4	9.0	9.4
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		80	440		87	
Approach Delay, s/veh		5.8	6.3		9.3	
Approach LOS		A	A		A	

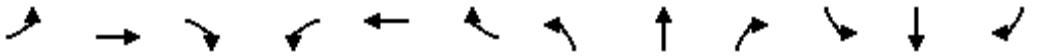
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.4				13.4		8.9
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		5.1				4.5		2.7
Green Ext Time (p_c), s		0.4				2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.7
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	110	14	155	436	9	185
Future Volume (vph)	110	14	155	436	9	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.98		1.00	1.00	0.87	
Flt Protected	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3226		1641	3282	1619	
Flt Permitted	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3226		1641	3282	1619	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	141	18	180	507	13	264
RTOR Reduction (vph)	10	0	0	0	0	0
Lane Group Flow (vph)	149	0	180	507	277	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	8.9		10.6	23.5	12.5	
Effective Green, g (s)	8.9		10.6	23.5	12.5	
Actuated g/C Ratio	0.20		0.23	0.52	0.28	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	635		384	1706	447	
v/s Ratio Prot	0.05		c0.11	c0.15	c0.17	
v/s Ratio Perm						
v/c Ratio	0.23		0.47	0.30	0.62	
Uniform Delay, d1	15.3		14.9	6.2	14.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.3	0.1	1.8	
Delay (s)	15.5		15.2	6.3	16.1	
Level of Service	B		B	A	B	
Approach Delay (s)	15.5			8.6	16.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	45.2	Sum of lost time (s)	17.7
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	275	2	32	547	479	4	6	15	234	1	20
Future Volume (vph)	28	275	2	32	547	479	4	6	15	234	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.93		1.00	0.89		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (prot)	1641	3278		1641	3052		1641	1543		1559	1537	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (perm)	1641	3278		1641	3052		1641	1543		1559	1537	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	28	278	2	34	588	515	6	9	22	334	1	29
RTOR Reduction (vph)	0	1	0	0	112	0	0	21	0	0	5	0
Lane Group Flow (vph)	28	279	0	34	991	0	6	10	0	184	175	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	2.5	36.2		3.3	37.0		3.4	3.4		16.8	16.8	
Effective Green, g (s)	2.5	36.2		3.3	37.0		3.4	3.4		16.8	16.8	
Actuated g/C Ratio	0.03	0.47		0.04	0.48		0.04	0.04		0.22	0.22	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	53	1543		70	1468		72	68		340	335	
v/s Ratio Prot	0.02	0.09		c0.02	c0.32		0.00	c0.01		c0.12	0.11	
v/s Ratio Perm												
v/c Ratio	0.53	0.18		0.49	0.68		0.08	0.15		0.54	0.52	
Uniform Delay, d1	36.6	11.8		36.0	15.3		35.3	35.4		26.6	26.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.1		1.9	1.3		0.5	1.0		1.8	1.5	
Delay (s)	40.9	11.8		37.9	16.6		35.8	36.4		28.4	28.0	
Level of Service	D	B		D	B		D	D		C	C	
Approach Delay (s)		14.5			17.3			36.3			28.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	17.2
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	422	140	263	662	0	0	0	0	384	1	405
Future Volume (veh/h)	0	422	140	263	662	0	0	0	0	384	1	405
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	502	0	302	761	0				432	0	379
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2140	957	396	2740	0				823	0	367
Arrive On Green	0.00	0.65	0.00	0.04	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	502	0	302	761	0				432	0	379
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.0	0.0	7.5	14.6	0.0				9.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	5.0	0.0	7.5	14.6	0.0				9.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2140	957	396	2740	0				823	0	367
V/C Ratio(X)	0.00	0.23	0.00	0.76	0.28	0.00				0.53	0.00	1.03
Avail Cap(c_a), veh/h	0	2140	957	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.00	0.37	0.37	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.7	0.0	37.2	10.1	0.0				25.9	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.4	0.1	0.0				0.3	0.0	55.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	0.0	3.3	6.6	0.0				4.1	0.0	13.7
LnGrp Delay(d),s/veh	0.0	6.0	0.0	37.6	10.1	0.0				26.2	0.0	85.6
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		502			1063						811	
Approach Delay, s/veh		6.0			18.0						54.0	
Approach LOS		A			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	57.8		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.5	7.0		22.0		16.6		
Green Ext Time (p_c), s	0.4	5.5		0.0		11.6		

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	337	464	0	0	476	378	453	254	564	0	0	0
Future Volume (veh/h)	337	464	0	0	476	378	453	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	383	527	0	0	541	388	434	459	434			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	460	2063	0	0	778	558	411	432	367			
Arrive On Green	0.29	1.00	0.00	0.00	0.43	0.43	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1913	1310	1645	1727	1468			
Grp Volume(v), veh/h	383	527	0	0	486	443	434	459	434			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1496	1645	1727	1468			
Q Serve(g_s), s	9.0	0.0	0.0	0.0	19.3	19.3	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	9.0	0.0	0.0	0.0	19.3	19.3	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.88	1.00		1.00			
Lane Grp Cap(c), veh/h	460	2063	0	0	699	637	411	432	367			
V/C Ratio(X)	0.83	0.26	0.00	0.00	0.70	0.70	1.06	1.06	1.18			
Avail Cap(c_a), veh/h	798	2063	0	0	699	637	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.5	0.0	0.0	0.0	18.7	18.7	30.0	30.0	30.0			
Incr Delay (d2), s/veh	1.4	0.3	0.0	0.0	5.7	6.2	59.7	61.0	106.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	0.1	0.0	0.0	9.7	9.0	15.8	16.8	18.9			
LnGrp Delay(d),s/veh	28.9	0.3	0.0	0.0	24.4	24.9	89.7	91.0	136.6			
LnGrp LOS	C	A			C	C	F	F	F			
Approach Vol, veh/h		910			929			1327				
Approach Delay, s/veh		12.3			24.6			105.5				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.2	39.2		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.0	21.3		22.0
Green Ext Time (p_c), s		8.1			0.6	3.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.4
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	171	5	0	132	10
Future Vol, veh/h	0	171	0	0	132	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	0	255	0	0	186	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	372	0	0	0	0	0
Stage 1	0	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	613	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	613	-	-	-	-	-
Mov Cap-2 Maneuver	613	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		0	
HCM LOS	-		

Minor Lane/Major Mvmt		NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-		568	-	-	-
HCM Lane V/C Ratio		-		0.032	-	-	-
HCM Control Delay (s)		-	-	12.6	-	-	-
HCM Lane LOS		-	-	B	-	-	-
HCM 95th %tile Q(veh)		-	-	-	-	-	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	121	4	259	33	5	123
Future Volume (Veh/h)	121	4	259	33	5	123
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.69	0.69	0.78	0.78
Hourly flow rate (vph)	205	7	375	48	6	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				177		
pX, platoon unblocked						
vC, conflicting volume			212		1006	208
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			212		1006	208
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			71		97	81
cM capacity (veh/h)			1312		184	812

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	212	423	6	158
Volume Left	0	375	6	0
Volume Right	7	0	0	158
cSH	1700	1312	184	812
Volume to Capacity	0.12	0.29	0.03	0.19
Queue Length 95th (ft)	0	30	3	18
Control Delay (s)	0.0	8.1	25.2	10.5
Lane LOS		A	D	B
Approach Delay (s)	0.0	8.1	11.0	
Approach LOS			B	

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	121	4	259	33	5	123
Future Vol, veh/h	121	4	259	33	5	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	205	7	375	48	6	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	1007	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	798	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1312	-	258	812
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	182	812
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.8	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	812	-	-	1312	-
HCM Lane V/C Ratio	0.035	0.194	-	-	0.286	-
HCM Control Delay (s)	25.5	10.5	-	-	8.8	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.7	-	-	1.2	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	221	0	151	24	0	15	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Effective Green, g (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Actuated g/C Ratio		0.13	0.13		0.15	0.15		0.01	0.30		0.10	0.38
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		207	398		245	235		19	911		160	1249
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.55		0.62	0.10		0.79	0.24		0.58	0.87
Uniform Delay, d1		32.6	34.1		33.1	30.5		40.9	22.2		35.8	23.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		3.2	0.1		102.4	0.3		3.4	7.5
Delay (s)		32.8	35.0		36.3	30.6		143.3	22.5		39.3	31.3
Level of Service		C	D		D	C		F	C		D	C
Approach Delay (s)			34.7			35.5			30.3			29.3
Approach LOS			C			D			C			C

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	267	10	10
Future Volume (vph)	267	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	303	11	11
RTOR Reduction (vph)	97	0	0
Lane Group Flow (vph)	206	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	31.6	2.0	2.0
Effective Green, g (s)	31.6	2.0	2.0
Actuated g/C Ratio	0.38	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	558	39	35
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.14		
v/c Ratio	0.37	0.28	0.31
Uniform Delay, d1	18.5	39.8	39.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4	1.9
Delay (s)	19.4	41.2	41.7
Level of Service	B	D	D
Approach Delay (s)		41.5	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Future Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	0	0	0	0	105	32	21	374	1

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	538	554	375			375	0	0	137	0	0
Stage 1	417	417	-			-	-	-	-	-	-
Stage 2	121	137	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	491	430	654			1141	-	-	1399	-	-
Stage 1	648	578	-			-	-	-	-	-	-
Stage 2	885	768	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	484	0	654			1141	-	-	1399	-	-
Mov Cap-2 Maneuver	484	0	-			-	-	-	-	-	-
Stage 1	638	0	-			-	-	-	-	-	-
Stage 2	885	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	1399	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.015	-	-
HCM Control Delay (s)	0	-	-	10.6	7.6	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Future Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	63	1	48	4	59	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	451	384	457	452	59	385	0	-	-	-	0
Stage 1	384	384	-	67	67	-	-	-	-	-	-	-
Stage 2	92	67	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	486	492	646	501	491	985	1131	-	0	0	-	-
Stage 1	623	598	-	924	824	-	-	-	0	0	-	-
Stage 2	896	824	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	460	490	646	489	489	985	1131	-	-	-	-	-
Mov Cap-2 Maneuver	524	522	-	528	519	-	-	-	-	-	-	-
Stage 1	621	598	-	920	821	-	-	-	-	-	-	-
Stage 2	848	821	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11	0.5	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	617	528	965	-	-
HCM Lane V/C Ratio	0.003	-	0.026	0.119	0.051	-	-
HCM Control Delay (s)	8.2	-	11	12.7	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.4	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Future Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	101	0	0	0	0	0	40	44
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.4
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	0%
Vol Thru, %	81%	100%	48%
Vol Right, %	0%	0%	52%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	32	52	63
LT Vol	6	0	0
Through Vol	26	52	30
RT Vol	0	0	33
Lane Flow Rate	42	68	84
Geometry Grp	7	7	2
Degree of Util (X)	0.057	0.09	0.092
Departure Headway (Hd)	4.912	4.818	3.939
Convergence, Y/N	Yes	Yes	Yes
Cap	729	743	895
Service Time	2.646	2.552	2.031
HCM Lane V/C Ratio	0.058	0.092	0.094
HCM Control Delay	7.9	8	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Future Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	106	26	7	12	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	337	483	120	373	448	115	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	440	2098	521	515	1945	500	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	101	0	74	13	0	9	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1579	0	1480	1476	0	1484	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.9	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.9	0.1	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.43		0.35	0.53		0.34	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	600	0	341	594	0	341	577	0	352	584	0	372
V/C Ratio(X)	0.17	0.00	0.22	0.02	0.00	0.03	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2060	0	1771	1919	0	1776	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.8	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	7.0	0.0	7.1	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		175			22			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.1
Green Ext Time (p_c), s		0.1		0.9		0.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Future Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	139	0	0	0	19	37	57	121	314	30

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	675	703	329	344	0	0	94	0	0
Stage 1	571	571	-	-	-	-	-	-	-
Stage 2	104	132	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	407	352	694	1172	-	-	1451	-	-
Stage 1	550	492	-	-	-	-	-	-	-
Stage 2	901	772	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	367	0	694	1172	-	-	1451	-	-
Mov Cap-2 Maneuver	367	0	-	-	-	-	-	-	-
Stage 1	496	0	-	-	-	-	-	-	-
Stage 2	901	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	1.4	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	367	694	1451	-	-
HCM Lane V/C Ratio	0.016	-	-	0.49	0.2	0.083	-	-
HCM Control Delay (s)	8.1	-	-	23.9	11.5	7.7	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	0.7	0.3	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Future Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	338	14	0	0	0	0	0	0	40	16	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	9.2	8.4
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	72%
Vol Thru, %	100%	89%	28%
Vol Right, %	0%	11%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	98	39
LT Vol	0	0	28
Through Vol	173	87	11
RT Vol	0	11	0
Lane Flow Rate	225	127	56
Geometry Grp	7	7	2
Degree of Util (X)	0.298	0.165	0.078
Departure Headway (Hd)	4.769	4.69	5.018
Convergence, Y/N	Yes	Yes	Yes
Cap	750	761	718
Service Time	2.524	2.445	3.018
HCM Lane V/C Ratio	0.3	0.167	0.078
HCM Control Delay	9.6	8.4	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	0.6	0.3

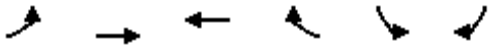
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Future Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	123	0	0	458	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	592	592	459	602	593	123	460	0	-	-	-	0
Stage 1	459	459	-	133	133	-	-	-	-	-	-	-
Stage 2	133	133	-	469	460	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	406	408	586	400	408	907	1060	-	0	0	-	-
Stage 1	567	553	-	852	771	-	-	-	0	0	-	-
Stage 2	852	771	-	560	553	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	404	406	586	386	406	907	1060	-	-	-	-	-
Mov Cap-2 Maneuver	476	466	-	456	464	-	-	-	-	-	-	-
Stage 1	564	553	-	848	767	-	-	-	-	-	-	-
Stage 2	848	767	-	542	553	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	13.6	0.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1060	-	561	456	-	-
HCM Lane V/C Ratio	0.005	-	0.043	0.079	-	-
HCM Control Delay (s)	8.4	-	11.7	13.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	241	58	25	67	5
Future Volume (veh/h)	20	241	58	25	67	5
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	25	305	70	28	85	6
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	682	1045	741	281	223	199
Arrive On Green	0.32	0.32	0.32	0.32	0.14	0.14
Sat Flow, veh/h	1198	3368	2415	884	1645	1468
Grp Volume(v), veh/h	25	305	48	50	85	6
Grp Sat Flow(s),veh/h/ln	1198	1641	1641	1571	1645	1468
Q Serve(g_s), s	0.3	1.5	0.5	0.5	1.0	0.1
Cycle Q Clear(g_c), s	0.8	1.5	0.5	0.5	1.0	0.1
Prop In Lane	1.00			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	682	1045	522	500	223	199
V/C Ratio(X)	0.04	0.29	0.09	0.10	0.38	0.03
Avail Cap(c_a), veh/h	1772	4031	2015	1930	1945	1736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.6	5.6	5.3	5.3	8.7	8.2
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.1	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.7	0.2	0.2	0.5	0.0
LnGrp Delay(d),s/veh	5.6	5.8	5.3	5.4	9.7	8.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		330	98		91	
Approach Delay, s/veh		5.8	5.3		9.6	
Approach LOS		A	A		A	

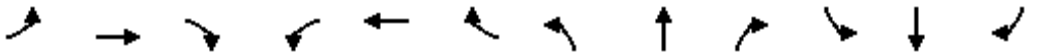
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.0				13.0		9.0
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		3.5				2.5		3.0
Green Ext Time (p_c), s		2.1				0.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	381	15	346	92	3	155
Future Volume (vph)	381	15	346	92	3	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.87	
Flt Protected	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3263		1641	3282	1618	
Flt Permitted	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3263		1641	3282	1618	
Peak-hour factor, PHF	0.78	0.78	0.92	0.92	0.54	1.00
Adj. Flow (vph)	488	19	376	100	6	155
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	504	0	376	100	161	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	13.4		10.6	28.0	7.4	
Effective Green, g (s)	13.4		10.6	28.0	7.4	
Actuated g/C Ratio	0.30		0.24	0.63	0.17	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	980		390	2060	268	
v/s Ratio Prot	c0.15		c0.23	0.03	c0.10	
v/s Ratio Perm						
v/c Ratio	0.51		0.96	0.05	0.60	
Uniform Delay, d1	12.9		16.8	3.2	17.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		35.8	0.0	2.6	
Delay (s)	13.4		52.6	3.2	19.8	
Level of Service	B		D	A	B	
Approach Delay (s)	13.4			42.2	19.8	
Approach LOS	B			D	B	

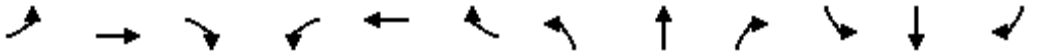
Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	44.6	Sum of lost time (s)	17.7
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	495	4	70	435	321	0	1	36	586	11	23
Future Volume (vph)	22	495	4	70	435	321	0	1	36	586	11	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.85		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3278		1641	3073			1474		1559	1554	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3278		1641	3073			1474		1559	1554	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	27	604	5	78	483	357	0	1	47	689	13	27
RTOR Reduction (vph)	0	1	0	0	111	0	0	45	0	0	3	0
Lane Group Flow (vph)	27	608	0	78	729	0	0	3	0	365	361	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	1.8	24.4		5.6	28.2			3.4		24.0	24.0	
Effective Green, g (s)	1.8	24.4		5.6	28.2			3.4		24.0	24.0	
Actuated g/C Ratio	0.02	0.33		0.08	0.38			0.05		0.32	0.32	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	39	1072		123	1161			67		501	499	
v/s Ratio Prot	0.02	0.19		c0.05	c0.24			c0.00		c0.23	0.23	
v/s Ratio Perm												
v/c Ratio	0.69	0.57		0.63	0.63			0.05		0.73	0.72	
Uniform Delay, d1	36.1	20.7		33.5	18.9			34.1		22.4	22.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	35.0	0.8		7.6	1.1			0.3		5.3	5.2	
Delay (s)	71.1	21.5		41.1	20.0			34.3		27.7	27.5	
Level of Service	E	C		D	C			C		C	C	
Approach Delay (s)		23.6			21.8			34.3			27.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Future Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	670	0	601	294	0				567	0	494
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1833	820	695	2740	0				823	0	367
Arrive On Green	0.00	0.56	0.00	0.07	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	670	0	601	294	0				567	0	494
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1833	820	695	2740	0				823	0	367
V/C Ratio(X)	0.00	0.37	0.00	0.87	0.11	0.00				0.69	0.00	1.35
Avail Cap(c_a), veh/h	0	1833	820	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.74	0.00	0.49	0.49	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	36.0	6.7	0.0				27.2	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	4.1	0.0	0.0				2.1	0.0	172.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0	7.0	2.4	0.0				5.9	0.0	25.7
LnGrp Delay(d),s/veh	0.0	10.2	0.0	40.1	6.8	0.0				29.2	0.0	202.8
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		670			895						1061	
Approach Delay, s/veh		10.2			29.1						110.1	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.1	50.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.9	11.1		22.0		7.4		
Green Ext Time (p_c), s	0.5	6.3		0.0		4.1		

Intersection Summary	
HCM 2010 Ctrl Delay	57.0
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Future Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	448	748	0	0	732	515	108	0	467			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	523	2266	0	0	866	604	310	0	553			
Arrive On Green	0.33	1.00	0.00	0.00	0.47	0.47	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1937	1290	1645	0	2936			
Grp Volume(v), veh/h	448	748	0	0	648	599	108	0	467			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1500	1645	0	1468			
Q Serve(g_s), s	10.5	0.0	0.0	0.0	27.8	28.3	4.6	0.0	12.3			
Cycle Q Clear(g_c), s	10.5	0.0	0.0	0.0	27.8	28.3	4.6	0.0	12.3			
Prop In Lane	1.00		0.00	0.00		0.86	1.00		1.00			
Lane Grp Cap(c), veh/h	523	2266	0	0	768	702	310	0	553			
V/C Ratio(X)	0.86	0.33	0.00	0.00	0.84	0.85	0.35	0.00	0.85			
Avail Cap(c_a), veh/h	798	2266	0	0	768	702	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.73	0.73	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.0	0.0	0.0	0.0	18.7	18.9	28.2	0.0	31.3			
Incr Delay (d2), s/veh	2.8	0.3	0.0	0.0	11.0	12.5	0.2	0.0	5.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	14.8	14.1	2.1	0.0	5.4			
LnGrp Delay(d),s/veh	28.8	0.3	0.0	0.0	29.7	31.4	28.5	0.0	36.8			
LnGrp LOS	C	A			C	C	C		D			
Approach Vol, veh/h		1196			1247			575				
Approach Delay, s/veh		11.0			30.5			35.2				
Approach LOS		B			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.3			17.8	42.5		19.7
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.5	30.3		14.3
Green Ext Time (p_c), s		12.5			0.6	0.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	9.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	124	9	0	341	10
Future Vol, veh/h	10	124	9	0	341	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	21	258	12	0	669	20

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1370	12	0	0	12	0
Stage 1	12	-	-	-	-	-
Stage 2	1358	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	155	1046	-	-	1607	-
Stage 1	990	-	-	-	-	-
Stage 2	230	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	91	1046	-	-	1607	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	230	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	8.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	91	1046	1607	-
HCM Lane V/C Ratio	-	-	0.004	0.247	0.416	-
HCM Control Delay (s)	-	-	5.6	10.6	8.8	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	0.8	1	2.1	-

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	160	1	118	350	0	55	0	336	0	0	0
Future Vol, veh/h	0	160	1	118	350	0	55	0	336	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	71	71	71	92	92	92	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	174	1	166	493	0	60	0	365	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	175	0	0	1000	-	175	-	1000	493
Stage 1	-	-	-	-	-	-	175	-	-	-	825	-
Stage 2	-	-	-	-	-	-	825	-	-	-	175	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1354	-	0	214	0	848	0	235	560
Stage 1	0	-	-	-	-	0	808	0	-	0	376	-
Stage 2	0	-	-	-	-	0	355	0	-	0	739	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1354	-	-	186	-	848	-	195	560
Mov Cap-2 Maneuver	-	-	-	-	-	-	186	-	-	-	195	-
Stage 1	-	-	-	-	-	-	808	-	-	-	312	-
Stage 2	-	-	-	-	-	-	295	-	-	-	739	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2	15.3	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	186	848	-	-	1354	-	-
HCM Lane V/C Ratio	0.321	0.431	-	-	0.123	-	-
HCM Control Delay (s)	33.3	12.4	-	-	8	0	0
HCM Lane LOS	D	B	-	-	A	A	A
HCM 95th %tile Q(veh)	1.3	2.2	-	-	0.4	-	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	170	0	183	16	64	19	91	393	516	145	31	99
Future Volume (vph)	170	0	183	16	64	19	91	393	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3242		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3242		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	198	0	213	19	91	27	130	447	586	165	35	112
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	198	228	0	91	157	0	447	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		17.6	17.6		14.6	14.6		20.7	33.0		4.2	16.5
Effective Green, g (s)		17.6	17.6		14.6	14.6		20.7	33.0		4.2	16.5
Actuated g/C Ratio		0.18	0.18		0.15	0.15		0.21	0.34		0.04	0.17
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		297	587		246	227		349	1078		70	557
v/s Ratio Prot		c0.12	0.07		0.06	c0.10		c0.27	c0.24		0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.67	0.39		0.37	0.69		1.28	0.70		0.50	0.20
Uniform Delay, d1		37.0	35.0		37.1	39.1		38.2	27.7		45.4	34.6
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.3	0.2		0.3	7.1		146.6	2.5		2.0	0.4
Delay (s)		41.4	35.2		37.5	46.3		184.8	30.2		47.5	35.0
Level of Service		D	D		D	D		F	C		D	D
Approach Delay (s)			38.0			43.0			87.9			38.0
Approach LOS			D			D			F			D

Intersection Summary			
HCM 2000 Control Delay	68.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	2.2	2.2
Effective Green, g (s)	2.2	2.2
Actuated g/C Ratio	0.02	0.02
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	37	33
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.30	0.33
Uniform Delay, d1	46.7	46.7
Progression Factor	1.00	1.00
Incremental Delay, d2	1.6	2.2
Delay (s)	48.3	48.9
Level of Service	D	D
Approach Delay (s)	48.6	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	2	0	3	2	0	12	2	238	6	19	264	2
Future Vol, veh/h	2	0	3	2	0	12	2	238	6	19	264	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	5	0	27	2	294	7	22	300	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	660	650	301	650	648	298	302	0	0	301	0	0
Stage 1	345	345	-	302	302	-	-	-	-	-	-	-
Stage 2	315	305	-	348	346	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	366	378	720	371	379	723	1215	-	-	1216	-	-
Stage 1	654	622	-	690	650	-	-	-	-	-	-	-
Stage 2	679	648	-	652	621	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	347	370	720	363	371	723	1215	-	-	1216	-	-
Mov Cap-2 Maneuver	347	370	-	363	371	-	-	-	-	-	-	-
Stage 1	653	611	-	689	649	-	-	-	-	-	-	-
Stage 2	652	647	-	636	610	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	11	0.1	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1215	-	-	504	633	1216	-	-
HCM Lane V/C Ratio	0.002	-	-	0.016	0.05	0.018	-	-
HCM Control Delay (s)	8	-	-	12.3	11	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Future Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	74	2	19	5	316	0	0	219	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	557	546	220	546	547	316	221	0	-	-	-	0
Stage 1	220	220	-	326	326	-	-	-	-	-	-	-
Stage 2	337	326	-	220	221	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	429	434	800	436	434	706	1302	-	0	0	-	-
Stage 1	765	706	-	670	634	-	-	-	0	0	-	-
Stage 2	661	634	-	765	706	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	415	432	800	435	432	706	1302	-	-	-	-	-
Mov Cap-2 Maneuver	503	500	-	521	499	-	-	-	-	-	-	-
Stage 1	762	706	-	667	631	-	-	-	-	-	-	-
Stage 2	638	631	-	765	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.5	0.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1302	-	-	521	676	-	-
HCM Lane V/C Ratio	0.004	-	-	0.142	0.032	-	-
HCM Control Delay (s)	7.8	-	0	13.1	10.5	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Future Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	99	22	13	10	0	0	25	11

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	74	133	-	-	122	61
Stage 1	-	-	-	0	0	-	-	122	-
Stage 2	-	-	-	74	133	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	886	739	0	0	749	966
Stage 1	-	-	-	-	-	0	0	775	-
Stage 2	-	-	-	904	767	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	854	739	-	-	749	966
Mov Cap-2 Maneuver	-	-	-	854	739	-	-	749	-
Stage 1	-	-	-	-	-	-	-	775	-
Stage 2	-	-	-	865	767	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	-	-	-	805
HCM Lane V/C Ratio	0.03	-	-	-	0.044
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	4	8	156	3	98	107	32	4	43	65
Future Volume (veh/h)	10	15	4	8	156	3	98	107	32	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	21	6	9	171	3	124	135	40	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	316	340	101	163	587	10	611	464	137	591	239	329
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	552	1812	539	80	3126	55	1148	1281	379	1117	659	908
Grp Volume(v), veh/h	25	0	16	98	0	85	124	0	175	6	0	145
Grp Sat Flow(s),veh/h/ln	1427	0	1477	1699	0	1562	1148	0	1660	1117	0	1567
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	1.3	2.3	0.0	2.0	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.3	0.0	0.2	1.3	0.0	1.3	4.0	0.0	2.0	2.1	0.0	1.7
Prop In Lane	0.57		0.37	0.09		0.04	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	480	0	277	466	0	293	611	0	601	591	0	567
V/C Ratio(X)	0.05	0.00	0.06	0.21	0.00	0.29	0.20	0.00	0.29	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1519	0	1441	1785	0	1524	1574	0	1994	1528	0	1882
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.9	0.0	8.9	9.3	0.0	9.3	7.4	0.0	6.1	6.8	0.0	6.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	0.5	0.2	0.0	0.3	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.6	0.0	0.6	0.7	0.0	0.9	0.0	0.0	0.8
LnGrp Delay(d),s/veh	9.0	0.0	9.0	9.5	0.0	9.8	7.5	0.0	6.3	6.8	0.0	6.2
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		41			183			299			151	
Approach Delay, s/veh		9.0			9.7			6.8			6.2	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.6		11.0		15.6		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.3		4.1		3.3
Green Ext Time (p_c), s		1.5		0.1		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Future Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	27	0	0	0	115	246	17	70	65	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	773	781	148	231	0	0	263	0	0
Stage 1	288	288	-	-	-	-	-	-	-
Stage 2	485	493	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	356	317	878	1291	-	-	1256	-	-
Stage 1	743	659	-	-	-	-	-	-	-
Stage 2	603	534	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	306	0	878	1291	-	-	1256	-	-
Mov Cap-2 Maneuver	306	0	-	-	-	-	-	-	-
Stage 1	639	0	-	-	-	-	-	-	-
Stage 2	603	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	2.5	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	306	878	1256	-	-
HCM Lane V/C Ratio	0.089	-	-	0.201	0.031	0.055	-	-
HCM Control Delay (s)	8.1	-	-	19.7	9.2	8	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	109	10	0	0	0	0	7	7	16	10	0
Future Vol, veh/h	9	109	10	0	0	0	0	7	7	16	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	11	135	12	0	0	0	0	12	12	22	14	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	163	74	96	169	-
Stage 1	-	-	-			-	163	-	0	0	-
Stage 2	-	-	-			-	0	-	96	169	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	710	947	854	705	0
Stage 1	-	-	-			0	743	-	-	-	0
Stage 2	-	-	-			0	-	-	877	739	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	710	947	832	705	-
Mov Cap-2 Maneuver	-	-	-			-	710	-	832	705	-
Stage 1	-	-	-			-	743	-	-	-	-
Stage 2	-	-	-			-	-	-	852	739	-

Approach	EB	NB	SB
HCM Control Delay, s		9.6	9.9
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	812	-	-	-	778
HCM Lane V/C Ratio	0.03	-	-	-	0.046
HCM Control Delay (s)	9.6	-	-	-	9.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

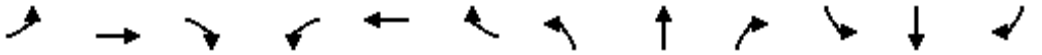
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	0	18	1	10	0	3	15	343	12	1	85	5
Future Vol, veh/h	0	18	1	10	0	3	15	343	12	1	85	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	72	4	12	0	4	19	429	15	1	127	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	610	615	131	646	611	437	134	0	0	444	0	0
Stage 1	133	133	-	475	475	-	-	-	-	-	-	-
Stage 2	477	482	-	171	136	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	395	396	898	374	398	603	1403	-	-	1075	-	-
Stage 1	852	771	-	556	544	-	-	-	-	-	-	-
Stage 2	554	540	-	812	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	388	390	898	316	392	603	1403	-	-	1075	-	-
Mov Cap-2 Maneuver	388	390	-	316	392	-	-	-	-	-	-	-
Stage 1	840	770	-	548	536	-	-	-	-	-	-	-
Stage 2	543	532	-	732	768	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	15.6	0.3	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	402	355	1075	-	-
HCM Lane V/C Ratio	0.013	-	-	0.189	0.045	0.001	-	-
HCM Control Delay (s)	7.6	-	-	16	15.6	8.4	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	14	2	32	45	272	4	6	15	46	1	6
Future Volume (veh/h)	19	14	2	32	45	272	4	6	15	46	1	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	19	14	2	34	48	263	6	9	21	74	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	32	1213	166	54	497	444	57	16	37	203	106	0
Arrive On Green	0.02	0.29	0.29	0.03	0.30	0.30	0.03	0.03	0.03	0.06	0.00	0.00
Sat Flow, veh/h	1645	4196	574	1645	1641	1468	1645	461	1076	3290	1727	0
Grp Volume(v), veh/h	19	10	6	34	48	263	6	0	30	74	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1626	1645	1641	1468	1645	0	1537	1645	1727	0
Q Serve(g_s), s	0.3	0.1	0.1	0.6	0.6	4.5	0.1	0.0	0.6	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.1	0.1	0.6	0.6	4.5	0.1	0.0	0.6	0.6	0.0	0.0
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	32	909	470	54	497	444	57	0	53	203	106	0
V/C Ratio(X)	0.59	0.01	0.01	0.63	0.10	0.59	0.11	0.00	0.56	0.37	0.00	0.00
Avail Cap(c_a), veh/h	300	3200	1655	356	1726	1544	1018	0	951	3671	1927	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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.4	7.5	7.5	14.1	7.4	8.8	13.8	0.0	14.1	13.3	0.0	0.0
Incr Delay (d2), s/veh	6.3	0.0	0.0	4.4	0.1	1.5	0.8	0.0	9.0	1.1	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	0.2	0.0	0.0	0.3	0.3	1.9	0.1	0.0	0.4	0.3	0.0	0.0
LnGrp Delay(d),s/veh	20.7	7.5	7.5	18.5	7.5	10.3	14.6	0.0	23.1	14.4	0.0	0.0
LnGrp LOS	C	A	A	B	A	B	B		C	B		
Approach Vol, veh/h		35			345			36			74	
Approach Delay, s/veh		14.6			10.7			21.7			14.4	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	13.2		6.0	4.8	13.5		5.2
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.4	30.1		* 33	* 5.4	31.1		18.3
Max Q Clear Time (g_c+I1), s	2.6	2.1		2.6	2.3	6.5		2.6
Green Ext Time (p_c), s	0.0	0.0		0.2	0.0	2.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	83	37	263	209	0	0	0	0	384	1	149
Future Volume (veh/h)	0	83	37	263	209	0	0	0	0	384	1	149
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	99	0	302	240	0				432	0	21
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1748	782	387	2339	0				526	0	235
Arrive On Green	0.00	0.53	0.00	0.16	0.95	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	99	0	302	240	0				432	0	21
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	1.2	0.0	7.3	0.3	0.0				10.2	0.0	1.0
Cycle Q Clear(g_c), s	0.0	1.2	0.0	7.3	0.3	0.0				10.2	0.0	1.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1748	782	387	2339	0				526	0	235
V/C Ratio(X)	0.00	0.06	0.00	0.78	0.10	0.00				0.82	0.00	0.09
Avail Cap(c_a), veh/h	0	1748	782	798	2339	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.0	0.0	32.5	0.6	0.0				32.5	0.0	28.6
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.1	0.1	0.0				1.9	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	3.2	0.2	0.0				4.8	0.0	0.4
LnGrp Delay(d),s/veh	0.0	9.1	0.0	33.6	0.7	0.0				34.4	0.0	28.7
LnGrp LOS		A		C	A					C		C
Approach Vol, veh/h		99			542						453	
Approach Delay, s/veh		9.1			19.0						34.2	
Approach LOS		A			B						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.4	47.7		17.9		62.1		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.3	3.2		12.2		2.3		
Green Ext Time (p_c), s	0.5	0.9		0.6		3.3		

Intersection Summary	
HCM 2010 Ctrl Delay	24.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	395	0	0	434	378	42	254	564	0	0	0
Future Volume (veh/h)	62	395	0	0	434	378	42	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	70	449	0	0	493	388	47	343	347			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	157	2063	0	0	911	716	411	432	367			
Arrive On Green	0.10	1.00	0.00	0.00	0.52	0.52	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1836	1376	1645	1727	1468			
Grp Volume(v), veh/h	70	449	0	0	462	419	47	343	347			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1485	1645	1727	1468			
Q Serve(g_s), s	1.7	0.0	0.0	0.0	15.0	15.1	1.8	14.9	18.6			
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	15.0	15.1	1.8	14.9	18.6			
Prop In Lane	1.00		0.00	0.00		0.93	1.00		1.00			
Lane Grp Cap(c), veh/h	157	2063	0	0	854	773	411	432	367			
V/C Ratio(X)	0.44	0.22	0.00	0.00	0.54	0.54	0.11	0.79	0.95			
Avail Cap(c_a), veh/h	798	2063	0	0	854	773	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.85	0.85	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	35.0	0.0	0.0	0.0	12.8	12.8	23.2	28.1	29.5			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	2.5	2.7	0.0	9.1	32.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	0.1	0.0	0.0	7.4	6.7	0.8	8.1	10.9			
LnGrp Delay(d),s/veh	35.6	0.2	0.0	0.0	15.2	15.5	23.2	37.2	62.2			
LnGrp LOS	D	A			B	B	C	D	E			
Approach Vol, veh/h		519			881			737				
Approach Delay, s/veh		5.0			15.4			48.1				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			8.6	46.8		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			3.7	17.1		20.6
Green Ext Time (p_c), s		6.7			0.1	5.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	25	0	0	19	5
Future Vol, veh/h	0	25	0	0	19	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	0	37	0	0	27	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	54	0	0	0	0	0
Stage 1	0	-	-	-	-	-
Stage 2	54	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	934	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	948	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	934	-	-	-	-	-
Mov Cap-2 Maneuver	934	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	948	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		0	
HCM LOS	-		

Minor Lane/Major Mvmt		NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-		1398	-	-	-
HCM Lane V/C Ratio		-		0.013	-	-	-
HCM Control Delay (s)		-	-	9.1	-	-	-
HCM Lane LOS		-	-	A	-	-	-
HCM 95th %tile Q(veh)		-	-	-	-	-	-

Intersection	
Int Delay, s/veh	35.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	495	4	15	58	0	29	0	123	0	244	23
Future Vol, veh/h	0	495	4	15	58	0	29	0	123	0	244	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	839	7	22	84	0	37	0	158	0	280	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	846	0	0	1124	-	843	-	974	84
Stage 1	-	-	-	-	-	-	843	-	-	-	128	-
Stage 2	-	-	-	-	-	-	281	-	-	-	846	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	758	-	0	176	0	352	0	~ 244	954
Stage 1	0	-	-	-	-	0	347	0	-	0	775	-
Stage 2	0	-	-	-	-	0	709	0	-	0	367	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	758	-	-	-	-	352	-	~ 237	954
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	~ 237	-
Stage 1	-	-	-	-	-	-	347	-	-	-	752	-
Stage 2	-	-	-	-	-	-	419	-	-	-	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2		167.5
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	352	-	-	758	-	253
HCM Lane V/C Ratio	-	0.448	-	-	0.029	-	1.213
HCM Control Delay (s)	-	23.3	-	-	9.9	0	167.5
HCM Lane LOS	-	C	-	-	A	A	F
HCM 95th %tile Q(veh)	-	2.2	-	-	0.1	-	14.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	308	278	106	13	10	55	116	75	82	957
Future Volume (vph)	40	0	308	278	106	13	10	55	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.93		1.00	0.94		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3048		1641	1617		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3048		1641	1617		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	358	323	151	19	14	62	132	85	93	1088
RTOR Reduction (vph)	0	0	99	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	582	0	151	33	0	63	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		20.5	20.5		13.5	13.5		7.1	29.4		8.5	30.8
Effective Green, g (s)		20.5	20.5		13.5	13.5		7.1	29.4		8.5	30.8
Actuated g/C Ratio		0.21	0.21		0.14	0.14		0.07	0.30		0.09	0.31
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		337	627		222	219		116	911		140	1014
v/s Ratio Prot		0.03	c0.19		c0.09	0.02		0.04	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.14	0.93		0.68	0.15		0.54	0.24		0.66	1.07
Uniform Delay, d1		32.3	38.8		41.0	38.0		44.7	26.6		44.2	34.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.1	19.7		6.7	0.1		2.8	0.3		8.8	50.0
Delay (s)		32.4	58.5		47.7	38.1		47.4	26.9		53.0	84.4
Level of Service		C	E		D	D		D	C		D	F
Approach Delay (s)			56.8			45.9			31.5			81.9
Approach LOS			E			D			C			F

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	25.5
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	2.2	2.2
Effective Green, g (s)	2.2	2.2
Actuated g/C Ratio	0.02	0.02
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	36	32
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.31	0.34
Uniform Delay, d1	47.9	48.0
Progression Factor	1.00	1.00
Incremental Delay, d2	1.8	2.3
Delay (s)	49.7	50.3
Level of Service	D	D
Approach Delay (s)	50.0	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Future Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	5	0	23	0	68	4	21	374	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	499	489	375	491	487	70	375	0	0	72	0	0
Stage 1	417	417	-	70	70	-	-	-	-	-	-	-
Stage 2	82	72	-	421	417	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	469	468	654	475	469	971	1141	-	-	1479	-	-
Stage 1	598	578	-	920	821	-	-	-	-	-	-	-
Stage 2	907	820	-	595	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	453	461	654	464	462	971	1141	-	-	1479	-	-
Mov Cap-2 Maneuver	453	461	-	464	462	-	-	-	-	-	-	-
Stage 1	598	570	-	920	821	-	-	-	-	-	-	-
Stage 2	886	820	-	579	570	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	9.6	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	804	1479	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.035	0.014	-	-
HCM Control Delay (s)	0	-	-	10.6	9.6	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Future Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	52	1	11	0	40	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	424	384	430	425	40	385	0	-	-	-	0
Stage 1	384	384	-	40	40	-	-	-	-	-	-	-
Stage 2	46	40	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	522	510	646	522	509	1009	1131	-	0	0	-	-
Stage 1	623	598	-	955	846	-	-	-	0	0	-	-
Stage 2	948	846	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	515	510	646	512	509	1009	1131	-	-	-	-	-
Mov Cap-2 Maneuver	549	529	-	538	528	-	-	-	-	-	-	-
Stage 1	623	598	-	955	846	-	-	-	-	-	-	-
Stage 2	936	846	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.7	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	624	538	932	-	-
HCM Lane V/C Ratio	-	-	0.026	0.096	0.013	-	-
HCM Control Delay (s)	0	-	10.9	12.4	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Future Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	68	21	4	8	0	0	40	16

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	70	105	-	-	95	45
Stage 1	-	-	-	0	0	-	-	95	-
Stage 2	-	-	-	70	105	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	891	766	0	0	776	990
Stage 1	-	-	-	-	-	0	0	797	-
Stage 2	-	-	-	909	789	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	842	766	-	-	776	990
Mov Cap-2 Maneuver	-	-	-	842	766	-	-	776	-
Stage 1	-	-	-	-	-	-	-	797	-
Stage 2	-	-	-	849	789	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	-	-	-	827
HCM Lane V/C Ratio	0.015	-	-	-	0.068
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	66	21	6	3	3	2	391	12	14	103	2
Future Volume (veh/h)	31	66	21	6	3	3	2	391	12	14	103	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	92	26	7	3	3	3	495	14	20	147	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	265	332	97	367	134	148	663	704	20	391	710	14
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	510	1953	570	815	786	868	1143	1672	47	823	1687	34
Grp Volume(v), veh/h	94	0	67	8	0	5	3	0	509	20	0	150
Grp Sat Flow(s),veh/h/ln	1561	0	1471	1050	0	1419	1143	0	1719	823	0	1721
Q Serve(g_s), s	0.1	0.0	1.2	0.0	0.0	0.1	0.0	0.0	7.2	0.6	0.0	1.6
Cycle Q Clear(g_c), s	1.4	0.0	1.2	1.2	0.0	0.1	1.7	0.0	7.2	7.8	0.0	1.6
Prop In Lane	0.46		0.39	0.86		0.61	1.00		0.03	1.00		0.02
Lane Grp Cap(c), veh/h	444	0	250	407	0	242	663	0	724	391	0	725
V/C Ratio(X)	0.21	0.00	0.27	0.02	0.00	0.02	0.00	0.00	0.70	0.05	0.00	0.21
Avail Cap(c_a), veh/h	1519	0	1302	1287	0	1256	1427	0	1873	941	0	1875
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.7	0.0	10.6	10.2	0.0	10.1	5.9	0.0	7.0	10.2	0.0	5.4
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.1
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	0.7	0.0	0.5	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.0	0.8
LnGrp Delay(d),s/veh	10.9	0.0	11.2	10.2	0.0	10.2	5.9	0.0	8.2	10.2	0.0	5.5
LnGrp LOS	B		B	B		B	A		A	B		A
Approach Vol, veh/h		161			13			512			170	
Approach Delay, s/veh		11.0			10.2			8.2			6.1	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		18.4		11.0		18.4		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		9.2		3.4		9.8		3.2
Green Ext Time (p_c), s		3.3		0.8		0.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.4
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Future Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	123	0	0	0	11	17	28	120	303	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	611	625	318			333	0	0	45	0	0
Stage 1	558	558	-			-	-	-	-	-	-
Stage 2	53	67	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	444	391	704			1183	-	-	1513	-	-
Stage 1	557	499	-			-	-	-	-	-	-
Stage 2	949	824	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	405	0	704			1183	-	-	1513	-	-
Mov Cap-2 Maneuver	405	0	-			-	-	-	-	-	-
Stage 1	509	0	-			-	-	-	-	-	-
Stage 2	949	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	1.5	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1183	-	-	405	704	1513	-	-
HCM Lane V/C Ratio	0.009	-	-	0.444	0.175	0.079	-	-
HCM Control Delay (s)	8.1	-	-	20.8	11.2	7.6	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Future Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	312	5	0	0	0	0	9	23	40	16	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	327	159	173	329	-
Stage 1	-	-	-	-	327	-	0	0	-
Stage 2	-	-	-	-	0	-	173	329	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	572	833	752	571	0
Stage 1	-	-	-	0	627	-	-	-	0
Stage 2	-	-	-	0	-	-	789	625	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	572	833	723	571	-
Mov Cap-2 Maneuver	-	-	-	-	572	-	723	571	-
Stage 1	-	-	-	-	627	-	-	-	-
Stage 2	-	-	-	-	-	-	756	625	-

Approach	EB	NB	SB
HCM Control Delay, s		10.1	10.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	734	-	-	-	673
HCM Lane V/C Ratio	0.044	-	-	-	0.083
HCM Control Delay (s)	10.1	-	-	-	10.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Future Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	57	9	1	435	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	510	514	436	520	511	62	437	0	0	66	0	0
Stage 1	438	438	-	72	72	-	-	-	-	-	-	-
Stage 2	72	76	-	448	439	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	461	453	604	454	455	981	1081	-	-	1486	-	-
Stage 1	582	565	-	918	820	-	-	-	-	-	-	-
Stage 2	918	816	-	575	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	459	450	604	438	452	981	1081	-	-	1486	-	-
Mov Cap-2 Maneuver	459	450	-	438	452	-	-	-	-	-	-	-
Stage 1	579	564	-	913	816	-	-	-	-	-	-	-
Stage 2	914	812	-	556	564	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14	0.6	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1081	-	-	570	438	1486	-	-
HCM Lane V/C Ratio	0.005	-	-	0.042	0.082	0.001	-	-
HCM Control Delay (s)	8.3	-	-	11.6	14	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	19	4	70	58	51	0	1	36	359	11	15
Future Volume (veh/h)	12	19	4	70	58	51	0	1	36	359	11	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	15	23	5	78	64	51	0	1	43	447	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	26	685	140	101	401	289	66	1	57	739	388	0
Arrive On Green	0.02	0.17	0.17	0.06	0.22	0.22	0.00	0.04	0.04	0.22	0.00	0.00
Sat Flow, veh/h	1645	3929	800	1645	1821	1315	1645	33	1440	3290	1727	0
Grp Volume(v), veh/h	15	18	10	78	57	58	0	0	44	447	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1586	1645	1641	1495	1645	0	1473	1645	1727	0
Q Serve(g_s), s	0.3	0.2	0.2	1.6	1.0	1.1	0.0	0.0	1.0	4.2	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.2	0.2	1.6	1.0	1.1	0.0	0.0	1.0	4.2	0.0	0.0
Prop In Lane	1.00		0.50	1.00		0.88	1.00		0.98	1.00		0.00
Lane Grp Cap(c), veh/h	26	548	277	101	361	329	66	0	59	739	388	0
V/C Ratio(X)	0.59	0.03	0.04	0.78	0.16	0.18	0.00	0.00	0.75	0.61	0.00	0.00
Avail Cap(c_a), veh/h	253	2331	1176	488	1450	1322	875	0	784	3233	1697	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.8	11.8	11.8	15.9	10.8	10.9	0.0	0.0	16.3	12.0	0.0	0.0
Incr Delay (d2), s/veh	7.7	0.0	0.1	4.8	0.2	0.3	0.0	0.0	17.1	0.8	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	0.2	0.1	0.1	0.8	0.5	0.5	0.0	0.0	0.7	1.9	0.0	0.0
LnGrp Delay(d),s/veh	24.5	11.8	11.9	20.7	11.1	11.2	0.0	0.0	33.4	12.8	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			C	B		
Approach Vol, veh/h		43			193			44			447	
Approach Delay, s/veh		16.3			15.0			33.4			12.8	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.3	10.6		11.9	4.7	12.2		5.6
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 10	25.5		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	3.6	2.2		6.2	2.3	3.1		3.0
Green Ext Time (p_c), s	0.0	0.1		1.6	0.0	0.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

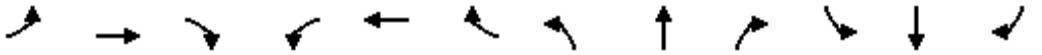
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	110	204	523	106	0	0	0	0	502	4	18
Future Volume (veh/h)	0	110	204	523	106	0	0	0	0	502	4	18
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	131	0	601	122	0				567	0	9
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1313	587	683	2208	0				657	0	293
Arrive On Green	0.00	0.40	0.00	0.21	0.67	0.00				0.20	0.00	0.20
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	131	0	601	122	0				567	0	9
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	2.0	0.0	14.6	1.0	0.0				13.3	0.0	0.4
Cycle Q Clear(g_c), s	0.0	2.0	0.0	14.6	1.0	0.0				13.3	0.0	0.4
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1313	587	683	2208	0				657	0	293
V/C Ratio(X)	0.00	0.10	0.00	0.88	0.06	0.00				0.86	0.00	0.03
Avail Cap(c_a), veh/h	0	1313	587	798	2208	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.91	0.00	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.0	0.0	30.4	4.4	0.0				31.0	0.0	25.8
Incr Delay (d2), s/veh	0.0	0.1	0.0	7.7	0.0	0.0				6.7	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
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.0	7.2	0.5	0.0				6.7	0.0	0.2
LnGrp Delay(d),s/veh	0.0	15.1	0.0	38.2	4.5	0.0				37.6	0.0	25.8
LnGrp LOS		B		D	A					D		C
Approach Vol, veh/h		131			723						576	
Approach Delay, s/veh		15.1			32.5						37.5	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	21.8	37.1		21.1		58.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.6	4.0		15.3		3.0		
Green Ext Time (p_c), s	0.5	1.2		0.6		1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	591	0	0	582	503	55	3	454	0	0	0
Future Volume (veh/h)	8	591	0	0	582	503	55	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	9	672	0	0	661	515	42	0	432			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	36	2307	0	0	1115	864	289	0	516			
Arrive On Green	0.02	1.00	0.00	0.00	0.63	0.63	0.18	0.00	0.18			
Sat Flow, veh/h	3191	3368	0	0	1848	1365	1645	0	2936			
Grp Volume(v), veh/h	9	672	0	0	615	561	42	0	432			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1486	1645	0	1468			
Q Serve(g_s), s	0.2	0.0	0.0	0.0	17.6	17.8	1.7	0.0	11.4			
Cycle Q Clear(g_c), s	0.2	0.0	0.0	0.0	17.6	17.8	1.7	0.0	11.4			
Prop In Lane	1.00		0.00	0.00		0.92	1.00		1.00			
Lane Grp Cap(c), veh/h	36	2307	0	0	1038	941	289	0	516			
V/C Ratio(X)	0.25	0.29	0.00	0.00	0.59	0.60	0.15	0.00	0.84			
Avail Cap(c_a), veh/h	798	2307	0	0	1038	941	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.77	0.77	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	38.8	0.0	0.0	0.0	8.6	8.7	27.9	0.0	31.9			
Incr Delay (d2), s/veh	1.0	0.2	0.0	0.0	2.5	2.8	0.1	0.0	4.1			
Initial Q Delay(d3),s/veh	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	0.1	0.0	0.0	8.6	7.9	0.8	0.0	4.9			
LnGrp Delay(d),s/veh	39.8	0.2	0.0	0.0	11.1	11.4	28.0	0.0	36.0			
LnGrp LOS	D	A			B	B	C		D			
Approach Vol, veh/h		681			1176			474				
Approach Delay, s/veh		0.8			11.3			35.3				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		61.3			5.6	55.7		18.7
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			2.2	19.8		13.4
Green Ext Time (p_c), s		10.9			0.0	4.7		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.1
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	22	12	0	36	26
Future Vol, veh/h	20	22	12	0	36	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	42	46	16	0	71	51

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	209	16	0	0	16	0
Stage 1	16	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	762	1040	-	-	1551	-
Stage 1	986	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	727	1040	-	-	1551	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	821	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	4.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	727	1040	1551	-
HCM Lane V/C Ratio	-	-	0.057	0.044	0.046	-
HCM Control Delay (s)	-	-	9.9	8.6	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	93	1	7	30	0	55	0	336	0	26	24
Future Vol, veh/h	0	93	1	7	30	0	55	0	336	0	26	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	135	1	10	42	0	63	0	382	0	27	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	136	0	0	224	-	136	-	198	42
Stage 1	-	-	-	-	-	-	136	-	-	-	62	-
Stage 2	-	-	-	-	-	-	88	-	-	-	136	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1400	-	0	715	0	892	0	684	1006
Stage 1	0	-	-	-	-	0	848	0	-	0	828	-
Stage 2	0	-	-	-	-	0	900	0	-	0	769	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1400	-	-	672	-	892	-	679	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	672	-	-	-	679	-
Stage 1	-	-	-	-	-	-	848	-	-	-	822	-
Stage 2	-	-	-	-	-	-	843	-	-	-	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.4	11.8	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	672	892	-	-	1400	-	805
HCM Lane V/C Ratio	0.093	0.428	-	-	0.007	-	0.065
HCM Control Delay (s)	10.9	12	-	-	7.6	0	9.8
HCM Lane LOS	B	B	-	-	A	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0	-	0.2



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	139	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	162	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	162	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.2	14.2		14.4	14.4		2.1	32.7		4.1	34.7
Effective Green, g (s)		14.2	14.2		14.4	14.4		2.1	32.7		4.1	34.7
Actuated g/C Ratio		0.15	0.15		0.15	0.15		0.02	0.35		0.04	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		250	493		254	234		37	1116		72	1224
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.65	0.39		0.36	0.67		0.38	0.67		0.49	0.09
Uniform Delay, d1		37.0	35.5		35.2	37.1		44.8	25.6		43.4	18.9
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.3	0.2		0.3	5.8		2.3	2.1		1.9	0.1
Delay (s)		41.3	35.7		35.5	42.9		47.2	27.7		45.3	19.0
Level of Service		D	D		D	D		D	C		D	B
Approach Delay (s)			38.2			40.2			28.1			25.2
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	93.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	2.1	2.1
Effective Green, g (s)	2.1	2.1
Actuated g/C Ratio	0.02	0.02
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	37	33
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.30	0.33
Uniform Delay, d1	44.7	44.8
Progression Factor	1.00	1.00
Incremental Delay, d2	1.6	2.2
Delay (s)	46.4	46.9
Level of Service	D	D
Approach Delay (s)	46.6	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑		↰	↑	
Traffic Vol, veh/h	2	0	3	2	0	12	2	238	6	19	179	2
Future Vol, veh/h	2	0	3	2	0	12	2	238	6	19	179	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	5	0	27	2	294	7	22	203	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	563	553	204	553	551	298	205	0	0	301	0	0
Stage 1	248	248	-	302	302	-	-	-	-	-	-	-
Stage 2	315	305	-	251	249	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	425	430	817	432	431	723	1320	-	-	1216	-	-
Stage 1	738	687	-	690	650	-	-	-	-	-	-	-
Stage 2	679	648	-	736	686	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	403	421	817	423	422	723	1320	-	-	1216	-	-
Mov Cap-2 Maneuver	403	421	-	423	422	-	-	-	-	-	-	-
Stage 1	737	675	-	689	649	-	-	-	-	-	-	-
Stage 2	652	647	-	718	674	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	10.8	0.1	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1320	-	-	579	656	1216	-	-
HCM Lane V/C Ratio	0.002	-	-	0.014	0.049	0.018	-	-
HCM Control Delay (s)	7.7	-	-	11.3	10.8	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Future Vol, veh/h	0	0	0	66	2	17	4	237	0	0	186	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	74	2	19	5	316	0	0	219	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	557	546	220	546	547	316	221	0	-	-	-	0
Stage 1	220	220	-	326	326	-	-	-	-	-	-	-
Stage 2	337	326	-	220	221	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	429	434	800	436	434	706	1302	-	0	0	-	-
Stage 1	765	706	-	670	634	-	-	-	0	0	-	-
Stage 2	661	634	-	765	706	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	415	432	800	435	432	706	1302	-	-	-	-	-
Mov Cap-2 Maneuver	503	500	-	521	499	-	-	-	-	-	-	-
Stage 1	762	706	-	667	631	-	-	-	-	-	-	-
Stage 2	638	631	-	765	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.5	0.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1302	-	-	521	676	-	-
HCM Lane V/C Ratio	0.004	-	-	0.142	0.032	-	-
HCM Control Delay (s)	7.8	-	0	13.1	10.5	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Future Vol, veh/h	0	0	0	5	80	18	9	7	0	0	20	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	99	22	13	10	0	0	25	11

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	74	133	-	-	122	61
Stage 1	-	-	-	0	0	-	-	122	-
Stage 2	-	-	-	74	133	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	886	739	0	0	749	966
Stage 1	-	-	-	-	-	0	0	775	-
Stage 2	-	-	-	904	767	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	854	739	-	-	749	966
Mov Cap-2 Maneuver	-	-	-	854	739	-	-	749	-
Stage 1	-	-	-	-	-	-	-	775	-
Stage 2	-	-	-	865	767	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	-	-	-	805
HCM Lane V/C Ratio	0.03	-	-	-	0.044
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Future Volume (veh/h)	10	15	4	8	156	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	21	6	9	171	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	321	346	103	165	596	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	552	1812	539	80	3127	55	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	25	0	16	98	0	85	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1427	0	1477	1699	0	1562	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	1.2	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.3	0.0	0.2	1.3	0.0	1.2	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.57		0.37	0.09		0.04	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	282	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.05	0.00	0.06	0.21	0.00	0.29	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1544	0	1465	1814	0	1549	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	0.5	0.2	0.0	0.1	0.0	0.0	0.3
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	0.1	0.6	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.7	0.0	8.8	9.3	0.0	9.6	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		41			183			198			151	
Approach Delay, s/veh		8.8			9.4			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.3		3.7		3.3
Green Ext Time (p_c), s		0.8		0.1		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Future Vol, veh/h	16	27	19	0	0	0	107	229	16	57	53	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	27	0	0	0	115	246	17	70	65	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	773	781	148	231	0	0	263	0	0
Stage 1	288	288	-	-	-	-	-	-	-
Stage 2	485	493	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	356	317	878	1291	-	-	1256	-	-
Stage 1	743	659	-	-	-	-	-	-	-
Stage 2	603	534	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	306	0	878	1291	-	-	1256	-	-
Mov Cap-2 Maneuver	306	0	-	-	-	-	-	-	-
Stage 1	639	0	-	-	-	-	-	-	-
Stage 2	603	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	2.5	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	306	878	1256	-	-
HCM Lane V/C Ratio	0.089	-	-	0.201	0.031	0.055	-	-
HCM Control Delay (s)	8.1	-	-	19.7	9.2	8	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Future Vol, veh/h	9	91	10	0	0	0	0	7	7	16	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	11	112	12	0	0	0	0	12	12	22	14	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	140	62	84	146	-
Stage 1	-	-	-			-	140	-	0	0	-
Stage 2	-	-	-			-	0	-	84	146	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	732	965	871	726	0
Stage 1	-	-	-			0	761	-	-	-	0
Stage 2	-	-	-			0	-	-	892	756	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	732	965	849	726	-
Mov Cap-2 Maneuver	-	-	-			-	732	-	849	726	-
Stage 1	-	-	-			-	761	-	-	-	-
Stage 2	-	-	-			-	-	-	867	756	-

Approach	EB	NB	SB
HCM Control Delay, s		9.5	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	833	-	-	-	797
HCM Lane V/C Ratio	0.029	-	-	-	0.045
HCM Control Delay (s)	9.5	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

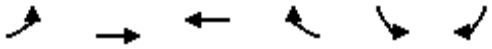
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	0	0	1	10	0	3	15	343	12	1	85	5
Future Vol, veh/h	0	0	1	10	0	3	15	343	12	1	85	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	429	15	1	127	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	610	615	131	610	611	437	134	0	0	444	0	0
Stage 1	133	133	-	475	475	-	-	-	-	-	-	-
Stage 2	477	482	-	135	136	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	395	396	898	395	398	603	1403	-	-	1075	-	-
Stage 1	852	771	-	556	544	-	-	-	-	-	-	-
Stage 2	554	540	-	849	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	388	390	898	389	392	603	1403	-	-	1075	-	-
Mov Cap-2 Maneuver	388	390	-	389	392	-	-	-	-	-	-	-
Stage 1	840	770	-	548	536	-	-	-	-	-	-	-
Stage 2	543	532	-	844	768	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	13.8	0.3	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	898	424	1075	-	-
HCM Lane V/C Ratio	0.013	-	-	0.004	0.038	0.001	-	-
HCM Control Delay (s)	7.6	-	-	9	13.8	8.4	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	33	218	155	30	43
Future Volume (veh/h)	22	33	218	155	30	43
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	28	42	263	169	38	49
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	524	746	425	273	154	137
Arrive On Green	0.43	0.43	0.43	0.43	0.09	0.09
Sat Flow, veh/h	883	1727	984	632	1645	1468
Grp Volume(v), veh/h	28	42	0	432	38	49
Grp Sat Flow(s),veh/h/ln	883	1727	0	1616	1645	1468
Q Serve(g_s), s	0.6	0.3	0.0	4.6	0.5	0.7
Cycle Q Clear(g_c), s	5.1	0.3	0.0	4.6	0.5	0.7
Prop In Lane	1.00			0.39	1.00	1.00
Lane Grp Cap(c), veh/h	524	746	0	698	154	137
V/C Ratio(X)	0.05	0.06	0.00	0.62	0.25	0.36
Avail Cap(c_a), veh/h	1379	2420	0	2264	1375	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.9	3.7	0.0	4.9	9.3	9.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.9	0.8	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.0	2.1	0.2	0.3
LnGrp Delay(d),s/veh	6.9	3.7	0.0	5.8	10.1	11.0
LnGrp LOS	A	A		A	B	B
Approach Vol, veh/h		70	432		87	
Approach Delay, s/veh		5.0	5.8		10.6	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		15.6				15.6		6.6
Change Period (Y+Rc), s		6.0				6.0		4.5
Max Green Setting (Gmax), s		31.0				31.0		18.5
Max Q Clear Time (g_c+I1), s		7.1				6.6		2.7
Green Ext Time (p_c), s		0.3				3.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	107	14	33	429	9	30
Future Volume (veh/h)	107	14	33	429	9	30
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	137	17	38	499	13	34
Adj No. of Lanes	1	0	1	1	1	1
Peak Hour Factor	0.78	0.78	0.86	0.86	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	476	59	122	946	158	258
Arrive On Green	0.32	0.32	0.07	0.55	0.09	0.09
Sat Flow, veh/h	1507	187	1645	1727	1774	1583
Grp Volume(v), veh/h	0	154	38	499	13	34
Grp Sat Flow(s),veh/h/ln	0	1694	1645	1727	1774	1583
Q Serve(g_s), s	0.0	1.7	0.6	4.7	0.2	0.5
Cycle Q Clear(g_c), s	0.0	1.7	0.6	4.7	0.2	0.5
Prop In Lane		0.11	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	535	122	946	158	258
V/C Ratio(X)	0.00	0.29	0.31	0.53	0.08	0.13
Avail Cap(c_a), veh/h	0	1766	520	2619	2269	2143
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	6.5	11.1	3.6	10.6	9.1
Incr Delay (d2), s/veh	0.0	0.3	0.5	0.5	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.3	2.2	0.1	0.2
LnGrp Delay(d),s/veh	0.0	6.8	11.6	4.1	10.7	9.2
LnGrp LOS		A	B	A	B	A
Approach Vol, veh/h	154			537	47	
Approach Delay, s/veh	6.8			4.6	9.6	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.9	12.6				18.5		6.9
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.6	3.7				6.7		2.5
Green Ext Time (p_c), s	0.0	0.8				3.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	5.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	121	2	32	426	272	4	6	15	46	1	12
Future Volume (veh/h)	19	121	2	32	426	272	4	6	15	46	1	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1727	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	19	122	2	34	458	234	6	9	21	41	36	16
Adj No. of Lanes	1	3	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	32	1855	30	53	693	589	55	15	36	111	76	34
Arrive On Green	0.02	0.39	0.39	0.03	0.40	0.40	0.03	0.03	0.03	0.07	0.07	0.07
Sat Flow, veh/h	1645	4779	78	1645	1727	1468	1645	461	1076	1645	1134	504
Grp Volume(v), veh/h	19	80	44	34	458	234	6	0	30	41	0	52
Grp Sat Flow(s),veh/h/ln	1645	1572	1714	1645	1727	1468	1645	0	1537	1645	0	1638
Q Serve(g_s), s	0.4	0.6	0.6	0.7	7.8	4.1	0.1	0.0	0.7	0.9	0.0	1.1
Cycle Q Clear(g_c), s	0.4	0.6	0.6	0.7	7.8	4.1	0.1	0.0	0.7	0.9	0.0	1.1
Prop In Lane	1.00		0.05	1.00		1.00	1.00		0.70	1.00		0.31
Lane Grp Cap(c), veh/h	32	1220	665	53	693	589	55	0	52	111	0	110
V/C Ratio(X)	0.60	0.07	0.07	0.65	0.66	0.40	0.11	0.00	0.58	0.37	0.00	0.47
Avail Cap(c_a), veh/h	243	2608	1422	307	1500	1275	838	0	783	1511	0	1505
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	6.9	6.9	17.2	8.8	7.7	16.8	0.0	17.1	16.0	0.0	16.1
Incr Delay (d2), s/veh	6.6	0.0	0.0	4.8	1.3	0.5	0.9	0.0	9.9	2.0	0.0	3.1
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	0.2	0.2	0.3	0.4	3.9	1.7	0.1	0.0	0.4	0.5	0.0	0.6
LnGrp Delay(d),s/veh	24.1	6.9	6.9	22.0	10.1	8.2	17.7	0.0	27.0	18.1	0.0	19.2
LnGrp LOS	C	A	A	C	B	A	B		C	B		B
Approach Vol, veh/h		143			726			36			93	
Approach Delay, s/veh		9.2			10.0			25.5			18.7	
Approach LOS		A			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	18.5		6.6	4.9	19.0		5.4
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.7	29.8		* 33	* 5.3	31.2		18.3
Max Q Clear Time (g_c+I1), s	2.7	2.6		3.1	2.4	9.8		2.7
Green Ext Time (p_c), s	0.0	0.8		0.4	0.0	4.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	110	117	263	590	0	0	0	0	384	1	149
Future Volume (veh/h)	0	110	117	263	590	0	0	0	0	384	1	149
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	131	0	302	678	0				432	0	134
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1732	775	396	2332	0				533	0	238
Arrive On Green	0.00	0.53	0.00	0.04	0.23	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	131	0	302	678	0				432	0	134
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	1.6	0.0	7.5	13.6	0.0				10.1	0.0	6.7
Cycle Q Clear(g_c), s	0.0	1.6	0.0	7.5	13.6	0.0				10.1	0.0	6.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1732	775	396	2332	0				533	0	238
V/C Ratio(X)	0.00	0.08	0.00	0.76	0.29	0.00				0.81	0.00	0.56
Avail Cap(c_a), veh/h	0	1732	775	798	2332	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.63	0.63	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.3	0.0	37.2	14.1	0.0				32.3	0.0	30.9
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.7	0.2	0.0				1.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.0	3.4	6.2	0.0				4.8	0.0	2.8
LnGrp Delay(d),s/veh	0.0	9.4	0.0	37.9	14.3	0.0				34.1	0.0	31.7
LnGrp LOS		A		D	B					C		C
Approach Vol, veh/h		131			980						566	
Approach Delay, s/veh		9.4			21.5						33.6	
Approach LOS		A			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	47.3		18.0		62.0		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.5	3.6		12.1		15.6		
Green Ext Time (p_c), s	0.4	1.3		0.8		10.2		

Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	422	0	0	434	378	423	254	564	0	0	0
Future Volume (veh/h)	62	422	0	0	434	378	423	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	70	480	0	0	493	388	380	418	185			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	157	2063	0	0	911	716	411	432	367			
Arrive On Green	0.10	1.00	0.00	0.00	0.52	0.52	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1836	1376	1645	1727	1468			
Grp Volume(v), veh/h	70	480	0	0	462	419	380	418	185			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1485	1645	1727	1468			
Q Serve(g_s), s	1.7	0.0	0.0	0.0	15.0	15.1	18.0	19.2	8.7			
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	15.0	15.1	18.0	19.2	8.7			
Prop In Lane	1.00		0.00	0.00		0.93	1.00		1.00			
Lane Grp Cap(c), veh/h	157	2063	0	0	854	773	411	432	367			
V/C Ratio(X)	0.44	0.23	0.00	0.00	0.54	0.54	0.92	0.97	0.50			
Avail Cap(c_a), veh/h	798	2063	0	0	854	773	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	35.0	0.0	0.0	0.0	12.8	12.8	29.3	29.7	25.7			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	2.5	2.7	26.0	34.8	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	0.1	0.0	0.0	7.4	6.7	11.1	13.2	3.5			
LnGrp Delay(d),s/veh	35.7	0.2	0.0	0.0	15.2	15.5	55.3	64.4	26.2			
LnGrp LOS	D	A			B	B	E	E	C			
Approach Vol, veh/h		550			881			983				
Approach Delay, s/veh		4.7			15.4			53.7				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			8.6	46.8		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			3.7	17.1		21.2
Green Ext Time (p_c), s		7.2			0.1	5.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	25	29	0	19	23
Future Vol, veh/h	10	25	29	0	19	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	15	37	48	0	27	32

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	134	48	0	0	48	0
Stage 1	48	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	841	999	-	-	1559	-
Stage 1	954	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	827	999	-	-	1559	-
Mov Cap-2 Maneuver	827	-	-	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	3.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	827	999	1559	-
HCM Lane V/C Ratio	-	-	0.018	0.037	0.017	-
HCM Control Delay (s)	-	-	9.4	8.7	7.3	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	4	15	10	0	5	0	123	0	244	23
Future Vol, veh/h	0	121	4	15	10	0	5	0	123	0	244	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	205	7	22	14	0	6	0	158	0	280	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	212	0	0	420	-	209	-	270	14
Stage 1	-	-	-	-	-	-	209	-	-	-	58	-
Stage 2	-	-	-	-	-	-	211	-	-	-	212	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1312	-	0	530	0	812	0	623	1043
Stage 1	0	-	-	-	-	0	775	0	-	0	831	-
Stage 2	0	-	-	-	-	0	773	0	-	0	712	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1312	-	-	327	-	812	-	612	1043
Mov Cap-2 Maneuver	-	-	-	-	-	-	327	-	-	-	612	-
Stage 1	-	-	-	-	-	-	775	-	-	-	817	-
Stage 2	-	-	-	-	-	-	486	-	-	-	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.7	10.7	15.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	327	812	-	-	1312	-	635
HCM Lane V/C Ratio	0.02	0.194	-	-	0.017	-	0.483
HCM Control Delay (s)	16.2	10.5	-	-	7.8	0	15.9
HCM Lane LOS	C	B	-	-	A	A	C
HCM 95th %tile Q(veh)	0.1	0.7	-	-	0.1	-	2.6



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	221	0	151	24	0	15	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Effective Green, g (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Actuated g/C Ratio		0.13	0.13		0.15	0.15		0.01	0.30		0.10	0.38
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		207	398		245	235		19	911		160	1249
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.55		0.62	0.10		0.79	0.24		0.58	0.87
Uniform Delay, d1		32.6	34.1		33.1	30.5		40.9	22.2		35.8	23.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		3.2	0.1		102.4	0.3		3.4	7.5
Delay (s)		32.8	35.0		36.3	30.6		143.3	22.5		39.3	31.3
Level of Service		C	D		D	C		F	C		D	C
Approach Delay (s)			34.7			35.5			30.3			31.9
Approach LOS			C			D			C			C

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	10	10
Future Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	11	11
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	2.0	2.0
Effective Green, g (s)	2.0	2.0
Actuated g/C Ratio	0.02	0.02
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	39	35
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.28	0.31
Uniform Delay, d1	39.8	39.8
Progression Factor	1.00	1.00
Incremental Delay, d2	1.4	1.9
Delay (s)	41.2	41.7
Level of Service	D	D
Approach Delay (s)	41.5	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Future Vol, veh/h	0	0	3	4	0	17	0	50	3	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	5	0	23	0	68	4	21	374	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	499	489	375	491	487	70	375	0	0	72	0	0
Stage 1	417	417	-	70	70	-	-	-	-	-	-	-
Stage 2	82	72	-	421	417	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	469	468	654	475	469	971	1141	-	-	1479	-	-
Stage 1	598	578	-	920	821	-	-	-	-	-	-	-
Stage 2	907	820	-	595	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	453	461	654	464	462	971	1141	-	-	1479	-	-
Mov Cap-2 Maneuver	453	461	-	464	462	-	-	-	-	-	-	-
Stage 1	598	570	-	920	821	-	-	-	-	-	-	-
Stage 2	886	820	-	579	570	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	9.6	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	804	1479	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.035	0.014	-	-
HCM Control Delay (s)	0	-	-	10.6	9.6	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Future Vol, veh/h	1	0	4	46	1	10	0	34	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	52	1	11	0	40	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	424	384	430	425	40	385	0	-	-	-	0
Stage 1	384	384	-	40	40	-	-	-	-	-	-	-
Stage 2	46	40	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	522	510	646	522	509	1009	1131	-	0	0	-	-
Stage 1	623	598	-	955	846	-	-	-	0	0	-	-
Stage 2	948	846	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	515	510	646	512	509	1009	1131	-	-	-	-	-
Mov Cap-2 Maneuver	549	529	-	538	528	-	-	-	-	-	-	-
Stage 1	623	598	-	955	846	-	-	-	-	-	-	-
Stage 2	936	846	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.7	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	624	538	932	-	-
HCM Lane V/C Ratio	-	-	0.026	0.096	0.013	-	-
HCM Control Delay (s)	0	-	10.9	12.4	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Future Vol, veh/h	0	0	0	6	52	16	3	6	0	0	30	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	68	21	4	8	0	0	40	16

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	70	105	-	-	95	45
Stage 1	-	-	-	0	0	-	-	95	-
Stage 2	-	-	-	70	105	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	891	766	0	0	776	990
Stage 1	-	-	-	-	-	0	0	797	-
Stage 2	-	-	-	909	789	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	842	766	-	-	776	990
Mov Cap-2 Maneuver	-	-	-	842	766	-	-	776	-
Stage 1	-	-	-	-	-	-	-	797	-
Stage 2	-	-	-	849	789	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	9.7
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	-	-	-	827
HCM Lane V/C Ratio	0.015	-	-	-	0.068
HCM Control Delay (s)	9.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Future Volume (veh/h)	31	66	21	6	3	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	92	26	7	3	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	350	461	131	510	184	204	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	471	2003	570	884	800	888	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	94	0	67	8	0	5	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1573	0	1471	1157	0	1415	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.8	0.8	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.46		0.39	0.85		0.63	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	604	0	339	573	0	326	577	0	352	584	0	372
V/C Ratio(X)	0.16	0.00	0.20	0.01	0.00	0.01	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2056	0	1761	1767	0	1694	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.7	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	6.9	0.0	7.0	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		161			13			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.8
Green Ext Time (p_c), s		0.1		0.8		0.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Future Vol, veh/h	14	101	79	0	0	0	10	16	27	108	273	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	123	0	0	0	11	17	28	120	303	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	611	625	318			333	0	0	45	0	0
Stage 1	558	558	-			-	-	-	-	-	-
Stage 2	53	67	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	444	391	704			1183	-	-	1513	-	-
Stage 1	557	499	-			-	-	-	-	-	-
Stage 2	949	824	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	405	0	704			1183	-	-	1513	-	-
Mov Cap-2 Maneuver	405	0	-			-	-	-	-	-	-
Stage 1	509	0	-			-	-	-	-	-	-
Stage 2	949	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	1.5	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1183	-	-	405	704	1513	-	-
HCM Lane V/C Ratio	0.009	-	-	0.444	0.175	0.079	-	-
HCM Control Delay (s)	8.1	-	-	20.8	11.2	7.6	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Future Vol, veh/h	5	240	4	0	0	0	0	5	12	28	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	312	5	0	0	0	0	9	23	40	16	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	327	159	173	329	-
Stage 1	-	-	-	-	327	-	0	0	-
Stage 2	-	-	-	-	0	-	173	329	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	572	833	752	571	0
Stage 1	-	-	-	0	627	-	-	-	0
Stage 2	-	-	-	0	-	-	789	625	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	572	833	723	571	-
Mov Cap-2 Maneuver	-	-	-	-	572	-	723	571	-
Stage 1	-	-	-	-	627	-	-	-	-
Stage 2	-	-	-	-	-	-	756	625	-

Approach	EB	NB	SB
HCM Control Delay, s		10.1	10.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	734	-	-	-	673
HCM Lane V/C Ratio	0.044	-	-	-	0.083
HCM Control Delay (s)	10.1	-	-	-	10.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

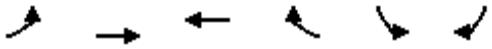
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Future Vol, veh/h	4	0	17	24	0	0	4	42	7	1	374	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	57	9	1	435	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	510	514	436	520	511	62	437	0	0	66	0	0
Stage 1	438	438	-	72	72	-	-	-	-	-	-	-
Stage 2	72	76	-	448	439	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	461	453	604	454	455	981	1081	-	-	1486	-	-
Stage 1	582	565	-	918	820	-	-	-	-	-	-	-
Stage 2	918	816	-	575	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	459	450	604	438	452	981	1081	-	-	1486	-	-
Mov Cap-2 Maneuver	459	450	-	438	452	-	-	-	-	-	-	-
Stage 1	579	564	-	913	816	-	-	-	-	-	-	-
Stage 2	914	812	-	556	564	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14	0.6	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1081	-	-	570	438	1486	-	-
HCM Lane V/C Ratio	0.005	-	-	0.042	0.082	0.001	-	-
HCM Control Delay (s)	8.3	-	-	11.6	14	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	231	50	25	67	8
Future Volume (veh/h)	20	231	50	25	67	8
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	25	292	60	28	85	10
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	759	620	400	187	170	151
Arrive On Green	0.36	0.36	0.36	0.36	0.10	0.10
Sat Flow, veh/h	1209	1727	1115	520	1645	1468
Grp Volume(v), veh/h	25	292	0	88	85	10
Grp Sat Flow(s),veh/h/ln	1209	1727	0	1635	1645	1468
Q Serve(g_s), s	0.3	2.5	0.0	0.7	1.0	0.1
Cycle Q Clear(g_c), s	1.0	2.5	0.0	0.7	1.0	0.1
Prop In Lane	1.00			0.32	1.00	1.00
Lane Grp Cap(c), veh/h	759	620	0	587	170	151
V/C Ratio(X)	0.03	0.47	0.00	0.15	0.50	0.07
Avail Cap(c_a), veh/h	2233	2726	0	2582	1577	1407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.6	4.8	0.0	4.2	8.3	7.9
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.1	2.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.2	0.0	0.3	0.5	0.1
LnGrp Delay(d),s/veh	4.6	5.4	0.0	4.4	10.6	8.1
LnGrp LOS	A	A		A	B	A
Approach Vol, veh/h		317	88		95	
Approach Delay, s/veh		5.3	4.4		10.3	
Approach LOS		A	A		B	

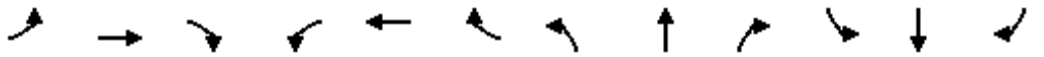
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.0				13.0		6.5
Change Period (Y+Rc), s		6.0				6.0		4.5
Max Green Setting (Gmax), s		30.8				30.8		18.7
Max Q Clear Time (g_c+I1), s		4.5				2.7		3.0
Green Ext Time (p_c), s		1.9				0.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.1
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	374	15	41	84	3	53
Future Volume (veh/h)	374	15	41	84	3	53
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	479	18	45	91	6	79
Adj No. of Lanes	1	0	1	1	1	1
Peak Hour Factor	0.78	0.78	0.92	0.92	0.54	0.54
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	652	24	134	1028	231	336
Arrive On Green	0.39	0.39	0.08	0.60	0.13	0.13
Sat Flow, veh/h	1654	62	1645	1727	1774	1583
Grp Volume(v), veh/h	0	497	45	91	6	79
Grp Sat Flow(s),veh/h/ln	0	1716	1645	1727	1774	1583
Q Serve(g_s), s	0.0	8.3	0.9	0.8	0.1	1.4
Cycle Q Clear(g_c), s	0.0	8.3	0.9	0.8	0.1	1.4
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	676	134	1028	231	336
V/C Ratio(X)	0.00	0.73	0.33	0.09	0.03	0.24
Avail Cap(c_a), veh/h	0	1351	392	1978	1714	1659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.7	14.5	2.9	12.7	11.0
Incr Delay (d2), s/veh	0.0	1.6	0.5	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.4	0.4	0.0	0.6
LnGrp Delay(d),s/veh	0.0	10.2	15.1	2.9	12.7	11.1
LnGrp LOS		B	B	A	B	B
Approach Vol, veh/h	497			136	85	
Approach Delay, s/veh	10.2			7.0	11.2	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.7	17.8				24.6		9.0
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	2.9	10.3				2.8		3.4
Green Ext Time (p_c), s	0.0	2.9				0.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	393	4	70	130	51	0	1	36	359	11	15
Future Volume (veh/h)	12	393	4	70	130	51	0	1	36	359	11	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1727	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	15	479	5	78	144	46	0	1	43	447	0	0
Adj No. of Lanes	1	3	0	1	1	1	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	25	1110	12	97	474	403	64	1	56	714	375	0
Arrive On Green	0.02	0.23	0.23	0.06	0.27	0.27	0.00	0.04	0.04	0.22	0.00	0.00
Sat Flow, veh/h	1645	4812	50	1645	1727	1468	1645	33	1440	3290	1727	0
Grp Volume(v), veh/h	15	313	171	78	144	46	0	0	44	447	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1718	1645	1727	1468	1645	0	1473	1645	1727	0
Q Serve(g_s), s	0.3	3.2	3.2	1.8	2.5	0.9	0.0	0.0	1.1	4.7	0.0	0.0
Cycle Q Clear(g_c), s	0.3	3.2	3.2	1.8	2.5	0.9	0.0	0.0	1.1	4.7	0.0	0.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.98	1.00		0.00
Lane Grp Cap(c), veh/h	25	725	396	97	474	403	64	0	58	714	375	0
V/C Ratio(X)	0.59	0.43	0.43	0.80	0.30	0.11	0.00	0.00	0.76	0.63	0.00	0.00
Avail Cap(c_a), veh/h	230	2058	1125	473	1386	1178	795	0	712	2935	1541	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.5	12.4	12.5	17.6	10.9	10.3	0.0	0.0	18.0	13.4	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.5	0.9	5.7	0.4	0.2	0.0	0.0	18.5	0.9	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	0.2	1.4	1.6	0.9	1.2	0.4	0.0	0.0	0.7	2.2	0.0	0.0
LnGrp Delay(d),s/veh	26.4	12.9	13.3	23.3	11.3	10.4	0.0	0.0	36.6	14.3	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			D	B		
Approach Vol, veh/h		499			268			44			447	
Approach Delay, s/veh		13.5			14.6			36.6			14.3	
Approach LOS		B			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	13.3		12.4	4.8	15.0		5.7
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 11	24.8		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	3.8	5.2		6.7	2.3	4.5		3.1
Green Ext Time (p_c), s	0.0	3.5		1.6	0.0	1.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	263	425	523	154	0	0	0	0	502	4	42
Future Volume (veh/h)	0	263	425	523	154	0	0	0	0	502	4	42
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	313	0	601	177	0				567	0	38
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1306	584	689	2207	0				658	0	294
Arrive On Green	0.00	0.40	0.00	0.14	0.45	0.00				0.20	0.00	0.20
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	313	0	601	177	0				567	0	38
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.1	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Cycle Q Clear(g_c), s	0.0	5.1	0.0	14.7	2.5	0.0				13.3	0.0	1.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1306	584	689	2207	0				658	0	294
V/C Ratio(X)	0.00	0.24	0.00	0.87	0.08	0.00				0.86	0.00	0.13
Avail Cap(c_a), veh/h	0	1306	584	798	2207	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.91	0.00	0.73	0.73	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	16.0	0.0	33.1	7.9	0.0				30.9	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.4	0.0	6.4	0.1	0.0				6.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.0	7.1	1.1	0.0				6.7	0.0	0.7
LnGrp Delay(d),s/veh	0.0	16.4	0.0	39.5	7.9	0.0				37.5	0.0	26.4
LnGrp LOS		B		D	A					D		C
Approach Vol, veh/h		313			778						605	
Approach Delay, s/veh		16.4			32.3						36.8	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.0	36.9		21.1		58.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.7	7.1		15.3		4.5		
Green Ext Time (p_c), s	0.5	3.2		0.7		2.3		

Intersection Summary	
HCM 2010 Ctrl Delay	31.0
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	621	0	0	588	503	97	3	454	0	0	0
Future Volume (veh/h)	131	621	0	0	588	503	97	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	149	706	0	0	668	515	74	0	449			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	221	2287	0	0	1007	772	299	0	534			
Arrive On Green	0.14	1.00	0.00	0.00	0.57	0.57	0.18	0.00	0.18			
Sat Flow, veh/h	3191	3368	0	0	1858	1357	1645	0	2936			
Grp Volume(v), veh/h	149	706	0	0	619	564	74	0	449			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1488	1645	0	1468			
Q Serve(g_s), s	3.5	0.0	0.0	0.0	20.9	21.1	3.1	0.0	11.8			
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	20.9	21.1	3.1	0.0	11.8			
Prop In Lane	1.00		0.00	0.00		0.91	1.00		1.00			
Lane Grp Cap(c), veh/h	221	2287	0	0	933	846	299	0	534			
V/C Ratio(X)	0.67	0.31	0.00	0.00	0.66	0.67	0.25	0.00	0.84			
Avail Cap(c_a), veh/h	798	2287	0	0	933	846	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.84	0.84	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	33.6	0.0	0.0	0.0	11.9	12.0	28.0	0.0	31.6			
Incr Delay (d2), s/veh	1.1	0.3	0.0	0.0	3.7	4.1	0.2	0.0	4.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.1	0.0	0.0	10.2	9.4	1.4	0.0	5.2			
LnGrp Delay(d),s/veh	34.7	0.3	0.0	0.0	15.6	16.1	28.2	0.0	36.4			
LnGrp LOS	C	A			B	B	C		D			
Approach Vol, veh/h		855			1183			523				
Approach Delay, s/veh		6.3			15.9			35.2				
Approach LOS		A			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.9			10.2	50.6		19.1
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			5.5	23.1		13.8
Green Ext Time (p_c), s		11.6			0.2	2.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.6
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	22	21	0	36	29
Future Vol, veh/h	20	22	21	0	36	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	42	46	28	0	71	57

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	227	28	0	0	28	0
Stage 1	28	-	-	-	-	-
Stage 2	199	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	744	1025	-	-	1585	-
Stage 1	974	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	711	1025	-	-	1585	-
Mov Cap-2 Maneuver	711	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	816	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	4.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	711	1025	1585	-
HCM Lane V/C Ratio	-	-	0.059	0.045	0.045	-
HCM Control Delay (s)	-	-	10.4	8.7	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	172	1	123	370	0	55	0	336	0	0	0
Future Vol, veh/h	0	172	1	123	370	0	55	0	336	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	249	1	173	521	0	63	0	382	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	250	0	0	1117	-	250	-	1117	521
Stage 1	-	-	-	-	-	-	250	-	-	-	867	-
Stage 2	-	-	-	-	-	-	867	-	-	-	250	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1270	-	0	178	0	770	0	200	540
Stage 1	0	-	-	-	-	0	737	0	-	0	359	-
Stage 2	0	-	-	-	-	0	337	0	-	0	685	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1270	-	-	152	-	770	-	162	540
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	-	-	-	162	-
Stage 1	-	-	-	-	-	-	737	-	-	-	290	-
Stage 2	-	-	-	-	-	-	272	-	-	-	685	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	18.4	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	152	770	-	-	1270	-	-
HCM Lane V/C Ratio	0.411	0.496	-	-	0.136	-	-
HCM Control Delay (s)	44.3	14.2	-	-	8.3	0	0
HCM Lane LOS	E	B	-	-	A	A	A
HCM 95th %tile Q(veh)	1.8	2.8	-	-	0.5	-	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	176	0	189	16	64	19	91	419	516	145	31	99
Future Volume (vph)	176	0	189	16	64	19	91	419	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3243		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3243		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	205	0	220	19	91	27	130	476	586	165	35	112
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	205	235	0	91	157	0	476	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		18.4	18.4		14.6	14.6		20.7	32.8		4.3	16.4
Effective Green, g (s)		18.4	18.4		14.6	14.6		20.7	32.8		4.3	16.4
Actuated g/C Ratio		0.19	0.19		0.15	0.15		0.21	0.34		0.04	0.17
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		308	610		244	225		347	1064		72	550
v/s Ratio Prot		c0.12	0.07		0.06	c0.10		c0.29	c0.24		0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.67	0.39		0.37	0.70		1.37	0.71		0.49	0.21
Uniform Delay, d1		36.8	34.7		37.5	39.5		38.5	28.3		45.7	35.1
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.2	0.1		0.4	7.4		184.6	2.7		1.9	0.4
Delay (s)		41.0	34.9		37.8	46.9		223.2	31.0		47.5	35.5
Level of Service		D	C		D	D		F	C		D	D
Approach Delay (s)			37.7			43.6			105.6			37.2
Approach LOS			D			D			F			D

Intersection Summary			
HCM 2000 Control Delay	77.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	25.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	50	10	10
Future Volume (vph)	50	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	57	11	11
RTOR Reduction (vph)	47	0	0
Lane Group Flow (vph)	10	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	16.4	2.2	2.2
Effective Green, g (s)	16.4	2.2	2.2
Actuated g/C Ratio	0.17	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	246	36	33
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.01		
v/c Ratio	0.04	0.31	0.33
Uniform Delay, d1	34.1	47.0	47.1
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.8	2.2
Delay (s)	34.2	48.8	49.2
Level of Service	C	D	D
Approach Delay (s)		49.0	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	0	0	0	2	264	33	19	269	2
Future Vol, veh/h	2	0	3	0	0	0	2	264	33	19	269	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	0	0	0	2	326	41	22	306	2

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	702	722	307	308	0	0	367	0	0
Stage 1	351	351	-	-	-	-	-	-	-
Stage 2	351	371	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	393	343	715	1209	-	-	1149	-	-
Stage 1	695	618	-	-	-	-	-	-	-
Stage 2	695	606	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	385	0	715	1209	-	-	1149	-	-
Mov Cap-2 Maneuver	385	0	-	-	-	-	-	-	-
Stage 1	680	0	-	-	-	-	-	-	-
Stage 2	695	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	0.1	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1209	-	-	532	1149	-	-
HCM Lane V/C Ratio	0.002	-	-	0.015	0.019	-	-
HCM Control Delay (s)	8	-	-	11.9	8.2	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	2	47	13	260	0	0	186	2
Future Vol, veh/h	0	0	0	76	2	47	13	260	0	0	186	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	85	2	53	17	347	0	0	219	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	629	601	220	601	602	347	221	0	-	-	-	0
Stage 1	220	220	-	381	381	-	-	-	-	-	-	-
Stage 2	409	381	-	220	221	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	384	404	800	401	403	678	1302	-	0	0	-	-
Stage 1	765	706	-	625	600	-	-	-	0	0	-	-
Stage 2	604	600	-	765	706	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	349	399	800	397	398	678	1302	-	-	-	-	-
Mov Cap-2 Maneuver	441	472	-	486	470	-	-	-	-	-	-	-
Stage 1	755	706	-	617	592	-	-	-	-	-	-	-
Stage 2	548	592	-	765	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.8	0.4	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1302	-	-	486	666	-	-
HCM Lane V/C Ratio	0.013	-	-	0.176	0.083	-	-
HCM Control Delay (s)	7.8	-	0	14	10.9	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	-	-

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Future Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	131	0	0	0	0	0	25	28
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	0%	0%
Vol Thru, %	88%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	71	43
LT Vol	5	0	0
Through Vol	35	71	20
RT Vol	0	0	23
Lane Flow Rate	50	87	53
Geometry Grp	7	7	2
Degree of Util (X)	0.067	0.115	0.06
Departure Headway (Hd)	4.825	4.763	4.087
Convergence, Y/N	Yes	Yes	Yes
Cap	743	753	882
Service Time	2.551	2.489	2.087
HCM Lane V/C Ratio	0.067	0.116	0.06
HCM Control Delay	7.9	8.1	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	23	4	15	163	11	98	119	52	4	43	65
Future Volume (veh/h)	10	23	4	15	163	11	98	119	52	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	32	6	16	179	12	124	151	65	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	272	408	77	179	540	36	613	418	180	557	240	331
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	400	2184	414	135	2887	194	1148	1147	494	1076	659	908
Grp Volume(v), veh/h	30	0	22	112	0	95	124	0	216	6	0	145
Grp Sat Flow(s),veh/h/ln	1500	0	1499	1678	0	1538	1148	0	1640	1076	0	1567
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.4	2.3	0.0	2.6	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.4	0.0	0.3	1.5	0.0	1.4	4.0	0.0	2.6	2.7	0.0	1.7
Prop In Lane	0.46		0.28	0.14		0.13	1.00		0.30	1.00		0.58
Lane Grp Cap(c), veh/h	477	0	280	468	0	288	613	0	597	557	0	571
V/C Ratio(X)	0.06	0.00	0.08	0.24	0.00	0.33	0.20	0.00	0.36	0.01	0.00	0.25
Avail Cap(c_a), veh/h	1551	0	1457	1757	0	1495	1998	0	2576	1856	0	2461
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.0	0.0	9.0	9.4	0.0	9.4	7.4	0.0	6.2	7.2	0.0	6.0
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.3	0.0	0.7	0.2	0.0	0.4	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.7	0.0	0.7	0.7	0.0	1.2	0.0	0.0	0.8
LnGrp Delay(d),s/veh	9.1	0.0	9.1	9.7	0.0	10.1	7.5	0.0	6.6	7.2	0.0	6.2
LnGrp LOS	A		A	A		B	A		A	A		A
Approach Vol, veh/h		52			207			340			151	
Approach Delay, s/veh		9.1			9.9			6.9			6.2	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.7		11.0		15.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		42.0		26.0		42.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.4		4.7		3.5
Green Ext Time (p_c), s		1.8		0.2		0.9		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	27	0	0	0	121	261	42	58	61	136
Future Vol, veh/h	16	27	27	0	0	0	121	261	42	58	61	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	39	0	0	0	130	281	45	71	74	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	863	885	157	240	0	0	326	0	0
Stage 1	299	299	-	-	-	-	-	-	-
Stage 2	564	586	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	315	276	868	1281	-	-	1190	-	-
Stage 1	734	652	-	-	-	-	-	-	-
Stage 2	554	484	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	266	0	868	1281	-	-	1190	-	-
Mov Cap-2 Maneuver	266	0	-	-	-	-	-	-	-
Stage 1	620	0	-	-	-	-	-	-	-
Stage 2	554	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.5	2.3	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1281	-	-	266	868	1190	-	-
HCM Lane V/C Ratio	0.102	-	-	0.231	0.044	0.059	-	-
HCM Control Delay (s)	8.1	-	-	22.6	9.3	8.2	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	135	22	0	0	0	0	0	0	16	10	0
Future Vol, veh/h	0	135	22	0	0	0	0	0	0	16	10	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	167	27	0	0	0	0	0	0	22	14	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.1	7.9
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	62%
Vol Thru, %	100%	67%	38%
Vol Right, %	0%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	90	67	26
LT Vol	0	0	16
Through Vol	90	45	10
RT Vol	0	22	0
Lane Flow Rate	111	83	36
Geometry Grp	7	7	2
Degree of Util (X)	0.146	0.103	0.047
Departure Headway (Hd)	4.733	4.503	4.648
Convergence, Y/N	Yes	Yes	Yes
Cap	758	796	775
Service Time	2.463	2.233	2.648
HCM Lane V/C Ratio	0.146	0.104	0.046
HCM Control Delay	8.3	7.8	7.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.3	0.1

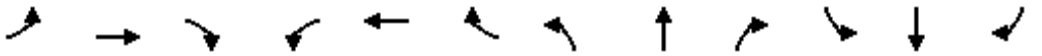
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	0	1	10	0	3	15	399	0	0	109	5
Future Vol, veh/h	30	0	1	10	0	3	15	399	0	0	109	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	120	0	4	12	0	4	19	499	0	0	163	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	706	704	167	706	707	499	170	0	-	-	-	0
Stage 1	167	167	-	537	537	-	-	-	-	-	-	-
Stage 2	539	537	-	169	170	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	340	352	857	340	350	556	1360	-	0	0	-	-
Stage 1	817	745	-	514	510	-	-	-	0	0	-	-
Stage 2	512	510	-	814	743	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	334	347	857	335	345	556	1360	-	-	-	-	-
Mov Cap-2 Maneuver	418	419	-	420	417	-	-	-	-	-	-	-
Stage 1	806	745	-	507	503	-	-	-	-	-	-	-
Stage 2	501	503	-	810	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	13.4	0.3	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1360	-	425	445	-	-
HCM Lane V/C Ratio	0.014	-	0.292	0.036	-	-
HCM Control Delay (s)	7.7	-	16.9	13.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	1.2	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	165	2	32	132	479	4	6	15	234	1	6
Future Volume (vph)	27	165	2	32	132	479	4	6	15	234	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.88		1.00	0.89		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (prot)	1641	3276		1641	2896		1641	1543		1559	1555	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (perm)	1641	3276		1641	2896		1641	1543		1559	1555	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	27	167	2	34	142	515	6	9	22	334	1	9
RTOR Reduction (vph)	0	1	0	0	364	0	0	21	0	0	1	0
Lane Group Flow (vph)	27	168	0	34	293	0	6	10	0	174	169	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	1.4	12.9		1.9	13.4		1.9	1.9		11.9	11.9	
Effective Green, g (s)	1.4	12.9		1.9	13.4		1.9	1.9		11.9	11.9	
Actuated g/C Ratio	0.03	0.28		0.04	0.29		0.04	0.04		0.26	0.26	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	50	922		68	847		68	64		405	404	
v/s Ratio Prot	0.02	0.05		c0.02	c0.10		0.00	c0.01		c0.11	0.11	
v/s Ratio Perm												
v/c Ratio	0.54	0.18		0.50	0.35		0.09	0.15		0.43	0.42	
Uniform Delay, d1	21.9	12.5		21.5	12.7		21.1	21.2		14.1	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.2	0.1		2.1	0.3		0.6	1.1		0.7	0.7	
Delay (s)	28.1	12.6		23.6	13.0		21.7	22.3		14.9	14.8	
Level of Service	C	B		C	B		C	C		B	B	
Approach Delay (s)		14.7			13.6			22.2			14.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	17.2
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	165	2	32	132	479	4	6	15	234	1	6
Future Volume (veh/h)	27	165	2	32	132	479	4	6	15	234	1	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	27	167	2	34	142	468	6	9	21	340	0	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	41	1418	17	50	709	634	52	15	34	528	277	0
Arrive On Green	0.03	0.43	0.43	0.03	0.43	0.43	0.03	0.03	0.03	0.16	0.00	0.00
Sat Flow, veh/h	1645	3321	40	1645	1641	1468	1645	461	1076	3290	1727	0
Grp Volume(v), veh/h	27	82	87	34	142	468	6	0	30	340	0	0
Grp Sat Flow(s),veh/h/ln	1645	1641	1720	1645	1641	1468	1645	0	1537	1645	1727	0
Q Serve(g_s), s	0.8	1.5	1.5	1.0	2.6	13.0	0.2	0.0	0.9	4.7	0.0	0.0
Cycle Q Clear(g_c), s	0.8	1.5	1.5	1.0	2.6	13.0	0.2	0.0	0.9	4.7	0.0	0.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	41	701	734	50	709	634	52	0	49	528	277	0
V/C Ratio(X)	0.65	0.12	0.12	0.68	0.20	0.74	0.12	0.00	0.62	0.64	0.00	0.00
Avail Cap(c_a), veh/h	178	2306	2417	255	2383	2132	614	0	574	2214	1162	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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.7	8.5	8.5	23.5	8.7	11.6	23.1	0.0	23.4	19.3	0.0	0.0
Incr Delay (d2), s/veh	6.3	0.1	0.1	6.0	0.2	2.0	1.0	0.0	12.1	1.3	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	0.4	0.7	0.7	0.5	1.2	5.6	0.1	0.0	0.6	2.2	0.0	0.0
LnGrp Delay(d),s/veh	30.0	8.6	8.6	29.6	8.8	13.7	24.0	0.0	35.5	20.6	0.0	0.0
LnGrp LOS	C	A	A	C	A	B	C		D	C		
Approach Vol, veh/h		196			644			36			340	
Approach Delay, s/veh		11.5			13.4			33.6			20.6	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	25.5		12.1	5.4	25.8		5.8
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 7.6	68.9		* 33	* 5.3	71.2		18.3
Max Q Clear Time (g_c+I1), s	3.0	3.5		6.7	2.8	15.0		2.9
Green Ext Time (p_c), s	0.0	1.3		1.2	0.0	6.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	390	63	263	248	0	0	0	0	384	1	404
Future Volume (veh/h)	0	390	63	263	248	0	0	0	0	384	1	404
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	464	0	302	285	0				432	0	378
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2143	959	393	2740	0				823	0	367
Arrive On Green	0.00	0.65	0.00	0.08	0.56	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	464	0	302	285	0				432	0	378
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	4.6	0.0	7.4	3.2	0.0				9.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	4.6	0.0	7.4	3.2	0.0				9.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2143	959	393	2740	0				823	0	367
V/C Ratio(X)	0.00	0.22	0.00	0.77	0.10	0.00				0.53	0.00	1.03
Avail Cap(c_a), veh/h	0	2143	959	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.00	0.66	0.66	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.6	0.0	35.6	3.6	0.0				25.9	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.8	0.0	0.0				0.3	0.0	54.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	0.0	3.3	1.5	0.0				4.1	0.0	13.6
LnGrp Delay(d),s/veh	0.0	5.8	0.0	36.4	3.7	0.0				26.2	0.0	84.9
LnGrp LOS		A		D	A					C		F
Approach Vol, veh/h		464			587						810	
Approach Delay, s/veh		5.8			20.5						53.6	
Approach LOS		A			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	57.8		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.4	6.6		22.0		5.2		
Green Ext Time (p_c), s	0.4	5.1		0.0		4.0		

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	336	433	0	0	470	378	45	254	564	0	0	0
Future Volume (veh/h)	336	433	0	0	470	378	45	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	382	492	0	0	534	388	51	389	397			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	460	2063	0	0	774	562	411	432	367			
Arrive On Green	0.29	1.00	0.00	0.00	0.43	0.43	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1903	1319	1645	1727	1468			
Grp Volume(v), veh/h	382	492	0	0	482	440	51	389	397			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1494	1645	1727	1468			
Q Serve(g_s), s	9.0	0.0	0.0	0.0	19.1	19.1	1.9	17.4	20.0			
Cycle Q Clear(g_c), s	9.0	0.0	0.0	0.0	19.1	19.1	1.9	17.4	20.0			
Prop In Lane	1.00		0.00	0.00		0.88	1.00		1.00			
Lane Grp Cap(c), veh/h	460	2063	0	0	699	637	411	432	367			
V/C Ratio(X)	0.83	0.24	0.00	0.00	0.69	0.69	0.12	0.90	1.08			
Avail Cap(c_a), veh/h	798	2063	0	0	699	637	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.6	0.0	0.0	0.0	18.7	18.7	23.2	29.0	30.0			
Incr Delay (d2), s/veh	1.4	0.2	0.0	0.0	5.5	6.0	0.0	21.0	70.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	0.1	0.0	0.0	9.6	8.9	0.9	10.8	15.2			
LnGrp Delay(d),s/veh	29.0	0.2	0.0	0.0	24.2	24.7	23.3	50.1	100.6			
LnGrp LOS	C	A			C	C	C	D	F			
Approach Vol, veh/h		874			922			837				
Approach Delay, s/veh		12.8			24.4			72.4				
Approach LOS		B			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.2	39.2		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.0	21.1		22.0
Green Ext Time (p_c), s		7.4			0.6	3.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	7.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	171	29	0	132	20
Future Vol, veh/h	10	171	29	0	132	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	15	255	48	0	186	28

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	448	48	0	0	48	0
Stage 1	48	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	554	999	-	-	1559	-
Stage 1	954	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	488	999	-	-	1559	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	6.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	488	999	1559	-
HCM Lane V/C Ratio	-	-	0.031	0.255	0.119	-
HCM Control Delay (s)	-	-	12.6	9.8	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	1	0.4	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	519	4	288	133	0	5	0	123	0	0	0
Future Vol, veh/h	0	519	4	288	133	0	5	0	123	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	880	7	417	193	0	6	0	158	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	887	0	0	1911	-	884	-	1914	193
Stage 1	-	-	-	-	-	-	884	-	-	-	1027	-
Stage 2	-	-	-	-	-	-	1027	-	-	-	887	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	731	-	0	49	0	333	0	65	828
Stage 1	0	-	-	-	-	0	329	0	-	0	302	-
Stage 2	0	-	-	-	-	0	273	0	-	0	352	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	731	-	-	24	-	333	-	23	828
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	-	-	-	23	-
Stage 1	-	-	-	-	-	-	329	-	-	-	109	-
Stage 2	-	-	-	-	-	-	99	-	-	-	352	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	11.1	32.1	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	24	333	-	-	731	-	-
HCM Lane V/C Ratio	0.267	0.474	-	-	0.571	-	-
HCM Control Delay (s)	202.8	25.2	-	-	16.3	0	0
HCM Lane LOS	F	D	-	-	C	A	A
HCM 95th %tile Q(veh)	0.8	2.4	-	-	3.7	-	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	230	0	345	57	106	7	10	142	116	75	82	957
Future Volume (vph)	230	0	345	57	106	7	10	142	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.98		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3212		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3212		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	267	0	401	66	151	10	14	161	132	85	93	1088
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	267	459	0	151	24	0	161	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		20.3	20.3		14.4	14.4		15.1	35.1		10.5	30.5
Effective Green, g (s)		20.3	20.3		14.4	14.4		15.1	35.1		10.5	30.5
Actuated g/C Ratio		0.19	0.19		0.13	0.13		0.14	0.32		0.10	0.28
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		308	603		218	209		229	1002		159	926
v/s Ratio Prot		c0.16	0.14		c0.09	0.02		c0.10	c0.07		0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.87	0.76		0.69	0.11		0.70	0.22		0.58	1.17
Uniform Delay, d1		42.6	41.6		44.7	41.2		44.4	26.5		46.7	38.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		21.1	5.1		7.5	0.1		7.7	0.2		3.5	90.1
Delay (s)		63.7	46.7		52.2	41.3		52.1	26.7		50.2	128.9
Level of Service		E	D		D	D		D	C		D	F
Approach Delay (s)			52.9			50.7			37.5			104.6
Approach LOS			D			D			D			F

Intersection Summary			
HCM 2000 Control Delay	78.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	267	10	10
Future Volume (vph)	267	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	303	11	11
RTOR Reduction (vph)	113	0	0
Lane Group Flow (vph)	190	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	30.5	2.3	2.3
Effective Green, g (s)	30.5	2.3	2.3
Actuated g/C Ratio	0.28	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	414	34	31
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.13		
v/c Ratio	0.46	0.32	0.35
Uniform Delay, d1	32.0	52.1	52.2
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.7	2.0	2.5
Delay (s)	33.7	54.1	54.7
Level of Service	C	D	D
Approach Delay (s)		54.4	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	0	0	0	0	78	24	19	369	1
Future Vol, veh/h	0	0	3	0	0	0	0	78	24	19	369	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	0	0	0	0	105	32	21	405	1

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	569	585	406			406	0	0	137	0	0
Stage 1	448	448	-			-	-	-	-	-	-
Stage 2	121	137	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	470	412	628			1111	-	-	1399	-	-
Stage 1	627	559	-			-	-	-	-	-	-
Stage 2	885	768	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	463	0	628			1111	-	-	1399	-	-
Mov Cap-2 Maneuver	463	0	-			-	-	-	-	-	-
Stage 1	618	0	-			-	-	-	-	-	-
Stage 2	885	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1111	-	-	628	1399	-	-
HCM Lane V/C Ratio	-	-	-	0.013	0.015	-	-
HCM Control Delay (s)	0	-	-	10.8	7.6	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Future Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	63	1	48	4	59	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	451	384	457	452	59	385	0	-	-	-	0
Stage 1	384	384	-	67	67	-	-	-	-	-	-	-
Stage 2	92	67	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	486	492	646	501	491	985	1131	-	0	0	-	-
Stage 1	623	598	-	924	824	-	-	-	0	0	-	-
Stage 2	896	824	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	460	490	646	489	489	985	1131	-	-	-	-	-
Mov Cap-2 Maneuver	524	522	-	528	519	-	-	-	-	-	-	-
Stage 1	621	598	-	920	821	-	-	-	-	-	-	-
Stage 2	848	821	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11	0.5	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	617	528	965	-	-
HCM Lane V/C Ratio	0.003	-	0.026	0.119	0.051	-	-
HCM Control Delay (s)	8.2	-	11	12.7	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.4	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Future Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	101	0	0	0	0	0	40	44
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.4
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	0%
Vol Thru, %	81%	100%	48%
Vol Right, %	0%	0%	52%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	32	52	63
LT Vol	6	0	0
Through Vol	26	52	30
RT Vol	0	0	33
Lane Flow Rate	42	68	84
Geometry Grp	7	7	2
Degree of Util (X)	0.057	0.09	0.092
Departure Headway (Hd)	4.912	4.818	3.939
Convergence, Y/N	Yes	Yes	Yes
Cap	729	743	895
Service Time	2.646	2.552	2.031
HCM Lane V/C Ratio	0.058	0.092	0.094
HCM Control Delay	7.9	8	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	76	21	14	11	13	2	396	89	14	31	2
Future Volume (veh/h)	31	76	21	14	11	13	2	396	89	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	106	26	15	12	14	3	501	112	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	230	308	79	264	147	176	807	661	148	357	772	53
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	488	2028	520	575	968	1160	1255	1368	306	747	1599	109
Grp Volume(v), veh/h	101	0	74	25	0	16	3	0	613	20	0	47
Grp Sat Flow(s),veh/h/ln	1556	0	1480	1337	0	1367	1255	0	1673	747	0	1708
Q Serve(g_s), s	0.6	0.0	1.5	0.0	0.0	0.3	0.0	0.0	9.8	0.7	0.0	0.5
Cycle Q Clear(g_c), s	1.8	0.0	1.5	1.5	0.0	0.3	0.5	0.0	9.8	10.6	0.0	0.5
Prop In Lane	0.43		0.35	0.61		0.85	1.00		0.18	1.00		0.06
Lane Grp Cap(c), veh/h	393	0	225	380	0	208	807	0	808	357	0	825
V/C Ratio(X)	0.26	0.00	0.33	0.06	0.00	0.08	0.00	0.00	0.76	0.06	0.00	0.06
Avail Cap(c_a), veh/h	1352	0	1170	1229	0	1081	1421	0	1628	723	0	1662
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	12.4	12.0	0.0	12.0	4.7	0.0	6.9	11.2	0.0	4.5
Incr Delay (d2), s/veh	0.3	0.0	0.8	0.1	0.0	0.2	0.0	0.0	1.5	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	0.9	0.0	0.6	0.2	0.0	0.1	0.0	0.0	4.8	0.2	0.0	0.2
LnGrp Delay(d),s/veh	12.9	0.0	13.3	12.1	0.0	12.1	4.7	0.0	8.4	11.3	0.0	4.5
LnGrp LOS	B		B	B		B	A		A	B		A
Approach Vol, veh/h		175			41			616			67	
Approach Delay, s/veh		13.1			12.1			8.4			6.6	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		21.9		11.0		21.9		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		11.8		3.8		12.6		3.5
Green Ext Time (p_c), s		4.1		0.9		0.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	89	0	0	0	26	35	54	109	283	27
Future Vol, veh/h	14	101	89	0	0	0	26	35	54	109	283	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	139	0	0	0	27	37	57	121	314	30

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	691	719	329	344	0	0	94	0	0
Stage 1	571	571	-	-	-	-	-	-	-
Stage 2	120	148	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	399	345	694	1172	-	-	1451	-	-
Stage 1	550	492	-	-	-	-	-	-	-
Stage 2	886	760	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	358	0	694	1172	-	-	1451	-	-
Mov Cap-2 Maneuver	358	0	-	-	-	-	-	-	-
Stage 1	493	0	-	-	-	-	-	-	-
Stage 2	886	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	1.8	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	358	694	1451	-	-
HCM Lane V/C Ratio	0.023	-	-	0.502	0.2	0.083	-	-
HCM Control Delay (s)	8.1	-	-	24.8	11.5	7.7	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.7	0.7	0.3	-	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	327	11	0	0	0	0	0	0	28	11	0
Future Vol, veh/h	0	327	11	0	0	0	0	0	0	28	11	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	425	14	0	0	0	0	0	0	40	16	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	9.8	8.6
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	72%
Vol Thru, %	100%	91%	28%
Vol Right, %	0%	9%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	218	120	39
LT Vol	0	0	28
Through Vol	218	109	11
RT Vol	0	11	0
Lane Flow Rate	283	156	56
Geometry Grp	7	7	2
Degree of Util (X)	0.375	0.204	0.08
Departure Headway (Hd)	4.769	4.705	5.191
Convergence, Y/N	Yes	Yes	Yes
Cap	750	757	694
Service Time	2.528	2.464	3.191
HCM Lane V/C Ratio	0.377	0.206	0.081
HCM Control Delay	10.4	8.7	8.6
HCM Lane LOS	B	A	A
HCM 95th-tile Q	1.7	0.8	0.3

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	71	0	17	24	0	0	4	91	0	0	404	2
Future Vol, veh/h	71	0	17	24	0	0	4	91	0	0	404	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	81	0	19	36	0	0	5	123	0	0	470	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	604	604	471	614	605	123	472	0	-	-	-	0
Stage 1	471	471	-	133	133	-	-	-	-	-	-	-
Stage 2	133	133	-	481	472	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	399	402	577	393	401	907	1049	-	0	0	-	-
Stage 1	558	546	-	852	771	-	-	-	0	0	-	-
Stage 2	852	771	-	551	546	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	397	400	577	378	399	907	1049	-	-	-	-	-
Mov Cap-2 Maneuver	469	461	-	449	458	-	-	-	-	-	-	-
Stage 1	555	546	-	848	767	-	-	-	-	-	-	-
Stage 2	848	767	-	533	546	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	13.7	0.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1049	-	487	449	-	-
HCM Lane V/C Ratio	0.005	-	0.205	0.08	-	-
HCM Control Delay (s)	8.4	-	14.3	13.7	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	124	4	70	306	321	0	1	36	586	11	7
Future Volume (vph)	22	124	4	70	306	321	0	1	36	586	11	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.92			0.85		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3266		1641	3030			1474		1559	1562	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3266		1641	3030			1474		1559	1562	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	27	151	5	78	340	357	0	1	47	689	13	8
RTOR Reduction (vph)	0	2	0	0	175	0	0	45	0	0	1	0
Lane Group Flow (vph)	27	154	0	78	522	0	0	3	0	358	351	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	1.5	17.3		4.4	20.2			3.2		22.1	22.1	
Effective Green, g (s)	1.5	17.3		4.4	20.2			3.2		22.1	22.1	
Actuated g/C Ratio	0.02	0.27		0.07	0.31			0.05		0.34	0.34	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	38	880		112	953			73		536	537	
v/s Ratio Prot	0.02	0.05		c0.05	c0.17			c0.00		c0.23	0.22	
v/s Ratio Perm												
v/c Ratio	0.71	0.17		0.70	0.55			0.05		0.67	0.65	
Uniform Delay, d1	31.1	18.0		29.2	18.2			29.0		17.9	17.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	40.7	0.1		14.1	0.7			0.3		3.1	2.9	
Delay (s)	71.9	18.1		43.3	18.9			29.3		21.1	20.7	
Level of Service	E	B		D	B			C		C	C	
Approach Delay (s)		26.0			21.4			29.3			20.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	470	176	523	127	0	0	0	0	502	4	515
Future Volume (veh/h)	0	470	176	523	127	0	0	0	0	502	4	515
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	560	0	601	146	0				567	0	494
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1845	825	683	2740	0				823	0	367
Arrive On Green	0.00	0.56	0.00	0.21	0.84	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	560	0	601	146	0				567	0	494
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	7.2	0.0	14.6	0.6	0.0				12.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	7.2	0.0	14.6	0.6	0.0				12.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1845	825	683	2740	0				823	0	367
V/C Ratio(X)	0.00	0.30	0.00	0.88	0.05	0.00				0.69	0.00	1.35
Avail Cap(c_a), veh/h	0	1845	825	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.86	0.00	0.58	0.58	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	0.0	30.4	1.1	0.0				27.2	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	5.5	0.0	0.0				2.1	0.0	172.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	0.0	7.0	0.3	0.0				5.9	0.0	25.7
LnGrp Delay(d),s/veh	0.0	9.6	0.0	36.0	1.2	0.0				29.2	0.0	202.8
LnGrp LOS		A		D	A					C		F
Approach Vol, veh/h		560			747						1061	
Approach Delay, s/veh		9.6			29.2						110.1	
Approach LOS		A			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	21.8	50.6		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.6	9.2		22.0		2.6		
Green Ext Time (p_c), s	0.5	5.7		0.0		1.9		

Intersection Summary	
HCM 2010 Ctrl Delay	60.8
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	394	565	0	0	644	503	14	3	454	0	0	0
Future Volume (veh/h)	394	565	0	0	644	503	14	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	448	642	0	0	732	515	12	0	416			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	523	2326	0	0	899	627	280	0	499			
Arrive On Green	0.33	1.00	0.00	0.00	0.49	0.49	0.17	0.00	0.17			
Sat Flow, veh/h	3191	3368	0	0	1937	1290	1645	0	2936			
Grp Volume(v), veh/h	448	642	0	0	648	599	12	0	416			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1500	1645	0	1468			
Q Serve(g_s), s	10.5	0.0	0.0	0.0	26.9	27.3	0.5	0.0	11.0			
Cycle Q Clear(g_c), s	10.5	0.0	0.0	0.0	26.9	27.3	0.5	0.0	11.0			
Prop In Lane	1.00		0.00	0.00		0.86	1.00		1.00			
Lane Grp Cap(c), veh/h	523	2326	0	0	798	729	280	0	499			
V/C Ratio(X)	0.86	0.28	0.00	0.00	0.81	0.82	0.04	0.00	0.83			
Avail Cap(c_a), veh/h	798	2326	0	0	798	729	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.79	0.79	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.0	0.0	0.0	0.0	17.5	17.6	27.8	0.0	32.1			
Incr Delay (d2), s/veh	3.0	0.2	0.0	0.0	8.9	10.1	0.0	0.0	3.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	14.0	13.2	0.2	0.0	4.7			
LnGrp Delay(d),s/veh	29.0	0.2	0.0	0.0	26.3	27.7	27.8	0.0	35.6			
LnGrp LOS	C	A			C	C	C		D			
Approach Vol, veh/h		1090			1247			428				
Approach Delay, s/veh		12.1			27.0			35.4				
Approach LOS		B			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		61.8			17.8	44.0		18.2
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.5	29.3		13.0
Green Ext Time (p_c), s		10.3			0.6	0.0		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	22.4
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	11.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	124	21	0	341	13
Future Vol, veh/h	20	124	21	0	341	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	42	258	28	0	669	25

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1391	28	0	0	28	0
Stage 1	28	-	-	-	-	-
Stage 2	1363	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	150	1025	-	-	1585	-
Stage 1	974	-	-	-	-	-
Stage 2	229	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	87	1025	-	-	1585	-
Mov Cap-2 Maneuver	87	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	229	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.4	0	8.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	4559	1025	1585	-
HCM Lane V/C Ratio	-	-	0.009	0.252	0.422	-
HCM Control Delay (s)	-	-	5.8	9.7	8.9	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	2	1	2.1	-

Intersection	
Int Delay, s/veh	8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	1	34	54	55	337
Future Vol, veh/h	93	1	34	54	55	337
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	135	1	48	76	63	383

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	136	0	308	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	172	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1400	-	668	892
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1400	-	644	892
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	839	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	644	892	-	-	1400	-
HCM Lane V/C Ratio	0.097	0.429	-	-	0.034	-
HCM Control Delay (s)	11.2	12	-	-	7.7	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	2.2	-	-	0.1	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Future Volume (vph)	140	0	152	16	64	19	91	12	516	145	31	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.99		1.00	0.88		1.00	0.97		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3234		1641	1513		1641	3174		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3234		1641	1513		1641	3174		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	163	0	177	19	91	27	130	14	586	165	35	112
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	163	191	0	91	157	0	14	751	0	35	113
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		14.3	14.3		14.4	14.4		2.1	32.7		4.1	34.7
Effective Green, g (s)		14.3	14.3		14.4	14.4		2.1	32.7		4.1	34.7
Actuated g/C Ratio		0.15	0.15		0.15	0.15		0.02	0.35		0.04	0.37
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		252	496		253	234		37	1114		72	1223
v/s Ratio Prot		c0.10	0.06		0.06	c0.10		0.01	c0.24		c0.02	0.03
v/s Ratio Perm												
v/c Ratio		0.65	0.38		0.36	0.67		0.38	0.67		0.49	0.09
Uniform Delay, d1		37.0	35.4		35.2	37.1		44.9	25.7		43.5	19.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.2	0.2		0.3	5.8		2.3	2.1		1.9	0.1
Delay (s)		41.3	35.6		35.5	42.9		47.2	27.8		45.3	19.0
Level of Service		D	D		D	D		D	C		D	B
Approach Delay (s)			38.2			40.2			28.1			23.4
Approach LOS			D			D			C			C

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	51	10	10
Future Volume (vph)	51	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	58	11	11
RTOR Reduction (vph)	36	0	0
Lane Group Flow (vph)	22	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	34.7	2.1	2.1
Effective Green, g (s)	34.7	2.1	2.1
Actuated g/C Ratio	0.37	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	547	37	33
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.01		
v/c Ratio	0.04	0.30	0.33
Uniform Delay, d1	18.6	44.8	44.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.6	2.2
Delay (s)	18.7	46.4	47.0
Level of Service	B	D	D
Approach Delay (s)		46.7	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	0	0	0	2	265	33	19	180	2
Future Vol, veh/h	2	0	3	0	0	0	2	265	33	19	180	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	5	0	0	0	2	327	41	22	205	2

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	602	622	206			207	0	0	368	0	0
Stage 1	250	250	-			-	-	-	-	-	-
Stage 2	352	372	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	450	392	815			1318	-	-	1148	-	-
Stage 1	773	685	-			-	-	-	-	-	-
Stage 2	694	605	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	441	0	815			1318	-	-	1148	-	-
Mov Cap-2 Maneuver	441	0	-			-	-	-	-	-	-
Stage 1	757	0	-			-	-	-	-	-	-
Stage 2	694	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.1	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1318	-	-	609	1148	-	-
HCM Lane V/C Ratio	0.002	-	-	0.013	0.019	-	-
HCM Control Delay (s)	7.7	-	-	11	8.2	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	2	47	13	261	0	0	187	2
Future Vol, veh/h	0	0	0	76	2	47	13	261	0	0	187	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	85	2	53	17	348	0	0	220	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	631	603	221	603	604	348	222	0	-	-	-	0
Stage 1	221	221	-	382	382	-	-	-	-	-	-	-
Stage 2	410	382	-	221	222	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	382	403	799	399	402	677	1301	-	0	0	-	-
Stage 1	764	706	-	625	599	-	-	-	0	0	-	-
Stage 2	603	599	-	764	705	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	347	398	799	395	397	677	1301	-	-	-	-	-
Mov Cap-2 Maneuver	439	472	-	485	469	-	-	-	-	-	-	-
Stage 1	754	706	-	617	591	-	-	-	-	-	-	-
Stage 2	547	591	-	764	705	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.8	0.4	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1301	-	-	485	665	-	-
HCM Lane V/C Ratio	0.013	-	-	0.176	0.083	-	-
HCM Control Delay (s)	7.8	-	0	14	10.9	-	-
HCM Lane LOS	A	-	A	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	-	-

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Future Vol, veh/h	0	0	0	5	106	0	0	0	0	0	20	23
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	6	131	0	0	0	0	0	25	28
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	0%	0%
Vol Thru, %	88%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	71	43
LT Vol	5	0	0
Through Vol	35	71	20
RT Vol	0	0	23
Lane Flow Rate	50	87	53
Geometry Grp	7	7	2
Degree of Util (X)	0.067	0.115	0.06
Departure Headway (Hd)	4.825	4.763	4.087
Convergence, Y/N	Yes	Yes	Yes
Cap	743	753	882
Service Time	2.551	2.489	2.087
HCM Lane V/C Ratio	0.067	0.116	0.06
HCM Control Delay	7.9	8.1	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Future Volume (veh/h)	10	23	4	8	163	3	98	45	14	4	43	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	14	32	6	9	179	3	124	57	17	6	61	84
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	277	417	79	164	598	10	602	449	134	668	232	319
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	402	2186	415	77	3133	52	1148	1279	381	1224	659	908
Grp Volume(v), veh/h	30	0	22	102	0	89	124	0	74	6	0	145
Grp Sat Flow(s),veh/h/ln	1504	0	1499	1699	0	1563	1148	0	1660	1224	0	1567
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.3	2.3	0.0	0.8	0.1	0.0	1.7
Cycle Q Clear(g_c), s	0.4	0.0	0.3	1.3	0.0	1.3	4.0	0.0	0.8	0.9	0.0	1.7
Prop In Lane	0.46		0.28	0.09		0.03	1.00		0.23	1.00		0.58
Lane Grp Cap(c), veh/h	488	0	286	474	0	298	602	0	583	668	0	551
V/C Ratio(X)	0.06	0.00	0.08	0.21	0.00	0.30	0.21	0.00	0.13	0.01	0.00	0.26
Avail Cap(c_a), veh/h	1589	0	1487	1814	0	1550	1600	0	2027	1732	0	1913
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.7	9.1	0.0	9.1	7.5	0.0	5.8	6.1	0.0	6.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.2	0.0	0.6	0.2	0.0	0.1	0.0	0.0	0.3
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	0.2	0.0	0.1	0.7	0.0	0.6	0.7	0.0	0.4	0.0	0.0	0.8
LnGrp Delay(d),s/veh	8.8	0.0	8.8	9.3	0.0	9.7	7.7	0.0	5.9	6.1	0.0	6.3
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		52			191			198			151	
Approach Delay, s/veh		8.8			9.5			7.0			6.3	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		11.0		15.2		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		6.0		2.4		3.7		3.3
Green Ext Time (p_c), s		0.8		0.2		0.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	27	0	0	0	114	262	42	58	62	136
Future Vol, veh/h	16	27	27	0	0	0	114	262	42	58	62	136
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	23	39	39	0	0	0	123	282	45	71	76	166

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	852	874	159	242	0	0	327	0	0
Stage 1	301	301	-	-	-	-	-	-	-
Stage 2	551	573	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	320	280	866	1279	-	-	1189	-	-
Stage 1	733	651	-	-	-	-	-	-	-
Stage 2	562	491	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	272	0	866	1279	-	-	1189	-	-
Mov Cap-2 Maneuver	272	0	-	-	-	-	-	-	-
Stage 1	623	0	-	-	-	-	-	-	-
Stage 2	562	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	2.2	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	272	866	1189	-	-
HCM Lane V/C Ratio	0.096	-	-	0.226	0.045	0.059	-	-
HCM Control Delay (s)	8.1	-	-	22.1	9.4	8.2	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Future Vol, veh/h	0	105	22	0	0	0	0	0	0	16	10	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	130	27	0	0	0	0	0	0	22	14	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	7.9	7.8
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	62%
Vol Thru, %	100%	61%	38%
Vol Right, %	0%	39%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	70	57	26
LT Vol	0	0	16
Through Vol	70	35	10
RT Vol	0	22	0
Lane Flow Rate	86	70	36
Geometry Grp	7	7	2
Degree of Util (X)	0.114	0.087	0.046
Departure Headway (Hd)	4.733	4.463	4.565
Convergence, Y/N	Yes	Yes	Yes
Cap	757	803	789
Service Time	2.461	2.191	2.565
HCM Lane V/C Ratio	0.114	0.087	0.046
HCM Control Delay	8.1	7.6	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.3	0.1

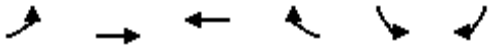
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	10	0	3	15	400	0	0	102	5
Future Vol, veh/h	0	0	1	10	0	3	15	400	0	0	102	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	4	12	0	4	19	500	0	0	152	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	696	694	156	696	697	500	159	0	-	-	-	0
Stage 1	156	156	-	538	538	-	-	-	-	-	-	-
Stage 2	540	538	-	158	159	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	346	356	869	346	355	555	1373	-	0	0	-	-
Stage 1	828	754	-	513	509	-	-	-	0	0	-	-
Stage 2	512	509	-	826	751	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	340	351	869	341	350	555	1373	-	-	-	-	-
Mov Cap-2 Maneuver	421	421	-	422	419	-	-	-	-	-	-	-
Stage 1	816	754	-	506	502	-	-	-	-	-	-	-
Stage 2	502	502	-	822	751	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	13.4	0.3	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1373	-	869	447	-	-
HCM Lane V/C Ratio	0.014	-	0.005	0.036	-	-
HCM Control Delay (s)	7.7	-	9.2	13.4	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	0.1	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	41	225	155	30	43
Future Volume (veh/h)	22	41	225	155	30	43
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	28	52	271	169	38	49
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	446	713	410	256	207	184
Arrive On Green	0.41	0.41	0.41	0.41	0.13	0.13
Sat Flow, veh/h	875	1727	995	620	1645	1468
Grp Volume(v), veh/h	28	52	0	440	38	49
Grp Sat Flow(s),veh/h/ln	875	1727	0	1615	1645	1468
Q Serve(g_s), s	0.7	0.5	0.0	5.7	0.5	0.8
Cycle Q Clear(g_c), s	6.4	0.5	0.0	5.7	0.5	0.8
Prop In Lane	1.00			0.38	1.00	1.00
Lane Grp Cap(c), veh/h	446	713	0	666	207	184
V/C Ratio(X)	0.06	0.07	0.00	0.66	0.18	0.27
Avail Cap(c_a), veh/h	994	1795	0	1678	1646	1469
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.7	4.6	0.0	6.2	10.2	10.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.1	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	0.0	2.7	0.3	0.4
LnGrp Delay(d),s/veh	8.8	4.7	0.0	7.3	10.6	11.0
LnGrp LOS	A	A		A	B	B
Approach Vol, veh/h		80	440		87	
Approach Delay, s/veh		6.1	7.3		10.8	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		16.7				16.7		9.3
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		8.4				7.7		2.8
Green Ext Time (p_c), s		0.3				2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	7.6
HCM 2010 LOS	A



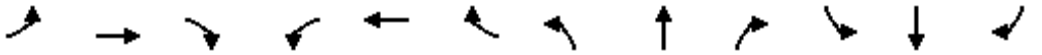
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	110	14	155	436	9	185
Future Volume (vph)	110	14	155	436	9	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.87	
Flt Protected	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1701		1641	1727	1619	
Flt Permitted	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	1701		1641	1727	1619	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	141	18	180	507	13	264
RTOR Reduction (vph)	5	0	0	0	0	0
Lane Group Flow (vph)	154	0	180	507	277	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	11.3		11.2	26.5	13.5	
Effective Green, g (s)	11.3		11.2	26.5	13.5	
Actuated g/C Ratio	0.23		0.23	0.54	0.27	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	390		373	930	444	
v/s Ratio Prot	0.09		0.11	c0.29	c0.17	
v/s Ratio Perm						
v/c Ratio	0.40		0.48	0.55	0.62	
Uniform Delay, d1	16.1		16.5	7.4	15.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7		0.4	0.7	2.0	
Delay (s)	16.7		16.8	8.1	17.6	
Level of Service	B		B	A	B	
Approach Delay (s)	16.7			10.4	17.6	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	17.7
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	275	2	32	547	479	4	6	15	234	1	20
Future Volume (vph)	28	275	2	32	547	479	4	6	15	234	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.93		1.00	0.89		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (prot)	1641	3278		1641	3052		1641	1543		1559	1537	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	
Satd. Flow (perm)	1641	3278		1641	3052		1641	1543		1559	1537	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	28	278	2	34	588	515	6	9	22	334	1	29
RTOR Reduction (vph)	0	1	0	0	112	0	0	21	0	0	5	0
Lane Group Flow (vph)	28	279	0	34	991	0	6	10	0	184	175	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	2.5	36.2		3.3	37.0		3.4	3.4		16.8	16.8	
Effective Green, g (s)	2.5	36.2		3.3	37.0		3.4	3.4		16.8	16.8	
Actuated g/C Ratio	0.03	0.47		0.04	0.48		0.04	0.04		0.22	0.22	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	53	1543		70	1468		72	68		340	335	
v/s Ratio Prot	0.02	0.09		c0.02	c0.32		0.00	c0.01		c0.12	0.11	
v/s Ratio Perm												
v/c Ratio	0.53	0.18		0.49	0.68		0.08	0.15		0.54	0.52	
Uniform Delay, d1	36.6	11.8		36.0	15.3		35.3	35.4		26.6	26.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.1		1.9	1.3		0.5	1.0		1.8	1.5	
Delay (s)	40.9	11.8		37.9	16.6		35.8	36.4		28.4	28.0	
Level of Service	D	B		D	B		D	D		C	C	
Approach Delay (s)		14.5			17.3			36.3			28.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	17.2
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	422	140	263	662	0	0	0	0	384	1	405
Future Volume (veh/h)	0	422	140	263	662	0	0	0	0	384	1	405
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	502	0	302	761	0				432	0	379
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2140	957	396	2740	0				823	0	367
Arrive On Green	0.00	0.65	0.00	0.04	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	502	0	302	761	0				432	0	379
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.0	0.0	7.5	14.6	0.0				9.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	5.0	0.0	7.5	14.6	0.0				9.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2140	957	396	2740	0				823	0	367
V/C Ratio(X)	0.00	0.23	0.00	0.76	0.28	0.00				0.53	0.00	1.03
Avail Cap(c_a), veh/h	0	2140	957	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.00	0.37	0.37	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.7	0.0	37.2	10.1	0.0				25.9	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.4	0.1	0.0				0.3	0.0	55.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	0.0	3.3	6.6	0.0				4.1	0.0	13.7
LnGrp Delay(d),s/veh	0.0	6.0	0.0	37.6	10.1	0.0				26.2	0.0	85.6
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		502			1063						811	
Approach Delay, s/veh		6.0			18.0						54.0	
Approach LOS		A			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	14.6	57.8		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	9.5	7.0		22.0		16.6		
Green Ext Time (p_c), s	0.4	5.5		0.0		11.6		

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	337	464	0	0	476	378	453	254	564	0	0	0
Future Volume (veh/h)	337	464	0	0	476	378	453	254	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	383	527	0	0	541	388	427	456	405			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	460	2063	0	0	778	558	411	432	367			
Arrive On Green	0.29	1.00	0.00	0.00	0.43	0.43	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1913	1310	1645	1727	1468			
Grp Volume(v), veh/h	383	527	0	0	486	443	427	456	405			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1496	1645	1727	1468			
Q Serve(g_s), s	9.0	0.0	0.0	0.0	19.3	19.3	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	9.0	0.0	0.0	0.0	19.3	19.3	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.88	1.00		1.00			
Lane Grp Cap(c), veh/h	460	2063	0	0	699	637	411	432	367			
V/C Ratio(X)	0.83	0.26	0.00	0.00	0.70	0.70	1.04	1.06	1.10			
Avail Cap(c_a), veh/h	798	2063	0	0	699	637	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.5	0.0	0.0	0.0	18.7	18.7	30.0	30.0	30.0			
Incr Delay (d2), s/veh	1.4	0.3	0.0	0.0	5.7	6.2	54.6	58.9	77.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	0.1	0.0	0.0	9.7	9.0	15.3	16.5	16.0			
LnGrp Delay(d),s/veh	28.9	0.3	0.0	0.0	24.4	24.9	84.6	88.9	107.8			
LnGrp LOS	C	A			C	C	F	F	F			
Approach Vol, veh/h		910			929			1288				
Approach Delay, s/veh		12.3			24.6			93.4				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.2	39.2		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.0	21.3		22.0
Green Ext Time (p_c), s		8.1			0.6	3.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.4
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	121	4	259	33	5	123
Future Vol, veh/h	121	4	259	33	5	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	205	7	375	48	6	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	1007	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	798	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1312	-	258	812
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	182	812
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.8	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	812	-	-	1312	-
HCM Lane V/C Ratio	0.035	0.194	-	-	0.286	-
HCM Control Delay (s)	25.5	10.5	-	-	8.8	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.7	-	-	1.2	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Future Volume (vph)	40	0	155	57	106	7	10	13	116	75	82	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.91		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3150		1641	1576		1641	3089		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3150		1641	1576		1641	3089		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	0	180	66	151	10	14	15	132	85	93	1088
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	47	221	0	151	24	0	15	217	0	93	1088
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Effective Green, g (s)		10.5	10.5		12.4	12.4		1.0	24.5		8.1	31.6
Actuated g/C Ratio		0.13	0.13		0.15	0.15		0.01	0.30		0.10	0.38
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		207	398		245	235		19	911		160	1249
v/s Ratio Prot		0.03	c0.07		c0.09	0.02		0.01	0.07		c0.06	c0.33
v/s Ratio Perm												
v/c Ratio		0.23	0.55		0.62	0.10		0.79	0.24		0.58	0.87
Uniform Delay, d1		32.6	34.1		33.1	30.5		40.9	22.2		35.8	23.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	1.0		3.2	0.1		102.4	0.3		3.4	7.5
Delay (s)		32.8	35.0		36.3	30.6		143.3	22.5		39.3	31.3
Level of Service		C	D		D	C		F	C		D	C
Approach Delay (s)			34.7			35.5			30.3			29.3
Approach LOS			C			D			C			C

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	267	10	10
Future Volume (vph)	267	10	10
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	303	11	11
RTOR Reduction (vph)	97	0	0
Lane Group Flow (vph)	206	11	11
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	31.6	2.0	2.0
Effective Green, g (s)	31.6	2.0	2.0
Actuated g/C Ratio	0.38	0.02	0.02
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	558	39	35
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.14		
v/c Ratio	0.37	0.28	0.31
Uniform Delay, d1	18.5	39.8	39.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4	1.9
Delay (s)	19.4	41.2	41.7
Level of Service	B	D	D
Approach Delay (s)		41.5	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Future Vol, veh/h	0	0	3	0	0	0	0	78	24	19	340	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	8	0	0	0	0	105	32	21	374	1

Major/Minor	Minor2				Major1			Major2		
Conflicting Flow All	538	554	375		375	0	0	137	0	0
Stage 1	417	417	-		-	-	-	-	-	-
Stage 2	121	137	-		-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3		4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-		-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-		-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39		2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	491	430	654		1141	-	-	1399	-	-
Stage 1	648	578	-		-	-	-	-	-	-
Stage 2	885	768	-		-	-	-	-	-	-
Platoon blocked, %						-	-		-	-
Mov Cap-1 Maneuver	484	0	654		1141	-	-	1399	-	-
Mov Cap-2 Maneuver	484	0	-		-	-	-	-	-	-
Stage 1	638	0	-		-	-	-	-	-	-
Stage 2	885	0	-		-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	654	1399	-	-
HCM Lane V/C Ratio	-	-	-	0.012	0.015	-	-
HCM Control Delay (s)	0	-	-	10.6	7.6	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Future Vol, veh/h	1	0	4	56	1	43	3	50	0	0	355	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	3	0	13	63	1	48	4	59	0	0	382	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	451	384	457	452	59	385	0	-	-	-	0
Stage 1	384	384	-	67	67	-	-	-	-	-	-	-
Stage 2	92	67	-	390	385	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	486	492	646	501	491	985	1131	-	0	0	-	-
Stage 1	623	598	-	924	824	-	-	-	0	0	-	-
Stage 2	896	824	-	618	597	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	460	490	646	489	489	985	1131	-	-	-	-	-
Mov Cap-2 Maneuver	524	522	-	528	519	-	-	-	-	-	-	-
Stage 1	621	598	-	920	821	-	-	-	-	-	-	-
Stage 2	848	821	-	606	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11	0.5	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1131	-	617	528	965	-	-
HCM Lane V/C Ratio	0.003	-	0.026	0.119	0.051	-	-
HCM Control Delay (s)	8.2	-	11	12.7	8.9	-	-
HCM Lane LOS	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.4	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Future Vol, veh/h	0	0	0	6	78	0	0	0	0	0	30	33
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	8	101	0	0	0	0	0	40	44
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	8	7.4
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	0%
Vol Thru, %	81%	100%	48%
Vol Right, %	0%	0%	52%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	32	52	63
LT Vol	6	0	0
Through Vol	26	52	30
RT Vol	0	0	33
Lane Flow Rate	42	68	84
Geometry Grp	7	7	2
Degree of Util (X)	0.057	0.09	0.092
Departure Headway (Hd)	4.912	4.818	3.939
Convergence, Y/N	Yes	Yes	Yes
Cap	729	743	895
Service Time	2.646	2.552	2.031
HCM Lane V/C Ratio	0.058	0.092	0.094
HCM Control Delay	7.9	8	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Future Volume (veh/h)	31	76	21	6	11	3	2	17	12	14	31	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	106	26	7	12	3	3	22	14	20	44	3
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	337	483	120	373	448	115	577	215	137	584	348	24
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	440	2098	521	515	1945	500	1255	988	629	1267	1599	109
Grp Volume(v), veh/h	101	0	74	13	0	9	3	0	36	20	0	47
Grp Sat Flow(s),veh/h/ln	1579	0	1480	1476	0	1484	1255	0	1616	1267	0	1708
Q Serve(g_s), s	0.0	0.0	0.9	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.9	0.1	0.0	0.1	0.5	0.0	0.4	0.7	0.0	0.5
Prop In Lane	0.43		0.35	0.53		0.34	1.00		0.39	1.00		0.06
Lane Grp Cap(c), veh/h	600	0	341	594	0	341	577	0	352	584	0	372
V/C Ratio(X)	0.17	0.00	0.22	0.02	0.00	0.03	0.01	0.00	0.10	0.03	0.00	0.13
Avail Cap(c_a), veh/h	2060	0	1771	1919	0	1776	2152	0	2381	2175	0	2516
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.8	6.5	0.0	6.5	7.0	0.0	6.8	7.1	0.0	6.8
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2
LnGrp Delay(d),s/veh	7.0	0.0	7.1	6.5	0.0	6.5	7.1	0.0	6.9	7.1	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		175			22			39			67	
Approach Delay, s/veh		7.0			6.5			6.9			7.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.7		11.0		10.7		11.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		2.5		3.0		2.7		2.1
Green Ext Time (p_c), s		0.1		0.9		0.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Future Vol, veh/h	14	101	89	0	0	0	18	35	54	109	283	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	25	25	25	95	95	95	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	22	158	139	0	0	0	19	37	57	121	314	30

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	675	703	329			344	0	0	94	0	0
Stage 1	571	571	-			-	-	-	-	-	-
Stage 2	104	132	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	407	352	694			1172	-	-	1451	-	-
Stage 1	550	492	-			-	-	-	-	-	-
Stage 2	901	772	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	367	0	694			1172	-	-	1451	-	-
Mov Cap-2 Maneuver	367	0	-			-	-	-	-	-	-
Stage 1	496	0	-			-	-	-	-	-	-
Stage 2	901	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	1.4	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	367	694	1451	-	-
HCM Lane V/C Ratio	0.016	-	-	0.49	0.2	0.083	-	-
HCM Control Delay (s)	8.1	-	-	23.9	11.5	7.7	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	0.7	0.3	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Future Vol, veh/h	0	260	11	0	0	0	0	0	0	28	11	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	338	14	0	0	0	0	0	0	40	16	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	9.2	8.4
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	72%
Vol Thru, %	100%	89%	28%
Vol Right, %	0%	11%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	98	39
LT Vol	0	0	28
Through Vol	173	87	11
RT Vol	0	11	0
Lane Flow Rate	225	127	56
Geometry Grp	7	7	2
Degree of Util (X)	0.298	0.165	0.078
Departure Headway (Hd)	4.769	4.69	5.018
Convergence, Y/N	Yes	Yes	Yes
Cap	750	761	718
Service Time	2.524	2.445	3.018
HCM Lane V/C Ratio	0.3	0.167	0.078
HCM Control Delay	9.6	8.4	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	0.6	0.3

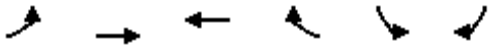
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Future Vol, veh/h	4	0	17	24	0	0	4	91	0	0	394	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	5	0	19	36	0	0	5	123	0	0	458	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	592	592	459	602	593	123	460	0	-	-	-	0
Stage 1	459	459	-	133	133	-	-	-	-	-	-	-
Stage 2	133	133	-	469	460	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	406	408	586	400	408	907	1060	-	0	0	-	-
Stage 1	567	553	-	852	771	-	-	-	0	0	-	-
Stage 2	852	771	-	560	553	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	404	406	586	386	406	907	1060	-	-	-	-	-
Mov Cap-2 Maneuver	476	466	-	456	464	-	-	-	-	-	-	-
Stage 1	564	553	-	848	767	-	-	-	-	-	-	-
Stage 2	848	767	-	542	553	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	13.6	0.4	0
HCM LOS	B	B		

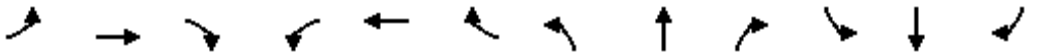
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1060	-	561	456	-	-
HCM Lane V/C Ratio	0.005	-	0.043	0.079	-	-
HCM Control Delay (s)	8.4	-	11.7	13.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.3	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	241	58	25	67	5
Future Volume (veh/h)	20	241	58	25	67	5
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	25	305	70	28	85	6
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	659	555	377	151	223	199
Arrive On Green	0.32	0.32	0.32	0.32	0.14	0.14
Sat Flow, veh/h	1198	1727	1175	470	1645	1468
Grp Volume(v), veh/h	25	305	0	98	85	6
Grp Sat Flow(s),veh/h/ln	1198	1727	0	1644	1645	1468
Q Serve(g_s), s	0.3	3.2	0.0	1.0	1.0	0.1
Cycle Q Clear(g_c), s	1.3	3.2	0.0	1.0	1.0	0.1
Prop In Lane	1.00			0.29	1.00	1.00
Lane Grp Cap(c), veh/h	659	555	0	528	223	199
V/C Ratio(X)	0.04	0.55	0.00	0.19	0.38	0.03
Avail Cap(c_a), veh/h	1739	2111	0	2010	1936	1728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.9	6.2	0.0	5.4	8.7	8.3
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.2	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.7	0.0	0.4	0.5	0.0
LnGrp Delay(d),s/veh	5.9	7.0	0.0	5.6	9.8	8.3
LnGrp LOS	A	A		A	A	A
Approach Vol, veh/h		330	98		91	
Approach Delay, s/veh		6.9	5.6		9.7	
Approach LOS		A	A		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.1				13.1		9.0
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		5.2				3.0		3.0
Green Ext Time (p_c), s		1.9				0.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	495	4	70	435	321	0	1	36	586	11	23
Future Volume (vph)	22	495	4	70	435	321	0	1	36	586	11	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.85		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3278		1641	3073			1474		1559	1554	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3278		1641	3073			1474		1559	1554	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	27	604	5	78	483	357	0	1	47	689	13	27
RTOR Reduction (vph)	0	1	0	0	111	0	0	45	0	0	3	0
Lane Group Flow (vph)	27	608	0	78	729	0	0	3	0	365	361	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	1.8	24.4		5.6	28.2			3.4		24.0	24.0	
Effective Green, g (s)	1.8	24.4		5.6	28.2			3.4		24.0	24.0	
Actuated g/C Ratio	0.02	0.33		0.08	0.38			0.05		0.32	0.32	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	39	1072		123	1161			67		501	499	
v/s Ratio Prot	0.02	0.19		c0.05	c0.24			c0.00		c0.23	0.23	
v/s Ratio Perm												
v/c Ratio	0.69	0.57		0.63	0.63			0.05		0.73	0.72	
Uniform Delay, d1	36.1	20.7		33.5	18.9			34.1		22.4	22.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	35.0	0.8		7.6	1.1			0.3		5.3	5.2	
Delay (s)	71.1	21.5		41.1	20.0			34.3		27.7	27.5	
Level of Service	E	C		D	C			C		C	C	
Approach Delay (s)		23.6			21.8			34.3			27.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Future Volume (veh/h)	0	563	454	523	256	0	0	0	0	502	4	515
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	670	0	601	294	0				567	0	494
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1833	820	695	2740	0				823	0	367
Arrive On Green	0.00	0.56	0.00	0.07	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	670	0	601	294	0				567	0	494
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	9.1	0.0	14.9	5.4	0.0				12.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1833	820	695	2740	0				823	0	367
V/C Ratio(X)	0.00	0.37	0.00	0.87	0.11	0.00				0.69	0.00	1.35
Avail Cap(c_a), veh/h	0	1833	820	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.74	0.00	0.56	0.56	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	36.0	6.7	0.0				27.2	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	4.7	0.0	0.0				2.1	0.0	172.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0	7.0	2.4	0.0				5.9	0.0	25.7
LnGrp Delay(d),s/veh	0.0	10.2	0.0	40.7	6.8	0.0				29.2	0.0	202.8
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		670			895						1061	
Approach Delay, s/veh		10.2			29.5						110.1	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.1	50.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	16.9	11.1		22.0		7.4		
Green Ext Time (p_c), s	0.5	6.3		0.0		4.1		

Intersection Summary	
HCM 2010 Ctrl Delay	57.1
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Future Volume (veh/h)	394	658	0	0	644	503	143	3	454	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	448	748	0	0	732	515	108	0	467			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	514	2286	0	0	882	615	300	0	535			
Arrive On Green	0.32	1.00	0.00	0.00	0.48	0.48	0.18	0.00	0.18			
Sat Flow, veh/h	3191	3368	0	0	1937	1290	1645	0	2936			
Grp Volume(v), veh/h	448	748	0	0	648	599	108	0	467			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1500	1645	0	1468			
Q Serve(g_s), s	10.6	0.0	0.0	0.0	27.3	27.8	4.6	0.0	12.4			
Cycle Q Clear(g_c), s	10.6	0.0	0.0	0.0	27.3	27.8	4.6	0.0	12.4			
Prop In Lane	1.00		0.00	0.00		0.86	1.00		1.00			
Lane Grp Cap(c), veh/h	514	2286	0	0	782	715	300	0	535			
V/C Ratio(X)	0.87	0.33	0.00	0.00	0.83	0.84	0.36	0.00	0.87			
Avail Cap(c_a), veh/h	610	2286	0	0	782	715	317	0	565			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.73	0.73	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.3	0.0	0.0	0.0	18.1	18.2	28.6	0.0	31.8			
Incr Delay (d2), s/veh	7.8	0.3	0.0	0.0	9.9	11.2	0.3	0.0	12.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.2	0.1	0.0	0.0	14.4	13.7	2.1	0.0	6.0			
LnGrp Delay(d),s/veh	34.1	0.3	0.0	0.0	28.0	29.5	28.9	0.0	44.7			
LnGrp LOS	C	A			C	C	C		D			
Approach Vol, veh/h		1196			1247			575				
Approach Delay, s/veh		12.9			28.7			41.7				
Approach LOS		B			C			D				

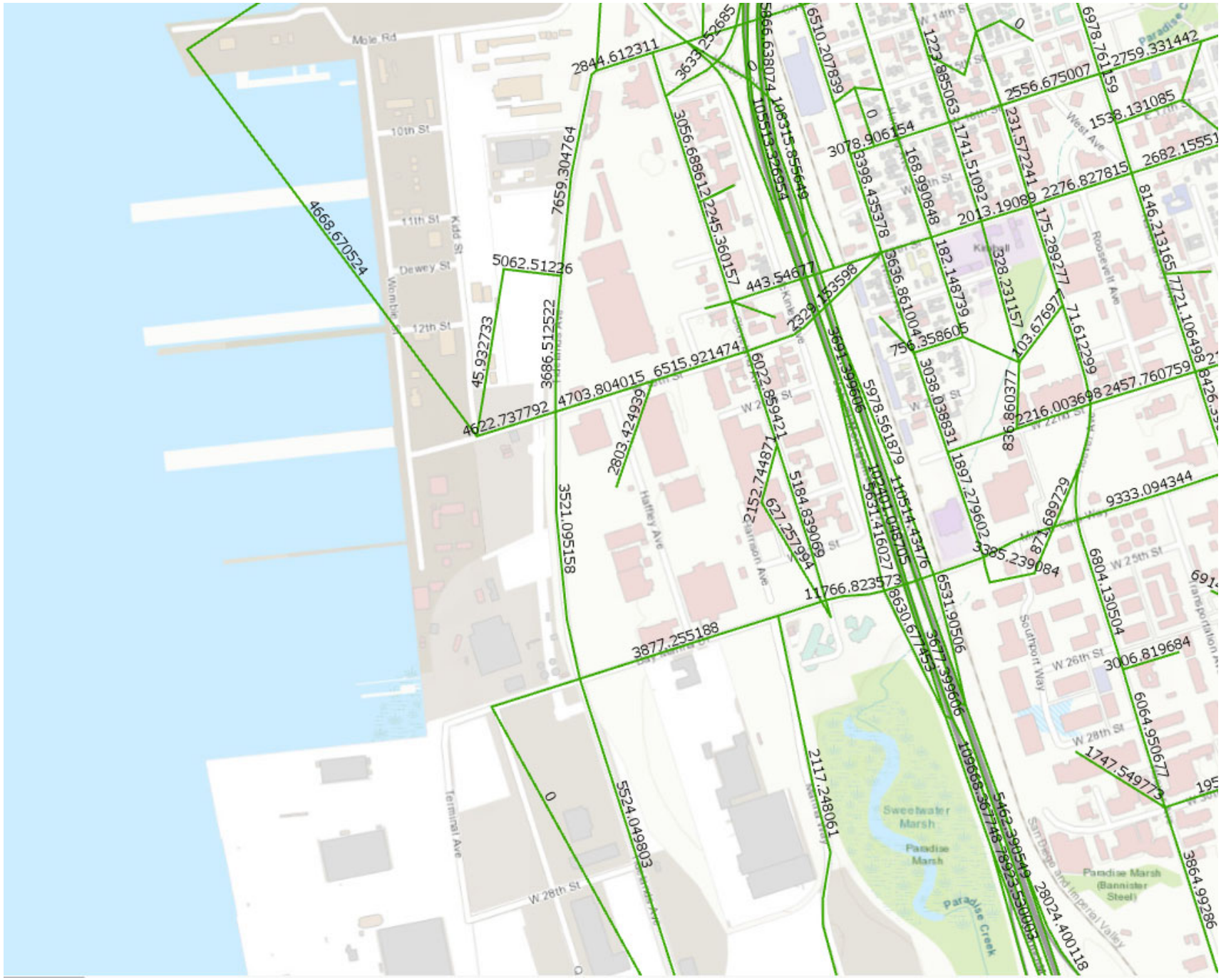
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.8			17.6	43.2		19.2
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		54.9			* 15	34.9		15.4
Max Q Clear Time (g_c+I1), s		2.0			12.6	29.8		14.4
Green Ext Time (p_c), s		12.9			0.3	4.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

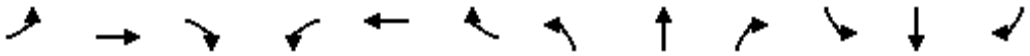
Notes

Appendix F
SANDAG Series 13 Travel Demand Model – Year 2030 ADTs

SANDAG SERIES 13 MODEL – 2030 ADTs



Appendix G
Peak Hour Intersection LOS Worksheets – Near-Term Year 2030 Base Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	110	40	50	65	0	60	0	340	0	30	30
Future Volume (Veh/h)	0	110	40	50	65	0	60	0	340	0	30	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.71	0.71	0.71	0.88	0.88	0.88	0.96	0.96	0.96
Hourly flow rate (vph)	0	159	58	70	92	0	68	0	386	0	31	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					168							
pX, platoon unblocked												
vC, conflicting volume	92			217			466	420	188	806	449	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92			217			466	420	188	806	449	92
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			95			84	100	54	100	93	97
cM capacity (veh/h)	1454			1307			435	485	834	150	467	944

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	217	162	68	386	62
Volume Left	0	70	68	0	0
Volume Right	58	0	0	386	31
cSH	1700	1307	435	834	625
Volume to Capacity	0.13	0.05	0.16	0.46	0.10
Queue Length 95th (ft)	0	4	14	62	8
Control Delay (s)	0.0	3.7	14.8	13.0	11.4
Lane LOS		A	B	B	B
Approach Delay (s)	0.0	3.7	13.3		11.4
Approach LOS			B		B

Intersection Summary				
Average Delay	8.2			
Intersection Capacity Utilization	35.9%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	110	40	50	65	0	60	0	340	0	30	30
Future Vol, veh/h	0	110	40	50	65	0	60	0	340	0	30	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	159	58	70	92	0	68	0	386	0	31	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	217	0	0	451	-	188	-	449	92
Stage 1	-	-	-	-	-	-	188	-	-	-	232	-
Stage 2	-	-	-	-	-	-	263	-	-	-	217	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1307	-	0	505	0	834	0	493	944
Stage 1	0	-	-	-	-	0	796	0	-	0	698	-
Stage 2	0	-	-	-	-	0	725	0	-	0	709	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1307	-	-	443	-	834	-	465	944
Mov Cap-2 Maneuver	-	-	-	-	-	-	443	-	-	-	465	-
Stage 1	-	-	-	-	-	-	796	-	-	-	659	-
Stage 2	-	-	-	-	-	-	630	-	-	-	709	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.4	13.2	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	443	834	-	-	1307	-	623
HCM Lane V/C Ratio	0.154	0.463	-	-	0.054	-	0.1
HCM Control Delay (s)	14.6	13	-	-	7.9	0	11.4
HCM Lane LOS	B	B	-	-	A	A	B
HCM 95th %tile Q(veh)	0.5	2.5	-	-	0.2	-	0.3



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	165	0	240	45	70	30	95	70	550	5	180	40
Future Volume (vph)	165	0	240	45	70	30	95	70	550	5	180	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.98		1.00	0.89		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3204		1641	1530		1641	3158			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3204		1641	1530		1641	3158			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	192	0	279	52	100	43	136	80	625	5	205	45
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	192	321	0	100	179	0	80	835	0	0	45
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		17.4	17.4		18.7	18.7		9.2	38.0			5.2
Effective Green, g (s)		17.4	17.4		18.7	18.7		9.2	38.0			5.2
Actuated g/C Ratio		0.16	0.16		0.17	0.17		0.08	0.34			0.05
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		257	502		276	257		136	1081			76
v/s Ratio Prot		c0.12	0.10		0.06	c0.12		c0.05	c0.26			0.03
v/s Ratio Perm												
v/c Ratio		0.75	0.64		0.36	0.70		0.59	0.77			0.59
Uniform Delay, d1		44.7	43.9		40.9	43.5		49.1	32.6			51.9
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		9.9	2.0		0.3	6.5		4.1	4.1			8.0
Delay (s)		54.6	45.8		41.2	50.0		53.2	36.7			59.8
Level of Service		D	D		D	D		D	D			E
Approach Delay (s)			49.0			46.8			38.2			
Approach LOS			D			D			D			

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	120	15	15
Future Volume (vph)	120	15	15
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	3282	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	3282	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	136	16	16
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	136	16	16
Turn Type	NA	Prot	Prot
Protected Phases	2	4	4
Permitted Phases			
Actuated Green, G (s)	34.0	6.2	6.2
Effective Green, g (s)	34.0	6.2	6.2
Actuated g/C Ratio	0.31	0.06	0.06
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	1005	91	81
v/s Ratio Prot	0.04	0.01	c0.01
v/s Ratio Perm			
v/c Ratio	0.14	0.18	0.20
Uniform Delay, d1	27.9	50.0	50.0
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.4
Delay (s)	28.0	50.3	50.5
Level of Service	C	D	D
Approach Delay (s)	35.9	50.4	
Approach LOS	D	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	5	0	15	10	250	10	20	185	5
Future Vol, veh/h	5	0	5	5	0	15	10	250	10	20	185	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	11	0	34	12	309	12	23	210	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	615	604	213	602	601	315	216	0	0	321	0	0
Stage 1	259	259	-	339	339	-	-	-	-	-	-	-
Stage 2	356	345	-	263	262	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	392	402	807	400	404	707	1308	-	-	1195	-	-
Stage 1	728	679	-	659	626	-	-	-	-	-	-	-
Stage 2	645	622	-	725	677	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	365	391	807	388	393	707	1308	-	-	1195	-	-
Mov Cap-2 Maneuver	365	391	-	388	393	-	-	-	-	-	-	-
Stage 1	721	666	-	653	620	-	-	-	-	-	-	-
Stage 2	608	616	-	704	664	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	11.7	0.3	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1308	-	-	503	586	1195	-	-
HCM Lane V/C Ratio	0.009	-	-	0.032	0.078	0.019	-	-
HCM Control Delay (s)	7.8	-	-	12.4	11.7	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	230	5	70	15	250	0	0	190	10
Future Vol, veh/h	5	0	5	230	5	70	15	250	0	0	190	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	258	6	79	20	333	0	0	224	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	646	603	230	613	609	333	236	0	-	-	-	0
Stage 1	230	230	-	373	373	-	-	-	-	-	-	-
Stage 2	416	373	-	240	236	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	374	403	790	393	399	691	1286	-	0	0	-	-
Stage 1	755	699	-	632	604	-	-	-	0	0	-	-
Stage 2	598	604	-	746	695	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	325	397	790	378	393	691	1286	-	-	-	-	-
Mov Cap-2 Maneuver	417	471	-	473	466	-	-	-	-	-	-	-
Stage 1	743	699	-	622	594	-	-	-	-	-	-	-
Stage 2	517	594	-	727	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	18.9	0.4	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1286	-	546	473	669	-	-
HCM Lane V/C Ratio	0.016	-	0.073	0.546	0.126	-	-
HCM Control Delay (s)	7.8	-	12.1	21.4	11.2	-	-
HCM Lane LOS	A	-	B	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	3.2	0.4	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	300	40	10	10	0	0	25	10
Future Vol, veh/h	0	0	0	20	300	40	10	10	0	0	25	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	25	370	49	15	15	0	0	31	12

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	251	469	-	-	445	210
Stage 1	-	-	-	0	0	-	-	445	-
Stage 2	-	-	-	251	469	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	661	473	0	0	489	771
Stage 1	-	-	-	-	-	0	0	553	-
Stage 2	-	-	-	709	539	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	619	473	-	-	489	771
Mov Cap-2 Maneuver	-	-	-	619	473	-	-	489	-
Stage 1	-	-	-	-	-	-	-	553	-
Stage 2	-	-	-	659	539	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		12.1	12.2
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	536	-	-	-	546
HCM Lane V/C Ratio	0.056	-	-	-	0.079
HCM Control Delay (s)	12.1	-	-	-	12.2
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	30	35	180	30	120	80	40	50	80	110
Future Volume (veh/h)	20	20	30	35	180	30	120	80	40	50	80	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	28	28	42	38	198	33	152	101	50	71	114	148
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	276	190	267	213	488	82	514	410	203	611	257	334
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	426	951	1336	267	2443	409	1032	1092	540	1142	683	887
Grp Volume(v), veh/h	56	0	42	148	0	121	152	0	151	71	0	262
Grp Sat Flow(s),veh/h/ln	1378	0	1336	1619	0	1500	1032	0	1632	1142	0	1571
Q Serve(g_s), s	0.0	0.0	0.7	0.2	0.0	2.0	3.7	0.0	1.8	1.3	0.0	3.5
Cycle Q Clear(g_c), s	2.0	0.0	0.7	2.1	0.0	2.0	7.2	0.0	1.8	3.1	0.0	3.5
Prop In Lane	0.50		1.00	0.26		0.27	1.00		0.33	1.00		0.56
Lane Grp Cap(c), veh/h	466	0	267	484	0	300	514	0	614	611	0	591
V/C Ratio(X)	0.12	0.00	0.16	0.31	0.00	0.40	0.30	0.00	0.25	0.12	0.00	0.44
Avail Cap(c_a), veh/h	1412	0	1228	1608	0	1378	1292	0	1845	1473	0	1776
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.4	9.9	0.0	9.9	9.3	0.0	6.1	7.1	0.0	6.6
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.4	0.0	0.9	0.3	0.0	0.2	0.1	0.0	0.5
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	0.4	0.0	0.3	1.0	0.0	0.9	1.1	0.0	0.8	0.4	0.0	1.6
LnGrp Delay(d),s/veh	9.5	0.0	9.6	10.3	0.0	10.7	9.6	0.0	6.3	7.2	0.0	7.1
LnGrp LOS	A		A	B		B	A		A	A		A
Approach Vol, veh/h		98			269			303			333	
Approach Delay, s/veh		9.5			10.5			8.0			7.2	
Approach LOS		A			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		16.6		11.7		16.6		11.7
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		9.2		4.0		5.5		4.1
Green Ext Time (p_c), s		1.5		0.5		1.9		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	40	25	0	0	0	110	235	40	80	60	230
Future Vol, veh/h	20	40	25	0	0	0	110	235	40	80	60	230
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	29	57	36	0	0	0	118	253	43	98	73	280

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	920	941	213	353	0	0	296	0	0
Stage 1	409	409	-	-	-	-	-	-	-
Stage 2	511	532	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	291	255	807	1163	-	-	1221	-	-
Stage 1	654	582	-	-	-	-	-	-	-
Stage 2	586	513	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	241	0	807	1163	-	-	1221	-	-
Mov Cap-2 Maneuver	241	0	-	-	-	-	-	-	-
Stage 1	541	0	-	-	-	-	-	-	-
Stage 2	586	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.6	2.4	1.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1163	-	-	241	807	1221	-	-
HCM Lane V/C Ratio	0.102	-	-	0.356	0.044	0.08	-	-
HCM Control Delay (s)	8.4	-	-	28	9.7	8.2	-	-
HCM Lane LOS	A	-	-	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.5	0.1	0.3	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	120	15	0	0	0	0	15	15	20	15	0
Future Vol, veh/h	30	120	15	0	0	0	0	15	15	20	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	37	148	19	0	0	0	0	26	26	28	21	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	232	84	161	241	-
Stage 1	-	-	-			-	232	-	0	0	-
Stage 2	-	-	-			-	0	-	161	241	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	649	933	767	641	0
Stage 1	-	-	-			0	692	-	-	-	0
Stage 2	-	-	-			0	-	-	802	686	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	649	933	723	641	-
Mov Cap-2 Maneuver	-	-	-			-	649	-	723	641	-
Stage 1	-	-	-			-	692	-	-	-	-
Stage 2	-	-	-			-	-	-	751	686	-

Approach	EB	NB	SB
HCM Control Delay, s		10	10.7
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	766	-	-	-	685
HCM Lane V/C Ratio	0.068	-	-	-	0.071
HCM Control Delay (s)	10	-	-	-	10.7
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

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	5	5	5	15	0	5	20	365	20	5	100	10
Future Vol, veh/h	5	5	5	15	0	5	20	365	20	5	100	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	7	7	7	19	0	6	25	456	25	7	149	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	693	702	157	697	697	469	164	0	0	481	0	0
Stage 1	171	171	-	519	519	-	-	-	-	-	-	-
Stage 2	522	531	-	178	178	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	347	353	868	345	355	578	1367	-	-	1041	-	-
Stage 1	812	742	-	525	520	-	-	-	-	-	-	-
Stage 2	524	513	-	805	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	337	344	868	331	346	578	1367	-	-	1041	-	-
Mov Cap-2 Maneuver	337	344	-	331	346	-	-	-	-	-	-	-
Stage 1	797	737	-	516	511	-	-	-	-	-	-	-
Stage 2	509	504	-	786	732	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	15.4	0.4	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1367	-	-	427	371	1041	-	-
HCM Lane V/C Ratio	0.018	-	-	0.047	0.067	0.007	-	-
HCM Control Delay (s)	7.7	-	-	13.8	15.4	8.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	100	10	100	250	200	10	20	20	50	50	60
Future Volume (veh/h)	20	100	10	100	250	200	10	20	20	50	50	60
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	25	127	13	120	301	224	17	34	32	63	63	72
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	432	1047	106	625	632	458	431	182	172	491	164	187
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	810	3010	304	1153	1818	1318	1158	820	771	1233	737	842
Grp Volume(v), veh/h	25	69	71	120	271	254	17	0	66	63	0	135
Grp Sat Flow(s),veh/h/ln	810	1641	1674	1153	1641	1495	1158	0	1591	1233	0	1579
Q Serve(g_s), s	0.7	0.8	0.8	2.2	3.6	3.7	0.4	0.0	0.9	1.2	0.0	2.0
Cycle Q Clear(g_c), s	4.4	0.8	0.8	3.0	3.6	3.7	2.4	0.0	0.9	2.2	0.0	2.0
Prop In Lane	1.00		0.18	1.00		0.88	1.00		0.48	1.00		0.53
Lane Grp Cap(c), veh/h	432	571	582	625	571	520	431	0	354	491	0	351
V/C Ratio(X)	0.06	0.12	0.12	0.19	0.47	0.49	0.04	0.00	0.19	0.13	0.00	0.38
Avail Cap(c_a), veh/h	1021	1763	1799	1464	1763	1606	1751	0	2166	1895	0	2149
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.9	6.2	6.2	7.2	7.1	7.2	10.2	0.0	8.8	9.7	0.0	9.2
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.1	0.6	0.7	0.0	0.0	0.3	0.1	0.0	0.7
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	0.2	0.4	0.4	0.7	1.7	1.6	0.1	0.0	0.4	0.4	0.0	0.9
LnGrp Delay(d),s/veh	8.9	6.3	6.3	7.4	7.7	7.9	10.3	0.0	9.1	9.8	0.0	9.9
LnGrp LOS	A	A	A	A	A	A	B		A	A		A
Approach Vol, veh/h		165			645			83			198	
Approach Delay, s/veh		6.7			7.7			9.3			9.9	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.7		12.2		15.7		12.2
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		6.4		4.4		5.7		4.2
Green Ext Time (p_c), s		0.9		0.4		4.0		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	225	50	65	470	20	50
Future Volume (veh/h)	225	50	65	470	20	50
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	288	64	76	547	29	64
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.86	0.86	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	736	161	208	1767	258	430
Arrive On Green	0.27	0.27	0.13	0.54	0.15	0.15
Sat Flow, veh/h	2765	586	1645	3368	1774	1583
Grp Volume(v), veh/h	175	177	76	547	29	64
Grp Sat Flow(s),veh/h/ln	1641	1624	1645	1641	1774	1583
Q Serve(g_s), s	2.5	2.6	1.2	2.7	0.4	0.9
Cycle Q Clear(g_c), s	2.5	2.6	1.2	2.7	0.4	0.9
Prop In Lane		0.36	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	451	446	208	1767	258	430
V/C Ratio(X)	0.39	0.40	0.37	0.31	0.11	0.15
Avail Cap(c_a), veh/h	1432	1417	509	4331	1975	1963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.6	8.6	11.6	3.7	10.8	8.0
Incr Delay (d2), s/veh	0.5	0.6	0.4	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.2	0.6	1.2	0.2	0.4
LnGrp Delay(d),s/veh	9.1	9.2	12.0	3.8	10.9	8.1
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	352			623	93	
Approach Delay, s/veh	9.1			4.8	9.0	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.7	12.6				20.3		8.8
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	9.0	25.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	3.2	4.6				4.7		2.9
Green Ext Time (p_c), s	0.0	2.0				4.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	6.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	170	50	40	500	340	5	10	20	80	10	30
Future Volume (veh/h)	55	170	50	40	500	340	5	10	20	80	10	30
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	56	172	51	43	538	337	7	14	28	85	55	42
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	74	1576	438	61	818	512	67	21	42	176	97	74
Arrive On Green	0.04	0.43	0.43	0.04	0.42	0.42	0.04	0.04	0.04	0.11	0.11	0.11
Sat Flow, veh/h	1645	3672	1019	1645	1940	1214	1645	515	1030	1645	910	695
Grp Volume(v), veh/h	56	146	77	43	455	420	7	0	42	85	0	97
Grp Sat Flow(s),veh/h/ln	1645	1572	1547	1645	1641	1513	1645	0	1545	1645	0	1605
Q Serve(g_s), s	1.5	1.2	1.3	1.2	9.9	9.9	0.2	0.0	1.2	2.2	0.0	2.6
Cycle Q Clear(g_c), s	1.5	1.2	1.3	1.2	9.9	9.9	0.2	0.0	1.2	2.2	0.0	2.6
Prop In Lane	1.00		0.66	1.00		0.80	1.00		0.67	1.00		0.43
Lane Grp Cap(c), veh/h	74	1350	664	61	692	638	67	0	63	176	0	171
V/C Ratio(X)	0.76	0.11	0.12	0.71	0.66	0.66	0.10	0.00	0.67	0.48	0.00	0.57
Avail Cap(c_a), veh/h	199	2124	1045	236	1145	1056	676	0	635	1218	0	1188
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.0	7.6	7.6	21.2	10.3	10.3	20.6	0.0	21.1	18.7	0.0	18.9
Incr Delay (d2), s/veh	5.8	0.0	0.1	5.5	1.3	1.4	0.7	0.0	11.4	2.1	0.0	2.9
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	0.8	0.5	0.6	0.6	4.7	4.3	0.1	0.0	0.7	1.1	0.0	1.3
LnGrp Delay(d),s/veh	26.9	7.6	7.7	26.7	11.6	11.7	21.3	0.0	32.5	20.8	0.0	21.8
LnGrp LOS	C	A	A	C	B	B	C		C	C		C
Approach Vol, veh/h		279			918			49			182	
Approach Delay, s/veh		11.5			12.4			30.9			21.4	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	23.7		9.0	6.2	23.4		6.0
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.4	30.1		* 33	* 5.4	31.1		18.3
Max Q Clear Time (g_c+I1), s	3.2	3.3		4.6	3.5	11.9		3.2
Green Ext Time (p_c), s	0.0	1.7		0.8	0.0	6.9		0.1

Intersection Summary			
HCM 2010 Ctrl Delay		14.0	
HCM 2010 LOS		B	

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	125	145	300	720	0	0	0	0	405	25	160
Future Volume (veh/h)	0	125	145	300	720	0	0	0	0	405	25	160
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	149	0	345	828	0				475	0	147
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1643	735	441	2289	0				575	0	257
Arrive On Green	0.00	0.50	0.00	0.05	0.23	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	149	0	345	828	0				475	0	147
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	1.9	0.0	8.6	16.9	0.0				11.1	0.0	7.3
Cycle Q Clear(g_c), s	0.0	1.9	0.0	8.6	16.9	0.0				11.1	0.0	7.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1643	735	441	2289	0				575	0	257
V/C Ratio(X)	0.00	0.09	0.00	0.78	0.36	0.00				0.83	0.00	0.57
Avail Cap(c_a), veh/h	0	1643	735	798	2289	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.42	0.42	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.4	0.0	37.0	15.8	0.0				31.8	0.0	30.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.5	0.2	0.0				3.2	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.0	3.8	7.8	0.0				5.3	0.0	3.0
LnGrp Delay(d),s/veh	0.0	10.6	0.0	37.5	16.0	0.0				35.0	0.0	31.0
LnGrp LOS		B		D	B					D		C
Approach Vol, veh/h		149			1173						622	
Approach Delay, s/veh		10.6			22.3						34.1	
Approach LOS		B			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.8	45.2		19.1		60.9		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 45		
Max Q Clear Time (g_c+I1), s	10.6	3.9		13.1		18.9		
Green Ext Time (p_c), s	0.5	1.5		0.9		11.4		

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	450	0	0	515	400	505	260	640	0	0	0
Future Volume (veh/h)	80	450	0	0	515	400	505	260	640	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	91	511	0	0	585	413	430	484	270			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	173	2063	0	0	949	670	411	432	367			
Arrive On Green	0.11	1.00	0.00	0.00	0.52	0.52	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1926	1299	1645	1727	1468			
Grp Volume(v), veh/h	91	511	0	0	522	476	430	484	270			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1498	1645	1727	1468			
Q Serve(g_s), s	2.2	0.0	0.0	0.0	18.1	18.1	20.0	20.0	13.5			
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.0	18.1	18.1	20.0	20.0	13.5			
Prop In Lane	1.00		0.00	0.00		0.87	1.00		1.00			
Lane Grp Cap(c), veh/h	173	2063	0	0	846	773	411	432	367			
V/C Ratio(X)	0.53	0.25	0.00	0.00	0.62	0.62	1.05	1.12	0.74			
Avail Cap(c_a), veh/h	794	2063	0	0	846	773	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.85	0.85	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	34.7	0.0	0.0	0.0	13.8	13.8	30.0	30.0	27.6			
Incr Delay (d2), s/veh	0.8	0.2	0.0	0.0	3.4	3.7	56.8	80.5	6.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	0.1	0.0	0.0	8.9	8.2	15.5	19.1	6.2			
LnGrp Delay(d),s/veh	35.5	0.2	0.0	0.0	17.1	17.4	86.8	110.5	34.2			
LnGrp LOS	D	A			B	B	F	F	C			
Approach Vol, veh/h		602			998			1184				
Approach Delay, s/veh		5.6			17.3			84.5				
Approach LOS		A			B			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			9.0	46.4		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.7			* 20	25.7		20.0
Max Q Clear Time (g_c+I1), s		2.0			4.2	20.1		22.0
Green Ext Time (p_c), s		6.4			0.1	4.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.3
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	5	5	0	5	0	25	0	25	45	35
Future Vol, veh/h	25	0	5	5	0	5	0	25	0	25	45	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	30	30	30	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	36	0	7	17	0	17	0	33	0	36	65	51

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	205	196	91	199	221	33	116	0	0	33	0	0
Stage 1	163	163	-	33	33	-	-	-	-	-	-	-
Stage 2	42	33	-	166	188	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	736	685	945	743	664	1018	1424	-	-	1529	-	-
Stage 1	821	748	-	963	852	-	-	-	-	-	-	-
Stage 2	952	852	-	818	730	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	710	668	945	723	647	1018	1424	-	-	1529	-	-
Mov Cap-2 Maneuver	710	668	-	723	647	-	-	-	-	-	-	-
Stage 1	821	729	-	963	852	-	-	-	-	-	-	-
Stage 2	936	852	-	791	712	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	9.4	0	1.8
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1424	-	-	741	846	1529	-	-
HCM Lane V/C Ratio	-	-	-	0.059	0.039	0.024	-	-
HCM Control Delay (s)	0	-	-	10.2	9.4	7.4	0	-
HCM Lane LOS	A	-	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	15	5	15	20	20	5	15	0	15	25	10
Future Vol, veh/h	0	15	5	15	20	20	5	15	0	15	25	10
Peak Hour Factor	0.54	0.54	0.54	0.52	0.52	0.52	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	28	9	29	38	38	7	20	0	20	33	13
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	7.7	7.8	8.1	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	25%	0%	0%	0%	100%	0%	0%	30%
Vol Thru, %	75%	100%	100%	0%	0%	100%	25%	50%
Vol Right, %	0%	0%	0%	100%	0%	0%	75%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	0	15	5	15	13	27	50
LT Vol	5	0	0	0	15	0	0	15
Through Vol	15	0	15	0	0	13	7	25
RT Vol	0	0	0	5	0	0	20	10
Lane Flow Rate	27	0	28	9	29	26	51	67
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.038	0	0.039	0.011	0.044	0.035	0.063	0.093
Departure Headway (Hd)	5.197	5.014	5.014	4.312	5.456	4.955	4.433	5.045
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	692	0	718	834	660	726	813	714
Service Time	2.904	2.72	2.72	2.017	3.161	2.659	2.133	2.751
HCM Lane V/C Ratio	0.039	0	0.039	0.011	0.044	0.036	0.063	0.094
HCM Control Delay	8.1	7.7	7.9	7.1	8.4	7.8	7.4	8.3
HCM Lane LOS	A	N	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.1	0	0.1	0.1	0.2	0.3

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	30	0	25	20
Future Vol, veh/h	0	35	30	0	25	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	0	52	49	0	35	28

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	147	49	0	0	49	0
Stage 1	49	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	827	997	-	-	1558	-
Stage 1	953	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	809	997	-	-	1558	-
Mov Cap-2 Maneuver	809	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	906	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	4.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	997	1558	-
HCM Lane V/C Ratio	-	-	-	0.052	0.023	-
HCM Control Delay (s)	-	-	0	8.8	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	71.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	170	50	65	30	0	10	0	130	0	390	45
Future Vol, veh/h	0	170	50	65	30	0	10	0	130	0	390	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	288	85	94	43	0	13	0	167	0	448	52

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	373	0	0	812	-	331	-	604	43
Stage 1	-	-	-	-	-	-	331	-	-	-	231	-
Stage 2	-	-	-	-	-	-	481	-	-	-	373	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1143	-	0	288	0	693	0	~ 402	1005
Stage 1	0	-	-	-	-	0	666	0	-	0	699	-
Stage 2	0	-	-	-	-	0	551	0	-	0	604	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1143	-	-	-	-	693	-	~ 368	1005
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	~ 368	-
Stage 1	-	-	-	-	-	-	666	-	-	-	640	-
Stage 2	-	-	-	-	-	-	143	-	-	-	604	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	5.8		168.9
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	693	-	-	1143	-	394
HCM Lane V/C Ratio	-	0.241	-	-	0.082	-	1.269
HCM Control Delay (s)	-	11.8	-	-	8.4	0	168.9
HCM Lane LOS	-	B	-	-	A	A	F
HCM 95th %tile Q(veh)	-	0.9	-	-	0.3	-	21.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Future Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3139		1641	1658		1641	3098		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3139		1641	1658		1641	3098		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	70	0	198	81	157	57	21	40	153	91	239	1256
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	249	0	157	78	0	40	244	0	239	1256
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		12.8	12.8		16.4	16.4		4.4	21.8		16.6	34.0
Effective Green, g (s)		12.8	12.8		16.4	16.4		4.4	21.8		16.6	34.0
Actuated g/C Ratio		0.13	0.13		0.17	0.17		0.04	0.22		0.17	0.34
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		212	406		272	274		73	682		275	1128
v/s Ratio Prot		0.04	c0.08		c0.10	0.05		0.02	0.08		c0.15	c0.38
v/s Ratio Perm												
v/c Ratio		0.33	0.61		0.58	0.28		0.55	0.36		0.87	1.11
Uniform Delay, d1		39.2	40.7		38.1	36.1		46.3	32.6		40.1	32.5
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	1.9		1.8	0.2		4.4	0.7		23.3	63.6
Delay (s)		39.5	42.7		39.9	36.3		50.7	33.3		63.4	96.1
Level of Service		D	D		D	D		D	C		E	F
Approach Delay (s)			42.0			38.7			35.8			90.9
Approach LOS			D			D			D			F

Intersection Summary			
HCM 2000 Control Delay	71.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	20	20
Future Volume (vph)	20	20
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	22	22
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	22	22
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	5.8	5.8
Effective Green, g (s)	5.8	5.8
Actuated g/C Ratio	0.06	0.06
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	96	86
v/s Ratio Prot	0.01	c0.01
v/s Ratio Perm		
v/c Ratio	0.23	0.26
Uniform Delay, d1	44.4	44.5
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.6
Delay (s)	44.9	45.1
Level of Service	D	D
Approach Delay (s)	45.0	
Approach LOS	D	

Intersection Summary

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	0	0	5	5	0	20	5	60	5	20	350	5
Future Vol, veh/h	0	0	5	5	0	20	5	60	5	20	350	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	13	7	0	27	7	81	7	22	385	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	544	534	388	537	533	85	390	0	0	88	0	0
Stage 1	432	432	-	99	99	-	-	-	-	-	-	-
Stage 2	112	102	-	438	434	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	438	441	643	442	442	952	1126	-	-	1459	-	-
Stage 1	587	569	-	888	798	-	-	-	-	-	-	-
Stage 2	874	795	-	582	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	419	432	643	426	433	952	1126	-	-	1459	-	-
Mov Cap-2 Maneuver	419	432	-	426	433	-	-	-	-	-	-	-
Stage 1	583	560	-	883	793	-	-	-	-	-	-	-
Stage 2	844	790	-	561	559	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	9.9	0.6	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	643	763	1459	-	-
HCM Lane V/C Ratio	0.006	-	-	0.02	0.044	0.015	-	-
HCM Control Delay (s)	8.2	-	-	10.7	9.9	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	175	5	30	5	40	0	0	370	20
Future Vol, veh/h	5	0	5	175	5	30	5	40	0	0	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	16	197	6	34	6	47	0	0	398	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	488	468	409	476	479	47	420	0	-	-	-	0
Stage 1	409	409	-	59	59	-	-	-	-	-	-	-
Stage 2	79	59	-	417	420	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	477	481	625	486	474	1000	1097	-	0	0	-	-
Stage 1	604	582	-	933	830	-	-	-	0	0	-	-
Stage 2	910	830	-	598	576	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	455	479	625	471	472	1000	1097	-	-	-	-	-
Mov Cap-2 Maneuver	514	510	-	509	501	-	-	-	-	-	-	-
Stage 1	601	582	-	928	826	-	-	-	-	-	-	-
Stage 2	869	826	-	583	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	15.3	0.9	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1097	-	564	509	875	-	-
HCM Lane V/C Ratio	0.005	-	0.057	0.386	0.045	-	-
HCM Control Delay (s)	8.3	-	11.8	16.5	9.3	-	-
HCM Lane LOS	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	1.8	0.1	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	200	30	5	15	0	0	35	15
Future Vol, veh/h	0	0	0	30	200	30	5	15	0	0	35	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	39	260	39	7	20	0	0	47	20

Major/Minor	Major2			Minor1			Minor2			
Conflicting Flow All	0	0	0	232	377	-	-	358	150	
Stage 1	-	-	-	0	0	-	-	358	-	
Stage 2	-	-	-	232	377	-	-	0	-	
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-	
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-	
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4	
Pot Cap-1 Maneuver	-	-	-	682	535	0	0	549	845	
Stage 1	-	-	-	-	-	0	0	607	-	
Stage 2	-	-	-	728	595	0	0	-	-	
Platoon blocked, %		-	-							
Mov Cap-1 Maneuver	-	-	-	623	535	-	-	549	845	
Mov Cap-2 Maneuver	-	-	-	623	535	-	-	549	-	
Stage 1	-	-	-	-	-	-	-	607	-	
Stage 2	-	-	-	656	595	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s		11.8	11.6
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	555	-	-	-	613
HCM Lane V/C Ratio	0.048	-	-	-	0.109
HCM Control Delay (s)	11.8	-	-	-	11.6
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	85	25	10	5	10	10	25	20	35	55	25
Future Volume (veh/h)	65	85	25	10	5	10	10	25	20	35	55	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	90	118	32	11	5	11	13	32	24	50	79	36
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	389	361	104	376	121	282	597	291	219	647	357	163
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	753	1711	493	651	575	1336	1180	918	688	1244	1124	512
Grp Volume(v), veh/h	144	0	96	16	0	11	13	0	56	50	0	115
Grp Sat Flow(s),veh/h/ln	1472	0	1485	1226	0	1336	1180	0	1606	1244	0	1637
Q Serve(g_s), s	1.2	0.0	1.4	0.0	0.0	0.2	0.2	0.0	0.6	0.8	0.0	1.3
Cycle Q Clear(g_c), s	2.1	0.0	1.4	1.4	0.0	0.2	1.5	0.0	0.6	1.4	0.0	1.3
Prop In Lane	0.63		0.33	0.69		1.00	1.00		0.43	1.00		0.31
Lane Grp Cap(c), veh/h	541	0	314	497	0	282	597	0	510	647	0	520
V/C Ratio(X)	0.27	0.00	0.31	0.03	0.00	0.04	0.02	0.00	0.11	0.08	0.00	0.22
Avail Cap(c_a), veh/h	1695	0	1516	1532	0	1364	1704	0	2018	1816	0	2057
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.5	8.0	0.0	8.0	6.9	0.0	6.1	6.6	0.0	6.4
Incr Delay (d2), s/veh	0.3	0.0	0.5	0.0	0.0	0.1	0.0	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.6	0.1	0.0	0.1	0.1	0.0	0.3	0.3	0.0	0.6
LnGrp Delay(d),s/veh	9.0	0.0	9.0	8.0	0.0	8.0	6.9	0.0	6.2	6.7	0.0	6.6
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		240			27			69			165	
Approach Delay, s/veh		9.0			8.0			6.4			6.6	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.1		11.4		14.1		11.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		3.5		4.1		3.4		3.4
Green Ext Time (p_c), s		0.3		1.3		0.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	11.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	165	90	0	0	0	10	20	30	160	280	100
Future Vol, veh/h	40	165	90	0	0	0	10	20	30	160	280	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	179	98	0	0	0	11	21	32	174	304	109

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	766	782	359	413	0	0	53	0	0
Stage 1	707	707	-	-	-	-	-	-	-
Stage 2	59	75	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	360	317	668	1104	-	-	1503	-	-
Stage 1	475	426	-	-	-	-	-	-	-
Stage 2	944	817	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	315	0	668	1104	-	-	1503	-	-
Mov Cap-2 Maneuver	315	0	-	-	-	-	-	-	-
Stage 1	416	0	-	-	-	-	-	-	-
Stage 2	944	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.2	1.4	2.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1104	-	-	315	668	1503	-	-
HCM Lane V/C Ratio	0.01	-	-	0.707	0.146	0.116	-	-
HCM Control Delay (s)	8.3	-	-	39.9	11.3	7.7	-	-
HCM Lane LOS	A	-	-	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	5	0.5	0.4	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	335	5	0	0	0	0	10	15	30	15	0
Future Vol, veh/h	20	335	5	0	0	0	0	10	15	30	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	26	435	6	0	0	0	0	19	28	43	21	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	490	221	279	493	-
Stage 1	-	-	-	-	490	-	0	0	-
Stage 2	-	-	-	-	0	-	279	493	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	460	759	631	458	0
Stage 1	-	-	-	0	527	-	-	-	0
Stage 2	-	-	-	0	-	-	682	526	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	460	759	589	458	-
Mov Cap-2 Maneuver	-	-	-	-	460	-	589	458	-
Stage 1	-	-	-	-	527	-	-	-	-
Stage 2	-	-	-	-	-	-	633	526	-

Approach	EB	NB	SB
HCM Control Delay, s		11.5	12.6
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	602	-	-	-	538
HCM Lane V/C Ratio	0.078	-	-	-	0.119
HCM Control Delay (s)	11.5	-	-	-	12.6
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	5	0	20	30	5	10	15	75	15	15	380	15
Future Vol, veh/h	5	0	20	30	5	10	15	75	15	15	380	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	23	45	7	15	20	101	20	17	442	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	647	646	451	648	645	111	460	0	0	121	0	0
Stage 1	485	485	-	151	151	-	-	-	-	-	-	-
Stage 2	162	161	-	497	494	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	373	380	592	373	381	921	1060	-	-	1418	-	-
Stage 1	549	538	-	833	757	-	-	-	-	-	-	-
Stage 2	822	750	-	540	533	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	353	368	592	350	369	921	1060	-	-	1418	-	-
Mov Cap-2 Maneuver	353	368	-	350	369	-	-	-	-	-	-	-
Stage 1	539	532	-	817	743	-	-	-	-	-	-	-
Stage 2	785	736	-	513	527	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	15.5	1.2	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1060	-	-	521	409	1418	-	-
HCM Lane V/C Ratio	0.019	-	-	0.055	0.164	0.012	-	-
HCM Control Delay (s)	8.5	-	-	12.3	15.5	7.6	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.6	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	220	20	45	55	45	15	25	65	75	35	35
Future Volume (veh/h)	60	220	20	45	55	45	15	25	65	75	35	35
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	76	278	25	54	66	52	26	43	103	95	44	44
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	572	839	75	484	504	360	536	114	274	483	201	201
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1176	3048	272	994	1829	1308	1209	452	1084	1147	794	794
Grp Volume(v), veh/h	76	149	154	54	59	59	26	0	146	95	0	88
Grp Sat Flow(s),veh/h/ln	1176	1641	1679	994	1641	1496	1209	0	1536	1147	0	1587
Q Serve(g_s), s	1.3	1.8	1.9	1.2	0.7	0.8	0.4	0.0	2.0	1.9	0.0	1.1
Cycle Q Clear(g_c), s	2.1	1.8	1.9	3.0	0.7	0.8	1.6	0.0	2.0	3.9	0.0	1.1
Prop In Lane	1.00		0.16	1.00		0.87	1.00		0.71	1.00		0.50
Lane Grp Cap(c), veh/h	572	452	462	484	452	412	536	0	388	483	0	401
V/C Ratio(X)	0.13	0.33	0.33	0.11	0.13	0.14	0.05	0.00	0.38	0.20	0.00	0.22
Avail Cap(c_a), veh/h	1636	1936	1981	1383	1936	1765	2037	0	2295	1907	0	2372
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.7	7.3	7.4	8.6	6.9	7.0	8.1	0.0	7.8	9.5	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.1	0.1	0.2	0.0	0.0	0.6	0.2	0.0	0.3
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	0.4	0.9	0.9	0.3	0.3	0.3	0.1	0.0	0.9	0.6	0.0	0.5
LnGrp Delay(d),s/veh	7.8	7.8	7.8	8.7	7.1	7.1	8.2	0.0	8.4	9.6	0.0	7.8
LnGrp LOS	A	A	A	A	A	A	A		A	A		A
Approach Vol, veh/h		379			172			172			183	
Approach Delay, s/veh		7.8			7.6			8.4			8.8	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		13.0		12.4		13.0		12.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		4.1		4.0		5.0		5.9
Green Ext Time (p_c), s		2.1		1.0		0.9		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	475	10	65	140	10	80
Future Volume (veh/h)	475	10	65	140	10	80
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	609	13	71	152	19	129
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.92	0.92	0.54	0.54
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1058	23	189	1818	313	462
Arrive On Green	0.32	0.32	0.11	0.55	0.18	0.18
Sat Flow, veh/h	3372	70	1645	3368	1774	1583
Grp Volume(v), veh/h	304	318	71	152	19	129
Grp Sat Flow(s),veh/h/ln	1641	1715	1645	1641	1774	1583
Q Serve(g_s), s	5.3	5.3	1.4	0.7	0.3	2.1
Cycle Q Clear(g_c), s	5.3	5.3	1.4	0.7	0.3	2.1
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	529	552	189	1818	313	462
V/C Ratio(X)	0.58	0.58	0.38	0.08	0.06	0.28
Avail Cap(c_a), veh/h	1268	1325	385	3689	1683	1683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.6	9.6	14.0	3.6	11.7	9.3
Incr Delay (d2), s/veh	1.0	1.0	0.5	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.6	0.6	0.3	0.2	1.0
LnGrp Delay(d),s/veh	10.6	10.6	14.4	3.6	11.7	9.5
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	622			223	148	
Approach Delay, s/veh	10.6			7.0	9.7	
Approach LOS	B			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.9	15.6				23.5		10.6
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	3.4	7.3				2.7		4.1
Green Ext Time (p_c), s	0.0	3.7				1.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	500	20	85	165	65	0	5	35	370	20	40
Future Volume (veh/h)	35	500	20	85	165	65	0	5	35	370	20	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	43	610	24	94	183	66	0	6	41	495	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	61	1232	48	115	710	248	66	8	52	742	389	0
Arrive On Green	0.04	0.26	0.26	0.07	0.30	0.30	0.00	0.04	0.04	0.23	0.00	0.00
Sat Flow, veh/h	1645	4656	182	1645	2388	833	1645	191	1306	3290	1727	0
Grp Volume(v), veh/h	43	411	223	94	124	125	0	0	47	495	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1695	1645	1641	1580	1645	0	1497	1645	1727	0
Q Serve(g_s), s	1.1	4.8	4.8	2.4	2.5	2.6	0.0	0.0	1.3	5.9	0.0	0.0
Cycle Q Clear(g_c), s	1.1	4.8	4.8	2.4	2.5	2.6	0.0	0.0	1.3	5.9	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.53	1.00		0.87	1.00		0.00
Lane Grp Cap(c), veh/h	61	832	449	115	488	470	66	0	60	742	389	0
V/C Ratio(X)	0.70	0.49	0.50	0.81	0.25	0.27	0.00	0.00	0.79	0.67	0.00	0.00
Avail Cap(c_a), veh/h	203	1812	977	417	1159	1116	700	0	637	2585	1357	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.5	13.4	13.4	19.7	11.5	11.5	0.0	0.0	20.5	15.2	0.0	0.0
Incr Delay (d2), s/veh	5.3	0.5	1.0	5.2	0.3	0.4	0.0	0.0	19.8	1.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.1	2.4	1.3	1.1	1.2	0.0	0.0	0.9	2.8	0.0	0.0
LnGrp Delay(d),s/veh	25.7	13.9	14.4	24.9	11.8	11.9	0.0	0.0	40.3	16.2	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			D	B		
Approach Vol, veh/h		677			343			47			495	
Approach Delay, s/veh		14.8			15.4			40.3			16.2	
Approach LOS		B			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	16.0		13.9	5.8	17.4		5.9
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 11	24.8		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	4.4	6.8		7.9	3.1	4.6		3.3
Green Ext Time (p_c), s	0.1	4.6		1.8	0.0	1.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	16.2
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	395	510	585	250	0	0	0	0	520	25	65
Future Volume (veh/h)	0	395	510	585	250	0	0	0	0	520	25	65
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	470	0	672	287	0				604	0	64
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1203	538	757	2174	0				691	0	309
Arrive On Green	0.00	0.37	0.00	0.08	0.22	0.00				0.21	0.00	0.21
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	470	0	672	287	0				604	0	64
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	8.5	0.0	16.7	5.6	0.0				14.2	0.0	2.9
Cycle Q Clear(g_c), s	0.0	8.5	0.0	16.7	5.6	0.0				14.2	0.0	2.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1203	538	757	2174	0				691	0	309
V/C Ratio(X)	0.00	0.39	0.00	0.89	0.13	0.00				0.87	0.00	0.21
Avail Cap(c_a), veh/h	0	1203	538	798	2174	0				806	0	360
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.86	0.00	0.53	0.53	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.7	0.0	35.8	12.8	0.0				30.6	0.0	26.1
Incr Delay (d2), s/veh	0.0	0.8	0.0	6.3	0.1	0.0				8.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.0	0.0	8.0	2.6	0.0				7.3	0.0	1.2
LnGrp Delay(d),s/veh	0.0	19.6	0.0	42.1	12.8	0.0				39.0	0.0	26.2
LnGrp LOS		B		D	B					D		C
Approach Vol, veh/h		470			959						668	
Approach Delay, s/veh		19.6			33.4						37.8	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.7	34.4		21.9		58.1		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.5		19.6		* 51		
Max Q Clear Time (g_c+I1), s	18.7	10.5		16.2		7.6		
Green Ext Time (p_c), s	0.3	4.6		0.6		4.0		

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	725	0	0	650	550	185	10	490	0	0	0
Future Volume (veh/h)	190	725	0	0	650	550	185	10	490	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	216	824	0	0	739	568	142	0	528			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	294	2202	0	0	926	701	342	0	610			
Arrive On Green	0.18	1.00	0.00	0.00	0.52	0.52	0.21	0.00	0.21			
Sat Flow, veh/h	3191	3368	0	0	1868	1349	1645	0	2936			
Grp Volume(v), veh/h	216	824	0	0	680	627	142	0	528			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1489	1645	0	1468			
Q Serve(g_s), s	5.1	0.0	0.0	0.0	27.2	27.9	6.0	0.0	13.9			
Cycle Q Clear(g_c), s	5.1	0.0	0.0	0.0	27.2	27.9	6.0	0.0	13.9			
Prop In Lane	1.00		0.00	0.00		0.91	1.00		1.00			
Lane Grp Cap(c), veh/h	294	2202	0	0	853	774	342	0	610			
V/C Ratio(X)	0.73	0.37	0.00	0.00	0.80	0.81	0.42	0.00	0.86			
Avail Cap(c_a), veh/h	798	2202	0	0	853	774	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.78	0.78	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	0.0	0.0	0.0	15.7	15.9	27.5	0.0	30.6			
Incr Delay (d2), s/veh	1.1	0.4	0.0	0.0	7.6	9.0	0.3	0.0	8.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.3	0.1	0.0	0.0	14.1	13.3	2.8	0.0	6.3			
LnGrp Delay(d),s/veh	32.8	0.4	0.0	0.0	23.4	24.9	27.8	0.0	38.7			
LnGrp LOS	C	A			C	C	C		D			
Approach Vol, veh/h		1040			1307			670				
Approach Delay, s/veh		7.1			24.1			36.3				
Approach LOS		A			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		58.8			12.1	46.7		21.2
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.2			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			7.1	29.9		15.9
Green Ext Time (p_c), s		10.6			0.3	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	0	5	5	0	5	15	60	50	15	60	20
Future Vol, veh/h	20	0	5	5	0	5	15	60	50	15	60	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	67	67	67	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	24	0	6	7	0	7	20	80	67	22	87	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	303	333	102	303	314	114	116	0	0	147	0	0
Stage 1	146	146	-	154	154	-	-	-	-	-	-	-
Stage 2	157	187	-	149	160	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	634	574	932	634	588	917	1424	-	-	1387	-	-
Stage 1	838	761	-	830	755	-	-	-	-	-	-	-
Stage 2	827	730	-	835	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	614	556	932	614	569	917	1424	-	-	1387	-	-
Mov Cap-2 Maneuver	614	556	-	614	569	-	-	-	-	-	-	-
Stage 1	825	748	-	818	744	-	-	-	-	-	-	-
Stage 2	808	719	-	815	738	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	10	0.9	1.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1424	-	-	659	736	1387	-	-
HCM Lane V/C Ratio	0.014	-	-	0.046	0.02	0.016	-	-
HCM Control Delay (s)	7.6	0	-	10.7	10	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	0	10	15	10	0	5	0	30	20	10
Future Vol, veh/h	5	5	0	10	15	10	0	5	0	30	20	10
Peak Hour Factor	0.50	0.50	0.50	0.44	0.44	0.44	0.56	0.56	0.56	0.97	0.97	0.97
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	10	10	0	23	34	23	0	9	0	31	21	10
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	8	7.7	7.7	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	0%	100%	0%	0%	100%	0%	0%	50%
Vol Thru, %	100%	0%	100%	100%	0%	100%	33%	33%
Vol Right, %	0%	0%	0%	0%	0%	0%	67%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	5	5	0	10	10	15	60
LT Vol	0	5	0	0	10	0	0	30
Through Vol	5	0	5	0	0	10	5	20
RT Vol	0	0	0	0	0	0	10	10
Lane Flow Rate	9	10	10	0	23	23	34	62
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.012	0.015	0.013	0	0.033	0.03	0.041	0.085
Departure Headway (Hd)	4.864	5.337	4.836	4.836	5.306	4.805	4.338	4.969
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	726	663	731	0	670	738	817	714
Service Time	2.663	3.128	2.626	2.626	3.08	2.579	2.111	2.75
HCM Lane V/C Ratio	0.012	0.015	0.014	0	0.034	0.031	0.042	0.087
HCM Control Delay	7.7	8.2	7.7	7.6	8.3	7.7	7.3	8.2
HCM Lane LOS	A	A	A	N	A	A	A	A
HCM 95th-tile Q	0	0	0	0	0.1	0.1	0.1	0.3

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	25	25	0	45	30
Future Vol, veh/h	25	25	25	0	45	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	52	52	33	0	88	59

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	268	33	0	0	33	0
Stage 1	33	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	704	1018	-	-	1579	-
Stage 1	969	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	665	1018	-	-	1579	-
Mov Cap-2 Maneuver	634	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	4.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	634	1018	1579	-
HCM Lane V/C Ratio	-	-	0.082	0.051	0.056	-
HCM Control Delay (s)	-	-	11.2	8.7	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.2	-

Appendix H
Peak Hour Intersection LOS Worksheets – Near-Term Year 2030 Plus Project Conditions

Intersection	
Int Delay, s/veh	7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	40	85	95	60	345
Future Vol, veh/h	110	40	85	95	60	345
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	159	58	120	134	68	392

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	217	0	562	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1307	-	475	834
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	678	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1307	-	428	834
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	428	834	-	-	1307	-
HCM Lane V/C Ratio	0.159	0.47	-	-	0.092	-
HCM Control Delay (s)	15	13.1	-	-	8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	2.5	-	-	0.3	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	170	0	240	45	70	30	95	70	550	5	180	40
Future Volume (vph)	170	0	240	45	70	30	95	70	550	5	180	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.98		1.00	0.89		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3204		1641	1530		1641	3158			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3204		1641	1530		1641	3158			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	198	0	279	52	100	43	136	80	625	5	205	45
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	198	321	0	100	179	0	80	835	0	0	45
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		17.8	17.8		16.2	16.2		8.0	31.6			4.6
Effective Green, g (s)		17.8	17.8		16.2	16.2		8.0	31.6			4.6
Actuated g/C Ratio		0.18	0.18		0.16	0.16		0.08	0.32			0.05
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		294	575		268	250		132	1006			76
v/s Ratio Prot		c0.12	0.10		0.06	c0.12		c0.05	c0.26			0.03
v/s Ratio Perm												
v/c Ratio		0.67	0.56		0.37	0.72		0.61	0.83			0.59
Uniform Delay, d1		37.9	37.1		36.9	39.3		44.0	31.3			46.3
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		4.7	0.7		0.3	7.9		5.3	6.6			8.0
Delay (s)		42.7	37.7		37.2	47.1		49.3	37.8			54.3
Level of Service		D	D		D	D		D	D			D
Approach Delay (s)			39.6			43.6			38.8			
Approach LOS			D			D			D			

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	120	65	15	15
Future Volume (vph)	120	65	15	15
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	136	74	16	16
RTOR Reduction (vph)	0	53	0	0
Lane Group Flow (vph)	136	21	16	16
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	28.2	28.2	3.4	3.4
Effective Green, g (s)	28.2	28.2	3.4	3.4
Actuated g/C Ratio	0.28	0.28	0.03	0.03
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	933	417	56	50
v/s Ratio Prot	0.04		0.01	c0.01
v/s Ratio Perm		0.01		
v/c Ratio	0.15	0.05	0.29	0.32
Uniform Delay, d1	26.5	25.7	46.7	46.7
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0	1.3
Delay (s)	26.6	25.8	47.7	48.1
Level of Service	C	C	D	D
Approach Delay (s)	31.3		47.9	
Approach LOS	C		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	10	295	80	20	190	5
Future Vol, veh/h	5	0	5	0	0	0	10	295	80	20	190	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	12	364	99	23	216	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	703	752	219	222	0	0	463	0	0
Stage 1	265	265	-	-	-	-	-	-	-
Stage 2	438	487	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	392	330	801	1301	-	-	1057	-	-
Stage 1	761	675	-	-	-	-	-	-	-
Stage 2	634	537	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	380	0	801	1301	-	-	1057	-	-
Mov Cap-2 Maneuver	380	0	-	-	-	-	-	-	-
Stage 1	737	0	-	-	-	-	-	-	-
Stage 2	634	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.2	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1301	-	-	515	1057	-	-
HCM Lane V/C Ratio	0.009	-	-	0.031	0.022	-	-
HCM Control Delay (s)	7.8	-	-	12.2	8.5	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	250	5	125	25	310	0	0	195	10
Future Vol, veh/h	5	0	5	250	5	125	25	310	0	0	195	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	281	6	140	33	413	0	0	229	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	787	714	235	724	720	413	241	0	-	-	-	0
Stage 1	235	235	-	479	479	-	-	-	-	-	-	-
Stage 2	552	479	-	245	241	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	300	347	785	331	344	622	1280	-	0	0	-	-
Stage 1	750	696	-	553	542	-	-	-	0	0	-	-
Stage 2	504	542	-	741	692	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	225	338	785	316	335	622	1280	-	-	-	-	-
Mov Cap-2 Maneuver	312	422	-	416	416	-	-	-	-	-	-	-
Stage 1	731	696	-	539	528	-	-	-	-	-	-	-
Stage 2	376	528	-	722	692	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	24	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1280	-	447	416	610	-	-
HCM Lane V/C Ratio	0.026	-	0.089	0.675	0.239	-	-
HCM Control Delay (s)	7.9	-	13.8	29.9	12.8	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	4.8	0.9	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Future Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	25	432	0	0	0	0	0	31	37
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	15%	0%	0%
Vol Thru, %	85%	100%	45%
Vol Right, %	0%	0%	55%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	137	233	55
LT Vol	20	0	0
Through Vol	117	233	25
RT Vol	0	0	30
Lane Flow Rate	169	288	68
Geometry Grp	7	7	2
Degree of Util (X)	0.228	0.383	0.09
Departure Headway (Hd)	4.862	4.789	4.758
Convergence, Y/N	Yes	Yes	Yes
Cap	734	746	758
Service Time	2.621	2.548	2.758
HCM Lane V/C Ratio	0.23	0.386	0.09
HCM Control Delay	9.1	10.5	8.2
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.9	1.8	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	30	35	190	30	120	80	40	50	80	110
Future Volume (veh/h)	20	30	30	35	190	30	120	80	40	50	80	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	28	42	42	38	209	33	152	101	50	71	114	148
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	258	260	244	209	505	80	511	410	203	608	257	333
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	375	1273	1198	254	2477	392	1032	1092	540	1142	683	887
Grp Volume(v), veh/h	64	0	48	153	0	127	152	0	151	71	0	262
Grp Sat Flow(s),veh/h/ln	1486	0	1360	1620	0	1503	1032	0	1632	1142	0	1571
Q Serve(g_s), s	0.0	0.0	0.8	0.2	0.0	2.1	3.7	0.0	1.8	1.3	0.0	3.6
Cycle Q Clear(g_c), s	0.9	0.0	0.8	2.2	0.0	2.1	7.3	0.0	1.8	3.1	0.0	3.6
Prop In Lane	0.44		0.88	0.25		0.26	1.00		0.33	1.00		0.56
Lane Grp Cap(c), veh/h	484	0	278	488	0	307	511	0	613	608	0	590
V/C Ratio(X)	0.13	0.00	0.17	0.31	0.00	0.41	0.30	0.00	0.25	0.12	0.00	0.44
Avail Cap(c_a), veh/h	1439	0	1240	1594	0	1370	1281	0	1831	1460	0	1762
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.4	9.9	0.0	9.9	9.4	0.0	6.1	7.2	0.0	6.7
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.4	0.0	0.9	0.3	0.0	0.2	0.1	0.0	0.5
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	0.4	0.0	0.3	1.1	0.0	0.9	1.1	0.0	0.8	0.4	0.0	1.6
LnGrp Delay(d),s/veh	9.5	0.0	9.7	10.3	0.0	10.8	9.7	0.0	6.3	7.3	0.0	7.2
LnGrp LOS	A		A	B		B	A		A	A		A
Approach Vol, veh/h		112			280			303			333	
Approach Delay, s/veh		9.6			10.5			8.0			7.2	
Approach LOS		A			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		16.7		11.8		16.7		11.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		9.3		2.9		5.6		4.2
Green Ext Time (p_c), s		1.5		0.6		1.9		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	40	35	0	0	0	120	305	85	85	70	230
Future Vol, veh/h	20	40	35	0	0	0	120	305	85	85	70	230
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	29	57	50	0	0	0	129	328	91	104	85	280

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1065	1110	225			365	0	0	419	0	0
Stage 1	433	433	-			-	-	-	-	-	-
Stage 2	632	677	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	238	202	795			1151	-	-	1098	-	-
Stage 1	637	568	-			-	-	-	-	-	-
Stage 2	515	440	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	191	0	795			1151	-	-	1098	-	-
Mov Cap-2 Maneuver	191	0	-			-	-	-	-	-	-
Stage 1	512	0	-			-	-	-	-	-	-
Stage 2	515	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.8	2	1.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	191	795	1098	-	-
HCM Lane V/C Ratio	0.112	-	-	0.449	0.063	0.094	-	-
HCM Control Delay (s)	8.5	-	-	38.3	9.8	8.6	-	-
HCM Lane LOS	A	-	-	E	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.1	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	145	35	0	0	0	0	0	0	20	15	0
Future Vol, veh/h	0	145	35	0	0	0	0	0	0	20	15	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	179	43	0	0	0	0	0	0	28	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.2	8
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	57%
Vol Thru, %	100%	58%	43%
Vol Right, %	0%	42%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	97	83	35
LT Vol	0	0	20
Through Vol	97	48	15
RT Vol	0	35	0
Lane Flow Rate	119	103	49
Geometry Grp	7	7	2
Degree of Util (X)	0.158	0.127	0.063
Departure Headway (Hd)	4.755	4.461	4.699
Convergence, Y/N	Yes	Yes	Yes
Cap	753	801	767
Service Time	2.495	2.2	2.699
HCM Lane V/C Ratio	0.158	0.129	0.064
HCM Control Delay	8.4	7.9	8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.4	0.2

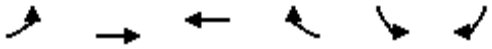
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	5	15	0	5	20	450	0	0	120	10
Future Vol, veh/h	5	5	5	15	0	5	20	450	0	0	120	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	7	7	7	19	0	6	25	563	0	0	179	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	803	800	187	807	807	563	194	0	-	-	-	0
Stage 1	187	187	-	613	613	-	-	-	-	-	-	-
Stage 2	616	613	-	194	194	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	292	309	835	291	306	511	1333	-	0	0	-	-
Stage 1	797	730	-	466	471	-	-	-	0	0	-	-
Stage 2	465	471	-	790	725	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	284	303	835	281	300	511	1333	-	-	-	-	-
Mov Cap-2 Maneuver	373	382	-	374	379	-	-	-	-	-	-	-
Stage 1	782	730	-	457	462	-	-	-	-	-	-	-
Stage 2	451	462	-	777	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	14.6	0.3	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1333	-	462	401	-	-
HCM Lane V/C Ratio	0.019	-	0.043	0.062	-	-
HCM Control Delay (s)	7.8	-	13.1	14.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	130	340	215	75	90
Future Volume (veh/h)	40	130	340	215	75	90
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	51	165	410	241	95	109
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	412	1263	768	447	323	288
Arrive On Green	0.38	0.38	0.38	0.38	0.20	0.20
Sat Flow, veh/h	720	3368	2083	1161	1645	1468
Grp Volume(v), veh/h	51	165	336	315	95	109
Grp Sat Flow(s),veh/h/ln	720	1641	1641	1517	1645	1468
Q Serve(g_s), s	1.7	0.9	4.5	4.6	1.4	1.8
Cycle Q Clear(g_c), s	6.3	0.9	4.5	4.6	1.4	1.8
Prop In Lane	1.00			0.77	1.00	1.00
Lane Grp Cap(c), veh/h	412	1263	631	584	323	288
V/C Ratio(X)	0.12	0.13	0.53	0.54	0.29	0.38
Avail Cap(c_a), veh/h	815	3094	1547	1430	1494	1333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	5.7	6.8	6.8	9.8	10.0
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.8	0.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.4	2.2	2.1	0.7	0.8
LnGrp Delay(d),s/veh	9.4	5.8	7.5	7.6	10.3	10.8
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		216	651		204	
Approach Delay, s/veh		6.6	7.6		10.6	
Approach LOS		A	A		B	

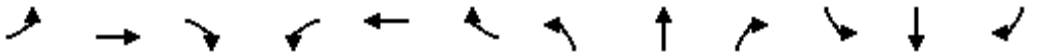
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		17.0				17.0		11.6
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		8.3				6.6		3.8
Green Ext Time (p_c), s		1.3				4.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	225	75	210	460	35	215
Future Volume (vph)	225	75	210	460	35	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.96		1.00	1.00	0.88	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3159		1641	3282	1635	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3159		1641	3282	1635	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	288	96	244	535	50	307
RTOR Reduction (vph)	34	0	0	0	0	0
Lane Group Flow (vph)	350	0	244	535	357	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	12.9		14.8	31.7	18.4	
Effective Green, g (s)	12.9		14.8	31.7	18.4	
Actuated g/C Ratio	0.22		0.25	0.53	0.31	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	687		409	1754	507	
v/s Ratio Prot	c0.11		c0.15	0.16	c0.22	
v/s Ratio Perm						
v/c Ratio	0.51		0.60	0.31	0.70	
Uniform Delay, d1	20.4		19.6	7.7	18.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.6		1.6	0.1	3.6	
Delay (s)	21.0		21.2	7.8	21.7	
Level of Service	C		C	A	C	
Approach Delay (s)	21.0			12.0	21.7	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	17.7
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	325	50	40	625	550	5	10	20	270	10	40
Future Volume (vph)	65	325	50	40	625	550	5	10	20	270	10	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.93		1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1641	3216		1641	3051		1641	1553		1559	1526	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (perm)	1641	3216		1641	3051		1641	1553		1559	1526	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	66	328	51	43	672	591	7	14	29	386	14	57
RTOR Reduction (vph)	0	8	0	0	107	0	0	27	0	0	9	0
Lane Group Flow (vph)	66	371	0	43	1156	0	7	16	0	232	216	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.8	51.3		5.3	50.8		5.4	5.4		21.8	21.8	
Effective Green, g (s)	5.8	51.3		5.3	50.8		5.4	5.4		21.8	21.8	
Actuated g/C Ratio	0.06	0.51		0.05	0.50		0.05	0.05		0.22	0.22	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	94	1633		86	1534		87	83		336	329	
v/s Ratio Prot	c0.04	0.12		0.03	c0.38		0.00	c0.01		c0.15	0.14	
v/s Ratio Perm												
v/c Ratio	0.70	0.23		0.50	0.75		0.08	0.19		0.69	0.66	
Uniform Delay, d1	46.8	13.8		46.6	20.1		45.4	45.7		36.5	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.6	0.1		1.7	2.2		0.4	1.1		6.0	4.7	
Delay (s)	64.3	13.9		48.2	22.3		45.8	46.8		42.5	40.9	
Level of Service	E	B		D	C		D	D		D	D	
Approach Delay (s)		21.4			23.2			46.7			41.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	440	170	300	795	0	0	0	0	405	25	420
Future Volume (veh/h)	0	440	170	300	795	0	0	0	0	405	25	420
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	524	0	345	914	0				475	0	396
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2094	937	441	2740	0				823	0	367
Arrive On Green	0.00	0.64	0.00	0.05	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	524	0	345	914	0				475	0	396
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.5	0.0	8.6	17.8	0.0				10.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	5.5	0.0	8.6	17.8	0.0				10.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2094	937	441	2740	0				823	0	367
V/C Ratio(X)	0.00	0.25	0.00	0.78	0.33	0.00				0.58	0.00	1.08
Avail Cap(c_a), veh/h	0	2094	937	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.2	0.0	37.0	11.2	0.0				26.3	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.1	0.0	0.0				0.7	0.0	69.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	0.0	3.8	8.1	0.0				4.6	0.0	15.2
LnGrp Delay(d),s/veh	0.0	6.5	0.0	37.1	11.2	0.0				27.0	0.0	99.7
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		524			1259						871	
Approach Delay, s/veh		6.5			18.3						60.0	
Approach LOS		A			B						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.8	56.6		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	10.6	7.5		22.0		19.8		
Green Ext Time (p_c), s	0.5	5.6		0.0		13.7		

Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	495	0	0	560	400	535	260	640	0	0	0
Future Volume (veh/h)	355	495	0	0	560	400	535	260	640	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	403	562	0	0	636	413	497	532	493			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	480	2063	0	0	801	520	411	432	367			
Arrive On Green	0.30	1.00	0.00	0.00	0.42	0.42	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1996	1239	1645	1727	1468			
Grp Volume(v), veh/h	403	562	0	0	546	503	497	532	493			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1509	1645	1727	1468			
Q Serve(g_s), s	9.5	0.0	0.0	0.0	23.2	23.2	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	9.5	0.0	0.0	0.0	23.2	23.2	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.82	1.00		1.00			
Lane Grp Cap(c), veh/h	480	2063	0	0	689	633	411	432	367			
V/C Ratio(X)	0.84	0.27	0.00	0.00	0.79	0.79	1.21	1.23	1.34			
Avail Cap(c_a), veh/h	798	2063	0	0	689	633	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.1	0.0	0.0	0.0	20.2	20.2	30.0	30.0	30.0			
Incr Delay (d2), s/veh	1.5	0.3	0.0	0.0	9.1	9.9	114.6	123.2	171.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.2	0.1	0.0	0.0	12.2	11.4	22.1	24.2	25.6			
LnGrp Delay(d),s/veh	28.6	0.3	0.0	0.0	29.3	30.1	144.6	153.2	201.7			
LnGrp LOS	C	A			C	C	F	F	F			
Approach Vol, veh/h		965			1049			1522				
Approach Delay, s/veh		12.1			29.7			166.1				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.7	38.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.5	25.2		22.0
Green Ext Time (p_c), s		8.7			0.6	0.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	83.6
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	6.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	185	60	0	140	55
Future Vol, veh/h	0	185	60	0	140	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	0	276	98	0	197	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	569	98	0	0	98	0
Stage 1	98	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	470	936	-	-	1495	-
Stage 1	906	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	408	936	-	-	1495	-
Mov Cap-2 Maneuver	408	-	-	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	612	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	5.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	936	1495	-
HCM Lane V/C Ratio	-	-	-	0.295	0.132	-
HCM Control Delay (s)	-	-	0	10.4	7.8	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	1.2	0.5	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	50	455	75	10	130
Future Volume (Veh/h)	170	50	455	75	10	130
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.69	0.69	0.78	0.78
Hourly flow rate (vph)	288	85	659	109	13	167
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				177		
pX, platoon unblocked					0.99	
vC, conflicting volume			373		1758	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			373		1761	330
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			42		65	76
cM capacity (veh/h)			1143		37	693

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	373	768	13	167
Volume Left	0	659	13	0
Volume Right	85	0	0	167
cSH	1700	1143	37	693
Volume to Capacity	0.22	0.58	0.35	0.24
Queue Length 95th (ft)	0	96	29	23
Control Delay (s)	0.0	11.7	148.0	11.8
Lane LOS		B	F	B
Approach Delay (s)	0.0	11.7	21.7	
Approach LOS			C	

Intersection Summary			
Average Delay	9.7		
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	9.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	50	455	75	10	130
Future Vol, veh/h	170	50	455	75	10	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	288	85	659	109	13	167

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	373	0	1758	331
Stage 1	-	-	-	-	331	-
Stage 2	-	-	-	-	1427	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1143	-	89	693
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	212	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1143	-	34	693
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	212	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.6	22.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	34	693	-	-	1143	-
HCM Lane V/C Ratio	0.377	0.241	-	-	0.577	-
HCM Control Delay (s)	164.7	11.8	-	-	12.4	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	1.2	0.9	-	-	3.8	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Future Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3139		1641	1658		1641	3098		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3139		1641	1658		1641	3098		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	70	0	198	81	157	57	21	40	153	91	239	1256
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	250	0	157	78	0	40	244	0	239	1256
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		12.2	12.2		13.7	13.7		4.3	20.8		15.8	32.3
Effective Green, g (s)		12.2	12.2		13.7	13.7		4.3	20.8		15.8	32.3
Actuated g/C Ratio		0.13	0.13		0.15	0.15		0.05	0.23		0.17	0.35
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		218	417		245	247		76	702		282	1156
v/s Ratio Prot		0.04	c0.08		c0.10	0.05		0.02	0.08		c0.15	c0.38
v/s Ratio Perm												
v/c Ratio		0.32	0.60		0.64	0.32		0.53	0.35		0.85	1.09
Uniform Delay, d1		36.0	37.4		36.7	34.8		42.7	29.8		36.8	29.7
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	1.5		4.2	0.3		3.0	0.6		19.6	53.2
Delay (s)		36.3	39.0		40.9	35.1		45.7	30.4		56.4	82.9
Level of Service		D	D		D	D		D	C		E	F
Approach Delay (s)			38.4			39.0			32.5			67.5
Approach LOS			D			D			C			E

Intersection Summary			
HCM 2000 Control Delay	57.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	25.5
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	435	20	20
Future Volume (vph)	435	20	20
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	494	22	22
RTOR Reduction (vph)	102	0	0
Lane Group Flow (vph)	392	22	22
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	32.3	3.7	3.7
Effective Green, g (s)	32.3	3.7	3.7
Actuated g/C Ratio	0.35	0.04	0.04
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	517	66	59
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.27		
v/c Ratio	0.76	0.33	0.37
Uniform Delay, d1	26.3	42.8	42.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	7.5	1.1	1.4
Delay (s)	33.7	43.9	44.3
Level of Service	C	D	D
Approach Delay (s)		44.1	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	0	0	0	5	105	55	20	350	5
Future Vol, veh/h	0	0	5	0	0	0	5	105	55	20	350	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	13	0	0	0	7	142	74	22	385	5

Major/Minor	Minor2				Major1			Major2		
Conflicting Flow All	625	662	388		390	0	0	216	0	0
Stage 1	432	432	-		-	-	-	-	-	-
Stage 2	193	230	-		-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3		4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-		-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-		-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39		2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	436	372	643		1126	-	-	1308	-	-
Stage 1	638	569	-		-	-	-	-	-	-
Stage 2	821	699	-		-	-	-	-	-	-
Platoon blocked, %						-	-		-	-
Mov Cap-1 Maneuver	426	0	643		1126	-	-	1308	-	-
Mov Cap-2 Maneuver	426	0	-		-	-	-	-	-	-
Stage 1	623	0	-		-	-	-	-	-	-
Stage 2	821	0	-		-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.2	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	643	1308	-	-
HCM Lane V/C Ratio	0.006	-	-	0.02	0.017	-	-
HCM Control Delay (s)	8.2	-	-	10.7	7.8	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Future Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	16	213	6	90	12	100	0	0	398	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	581	533	409	541	544	100	420	0	-	-	-	0
Stage 1	409	409	-	124	124	-	-	-	-	-	-	-
Stage 2	172	124	-	417	420	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	413	442	625	440	435	934	1097	-	0	0	-	-
Stage 1	604	582	-	861	778	-	-	-	0	0	-	-
Stage 2	811	778	-	598	576	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	367	437	625	425	430	934	1097	-	-	-	-	-
Mov Cap-2 Maneuver	462	491	-	487	480	-	-	-	-	-	-	-
Stage 1	597	582	-	852	769	-	-	-	-	-	-	-
Stage 2	720	769	-	583	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	15.4	0.9	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1097	-	531	487	885	-	-
HCM Lane V/C Ratio	0.011	-	0.061	0.438	0.108	-	-
HCM Control Delay (s)	8.3	-	12.2	18	9.6	-	-
HCM Lane LOS	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	2.2	0.4	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Future Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	39	312	0	0	0	0	0	47	53
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	9.3	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	27%	0%	0%
Vol Thru, %	73%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	110	160	75
LT Vol	30	0	0
Through Vol	80	160	35
RT Vol	0	0	40
Lane Flow Rate	143	208	100
Geometry Grp	7	7	2
Degree of Util (X)	0.198	0.28	0.127
Departure Headway (Hd)	4.983	4.846	4.569
Convergence, Y/N	Yes	Yes	Yes
Cap	714	736	789
Service Time	2.758	2.621	2.569
HCM Lane V/C Ratio	0.2	0.283	0.127
HCM Control Delay	9	9.5	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	1.1	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	95	25	10	15	10	10	25	20	35	55	25
Future Volume (veh/h)	65	95	25	10	15	10	10	25	20	35	55	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	90	132	32	11	16	11	13	32	24	50	79	36
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	378	389	100	311	312	211	592	290	218	643	355	162
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	712	1796	460	467	1439	974	1180	918	688	1244	1124	512
Grp Volume(v), veh/h	150	0	104	22	0	16	13	0	56	50	0	115
Grp Sat Flow(s),veh/h/ln	1477	0	1491	1479	0	1400	1180	0	1606	1244	0	1637
Q Serve(g_s), s	1.2	0.0	1.5	0.0	0.0	0.2	0.2	0.0	0.6	0.8	0.0	1.3
Cycle Q Clear(g_c), s	2.1	0.0	1.5	0.3	0.0	0.2	1.5	0.0	0.6	1.4	0.0	1.3
Prop In Lane	0.60		0.31	0.50		0.70	1.00		0.43	1.00		0.31
Lane Grp Cap(c), veh/h	544	0	323	530	0	303	592	0	508	643	0	517
V/C Ratio(X)	0.28	0.00	0.32	0.04	0.00	0.05	0.02	0.00	0.11	0.08	0.00	0.22
Avail Cap(c_a), veh/h	1679	0	1509	1618	0	1417	1689	0	2001	1800	0	2040
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.5	8.0	0.0	8.0	7.0	0.0	6.2	6.7	0.0	6.5
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.7	0.1	0.0	0.1	0.1	0.0	0.3	0.3	0.0	0.6
LnGrp Delay(d),s/veh	8.9	0.0	9.0	8.0	0.0	8.0	7.0	0.0	6.3	6.8	0.0	6.7
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		254			38			69			165	
Approach Delay, s/veh		9.0			8.0			6.5			6.7	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.1		11.6		14.1		11.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		3.5		4.1		3.4		2.3
Green Ext Time (p_c), s		0.3		1.4		0.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	17.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	165	100	0	0	0	20	70	70	175	290	100
Future Vol, veh/h	40	165	100	0	0	0	20	70	70	175	290	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	179	109	0	0	0	21	74	74	190	315	109

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	903	940	370	424	0	0	148	0	0
Stage 1	750	750	-	-	-	-	-	-	-
Stage 2	153	190	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	298	256	658	1094	-	-	1386	-	-
Stage 1	453	407	-	-	-	-	-	-	-
Stage 2	856	728	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	252	0	658	1094	-	-	1386	-	-
Mov Cap-2 Maneuver	252	0	-	-	-	-	-	-	-
Stage 1	384	0	-	-	-	-	-	-	-
Stage 2	856	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52.9	1	2.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	252	658	1386	-	-
HCM Lane V/C Ratio	0.019	-	-	0.884	0.165	0.137	-	-
HCM Control Delay (s)	8.4	-	-	73	11.6	8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.5	0.6	0.5	-	-

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	360	20	0	0	0	0	0	0	30	15	0
Future Vol, veh/h	0	360	20	0	0	0	0	0	0	30	15	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	468	26	0	0	0	0	0	0	43	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	10.2	8.8
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	86%	33%
Vol Right, %	0%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	240	140	45
LT Vol	0	0	30
Through Vol	240	120	15
RT Vol	0	20	0
Lane Flow Rate	312	182	64
Geometry Grp	7	7	2
Degree of Util (X)	0.414	0.237	0.094
Departure Headway (Hd)	4.783	4.683	5.279
Convergence, Y/N	Yes	Yes	Yes
Cap	745	760	683
Service Time	2.556	2.456	3.279
HCM Lane V/C Ratio	0.419	0.239	0.094
HCM Control Delay	10.9	8.9	8.8
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2	0.9	0.3

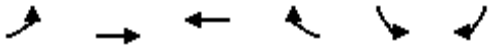
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	20	30	5	10	15	155	0	0	400	15
Future Vol, veh/h	5	0	20	30	5	10	15	155	0	0	400	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	23	45	7	15	20	209	0	0	465	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	734	723	474	735	732	209	483	0	-	-	-	0
Stage 1	474	474	-	249	249	-	-	-	-	-	-	-
Stage 2	260	249	-	486	483	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	326	343	574	325	339	812	1039	-	0	0	-	-
Stage 1	556	545	-	738	686	-	-	-	0	0	-	-
Stage 2	727	686	-	548	540	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	311	336	574	307	333	812	1039	-	-	-	-	-
Mov Cap-2 Maneuver	416	425	-	403	414	-	-	-	-	-	-	-
Stage 1	545	545	-	724	673	-	-	-	-	-	-	-
Stage 2	692	673	-	526	540	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	14.3	0.8	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1039	-	533	455	-	-
HCM Lane V/C Ratio	0.02	-	0.053	0.148	-	-
HCM Control Delay (s)	8.5	-	12.1	14.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.5	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	85	295	85	50	105	45
Future Volume (veh/h)	85	295	85	50	105	45
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	108	373	102	58	133	57
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	600	1024	646	344	338	302
Arrive On Green	0.31	0.31	0.31	0.31	0.21	0.21
Sat Flow, veh/h	1132	3368	2156	1104	1645	1468
Grp Volume(v), veh/h	108	373	79	81	133	57
Grp Sat Flow(s),veh/h/ln	1132	1641	1641	1533	1645	1468
Q Serve(g_s), s	1.9	2.2	0.9	0.9	1.7	0.8
Cycle Q Clear(g_c), s	2.9	2.2	0.9	0.9	1.7	0.8
Prop In Lane	1.00			0.72	1.00	1.00
Lane Grp Cap(c), veh/h	600	1024	512	478	338	302
V/C Ratio(X)	0.18	0.36	0.16	0.17	0.39	0.19
Avail Cap(c_a), veh/h	1475	3561	1781	1663	1719	1534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.3	6.6	6.2	6.2	8.5	8.2
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.2	0.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.0	0.4	0.4	0.8	0.3
LnGrp Delay(d),s/veh	7.4	6.9	6.3	6.4	9.3	8.5
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		481	160		190	
Approach Delay, s/veh		7.0	6.4		9.0	
Approach LOS		A	A		A	

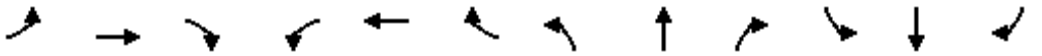
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		13.8				13.8		11.1
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		4.9				2.9		3.7
Green Ext Time (p_c), s		2.9				0.9		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	485	40	395	125	15	185
Future Volume (vph)	485	40	395	125	15	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.88	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3245		1641	3282	1634	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3245		1641	3282	1634	
Peak-hour factor, PHF	0.78	0.78	0.92	0.92	0.54	1.00
Adj. Flow (vph)	622	51	429	136	28	185
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	667	0	429	136	213	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	18.4		15.3	37.7	12.3	
Effective Green, g (s)	18.4		15.3	37.7	12.3	
Actuated g/C Ratio	0.31		0.26	0.64	0.21	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	1008		424	2090	339	
v/s Ratio Prot	c0.21		c0.26	0.04	c0.13	
v/s Ratio Perm						
v/c Ratio	0.66		1.01	0.07	0.63	
Uniform Delay, d1	17.7		22.0	4.1	21.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.6		46.7	0.0	2.6	
Delay (s)	19.3		68.6	4.1	24.0	
Level of Service	B		E	A	C	
Approach Delay (s)	19.3			53.1	24.0	
Approach LOS	B			D	C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	17.7
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	605	20	85	470	335	0	5	35	600	20	50
Future Volume (vph)	45	605	20	85	470	335	0	5	35	600	20	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.87		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3266		1641	3077			1499		1559	1543	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3266		1641	3077			1499		1559	1543	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	55	738	24	94	522	372	0	6	45	706	24	59
RTOR Reduction (vph)	0	2	0	0	108	0	0	43	0	0	6	0
Lane Group Flow (vph)	55	760	0	94	786	0	0	8	0	395	388	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	4.3	26.5		7.9	30.1			3.8		26.8	26.8	
Effective Green, g (s)	4.3	26.5		7.9	30.1			3.8		26.8	26.8	
Actuated g/C Ratio	0.05	0.32		0.10	0.37			0.05		0.33	0.33	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	85	1052		157	1126			69		508	503	
v/s Ratio Prot	0.03	0.23		c0.06	c0.26			c0.01		c0.25	0.25	
v/s Ratio Perm												
v/c Ratio	0.65	0.72		0.60	0.70			0.12		0.78	0.77	
Uniform Delay, d1	38.2	24.6		35.6	22.2			37.6		25.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	12.0	2.6		4.0	2.0			0.8		7.4	7.2	
Delay (s)	50.2	27.2		39.7	24.2			38.4		32.4	32.1	
Level of Service	D	C		D	C			D		C	C	
Approach Delay (s)		28.7			25.6			38.4			32.3	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	695	540	585	355	0	0	0	0	520	25	540
Future Volume (veh/h)	0	695	540	585	355	0	0	0	0	520	25	540
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	827	0	672	408	0				604	0	522
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1769	792	757	2740	0				823	0	367
Arrive On Green	0.00	0.54	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	827	0	672	408	0				604	0	522
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	12.4	0.0	16.7	7.5	0.0				13.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	12.4	0.0	16.7	7.5	0.0				13.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1769	792	757	2740	0				823	0	367
V/C Ratio(X)	0.00	0.47	0.00	0.89	0.15	0.00				0.73	0.00	1.42
Avail Cap(c_a), veh/h	0	1769	792	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.59	0.00	0.12	0.12	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.4	0.0	35.8	7.5	0.0				27.6	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.5	0.0	0.0				3.0	0.0	205.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.6	0.0	7.5	3.4	0.0				6.5	0.0	29.0
LnGrp Delay(d),s/veh	0.0	11.9	0.0	37.3	7.5	0.0				30.6	0.0	235.3
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		827			1080						1126	
Approach Delay, s/veh		11.9			26.1						125.5	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.7	48.7		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	18.7	14.4		22.0		9.5		
Green Ext Time (p_c), s	0.3	6.3		0.0		5.8		

Intersection Summary	
HCM 2010 Ctrl Delay	59.1
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	765	0	0	710	550	235	10	490	0	0	0
Future Volume (veh/h)	455	765	0	0	710	550	235	10	490	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	517	869	0	0	807	568	180	0	548			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	588	2180	0	0	783	540	353	0	630			
Arrive On Green	0.37	1.00	0.00	0.00	0.42	0.42	0.21	0.00	0.21			
Sat Flow, veh/h	3191	3368	0	0	1945	1283	1645	0	2936			
Grp Volume(v), veh/h	517	869	0	0	710	665	180	0	548			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1501	1645	0	1468			
Q Serve(g_s), s	12.1	0.0	0.0	0.0	33.7	33.7	7.7	0.0	14.4			
Cycle Q Clear(g_c), s	12.1	0.0	0.0	0.0	33.7	33.7	7.7	0.0	14.4			
Prop In Lane	1.00		0.00	0.00		0.85	1.00		1.00			
Lane Grp Cap(c), veh/h	588	2180	0	0	691	632	353	0	630			
V/C Ratio(X)	0.88	0.40	0.00	0.00	1.03	1.05	0.51	0.00	0.87			
Avail Cap(c_a), veh/h	798	2180	0	0	691	632	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.55	0.55	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.4	0.0	0.0	0.0	23.2	23.2	27.7	0.0	30.4			
Incr Delay (d2), s/veh	4.0	0.3	0.0	0.0	41.5	50.0	0.4	0.0	8.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.5	0.1	0.0	0.0	23.1	22.7	3.5	0.0	6.6			
LnGrp Delay(d),s/veh	28.4	0.3	0.0	0.0	64.7	73.1	28.1	0.0	39.2			
LnGrp LOS	C	A			F	F	C		D			
Approach Vol, veh/h		1386			1375			728				
Approach Delay, s/veh		10.8			68.8			36.5				
Approach LOS		B			E			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		58.2			19.4	38.8		21.8
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			14.1	35.7		16.4
Green Ext Time (p_c), s		15.3			0.6	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	39.0
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	130	30	0	350	50
Future Vol, veh/h	25	130	30	0	350	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	52	271	40	0	686	98

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1510	40	0	0	40	0
Stage 1	40	-	-	-	-	-
Stage 2	1470	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	127	1009	-	-	1570	-
Stage 1	962	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	72	1009	-	-	1570	-
Mov Cap-2 Maneuver	2833	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	202	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	7.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	2833	1009	1570	-
HCM Lane V/C Ratio	-	-	0.018	0.268	0.437	-
HCM Control Delay (s)	-	-	6.3	9.9	9.1	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	1.1	2.3	-

Intersection	
Int Delay, s/veh	22.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	330	40	190	470	0	60	0	340	0	0	0
Future Vol, veh/h	0	330	40	190	470	0	60	0	340	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	478	58	268	662	0	68	0	386	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	536	0	0	1705	-	507	-	1734	662
Stage 1	-	-	-	-	-	-	507	-	-	-	1198	-
Stage 2	-	-	-	-	-	-	1198	-	-	-	536	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	993	-	0	69	0	550	0	84	448
Stage 1	0	-	-	-	-	0	534	0	-	0	250	-
Stage 2	0	-	-	-	-	0	218	0	-	0	511	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	993	-	-	~ 46	-	550	-	48	448
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	-	-	-	48	-
Stage 1	-	-	-	-	-	-	534	-	-	-	143	-
Stage 2	-	-	-	-	-	-	125	-	-	-	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.9	88.4	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	46	550	-	-	993	-	-
HCM Lane V/C Ratio	1.482	0.702	-	-	0.269	-	-
HCM Control Delay (s)	$ 444.7	25.5	-	-	10	0	0
HCM Lane LOS	F	D	-	-	A	A	A
HCM 95th %tile Q(veh)	6.6	5.6	-	-	1.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	270	0	345	45	70	30	95	555	550	5	180	40
Future Volume (vph)	270	0	345	45	70	30	95	555	550	5	180	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.98		1.00	0.89		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3225		1641	1530		1641	3158			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3225		1641	1530		1641	3158			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	314	0	401	52	100	43	136	631	625	5	205	45
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	314	447	0	100	179	0	631	835	0	0	45
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		20.5	20.5		16.3	16.3		20.5	32.9			4.8
Effective Green, g (s)		20.5	20.5		16.3	16.3		20.5	32.9			4.8
Actuated g/C Ratio		0.20	0.20		0.16	0.16		0.20	0.32			0.05
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		325	638		258	240		325	1003			76
v/s Ratio Prot		c0.19	0.14		0.06	c0.12		c0.38	c0.26			0.03
v/s Ratio Perm												
v/c Ratio		0.97	0.70		0.39	0.75		1.94	0.83			0.59
Uniform Delay, d1		41.2	38.6		39.1	41.6		41.5	32.7			48.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		40.3	2.7		0.4	10.5		434.8	6.7			8.0
Delay (s)		81.4	41.4		39.5	52.1		476.3	39.4			56.4
Level of Service		F	D		D	D		F	D			E
Approach Delay (s)			57.8			47.6			227.5			
Approach LOS			E			D			F			

Intersection Summary			
HCM 2000 Control Delay	144.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	103.5	Sum of lost time (s)	25.5
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	120	60	15	15
Future Volume (vph)	120	60	15	15
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	136	68	16	16
RTOR Reduction (vph)	0	57	0	0
Lane Group Flow (vph)	136	11	16	16
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	17.2	17.2	3.5	3.5
Effective Green, g (s)	17.2	17.2	3.5	3.5
Actuated g/C Ratio	0.17	0.17	0.03	0.03
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	545	243	55	49
v/s Ratio Prot	0.04		0.01	c0.01
v/s Ratio Perm		0.01		
v/c Ratio	0.25	0.05	0.29	0.33
Uniform Delay, d1	37.5	36.3	48.8	48.8
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.1	1.4
Delay (s)	38.0	36.4	49.9	50.3
Level of Service	D	D	D	D
Approach Delay (s)	40.9		50.1	
Approach LOS	D		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	10	290	80	20	295	5
Future Vol, veh/h	5	0	5	0	0	0	10	290	80	20	295	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	12	358	99	23	335	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	816	865	338	341	0	0	457	0	0
Stage 1	384	384	-	-	-	-	-	-	-
Stage 2	432	481	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	336	283	686	1175	-	-	1063	-	-
Stage 1	671	598	-	-	-	-	-	-	-
Stage 2	638	541	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	325	0	686	1175	-	-	1063	-	-
Mov Cap-2 Maneuver	325	0	-	-	-	-	-	-	-
Stage 1	650	0	-	-	-	-	-	-	-
Stage 2	638	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1175	-	-	441	1063	-	-
HCM Lane V/C Ratio	0.011	-	-	0.037	0.021	-	-
HCM Control Delay (s)	8.1	-	-	13.5	8.5	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	250	5	125	25	305	0	0	190	10
Future Vol, veh/h	5	0	5	250	5	125	25	305	0	0	190	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	281	6	140	33	407	0	0	224	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	776	703	230	713	709	407	236	0	-	-	-	0
Stage 1	230	230	-	473	473	-	-	-	-	-	-	-
Stage 2	546	473	-	240	236	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	305	352	790	337	349	627	1286	-	0	0	-	-
Stage 1	755	699	-	557	545	-	-	-	0	0	-	-
Stage 2	508	545	-	746	695	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	230	343	790	322	340	627	1286	-	-	-	-	-
Mov Cap-2 Maneuver	316	425	-	421	420	-	-	-	-	-	-	-
Stage 1	735	699	-	543	531	-	-	-	-	-	-	-
Stage 2	380	531	-	727	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	23.5	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1286	-	451	421	615	-	-
HCM Lane V/C Ratio	0.026	-	0.089	0.667	0.238	-	-
HCM Control Delay (s)	7.9	-	13.8	29.1	12.7	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	4.7	0.9	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Future Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	25	432	0	0	0	0	0	31	37
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	15%	0%	0%
Vol Thru, %	85%	100%	45%
Vol Right, %	0%	0%	55%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	137	233	55
LT Vol	20	0	0
Through Vol	117	233	25
RT Vol	0	0	30
Lane Flow Rate	169	288	68
Geometry Grp	7	7	2
Degree of Util (X)	0.228	0.383	0.09
Departure Headway (Hd)	4.862	4.789	4.758
Convergence, Y/N	Yes	Yes	Yes
Cap	734	746	758
Service Time	2.621	2.548	2.758
HCM Lane V/C Ratio	0.23	0.386	0.09
HCM Control Delay	9.1	10.5	8.2
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.9	1.8	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	30	45	190	40	120	290	120	50	80	110
Future Volume (veh/h)	20	30	30	45	190	40	120	290	120	50	80	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	28	42	42	49	209	44	152	367	151	71	114	148
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	223	235	227	199	451	95	563	525	216	372	308	400
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	355	1190	1148	316	2285	480	1032	1164	479	816	683	887
Grp Volume(v), veh/h	62	0	50	166	0	136	152	0	518	71	0	262
Grp Sat Flow(s),veh/h/ln	1324	0	1369	1594	0	1487	1032	0	1643	816	0	1571
Q Serve(g_s), s	0.0	0.0	1.0	1.0	0.0	2.8	3.9	0.0	8.6	2.6	0.0	3.8
Cycle Q Clear(g_c), s	2.8	0.0	1.0	3.0	0.0	2.8	7.6	0.0	8.6	11.2	0.0	3.8
Prop In Lane	0.45		0.84	0.30		0.32	1.00		0.29	1.00		0.56
Lane Grp Cap(c), veh/h	415	0	270	451	0	294	563	0	741	372	0	708
V/C Ratio(X)	0.15	0.00	0.19	0.37	0.00	0.46	0.27	0.00	0.70	0.19	0.00	0.37
Avail Cap(c_a), veh/h	1165	0	1043	1317	0	1133	1367	0	2021	1008	0	1932
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	11.4	12.2	0.0	12.1	8.7	0.0	7.5	12.0	0.0	6.2
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.5	0.0	1.1	0.3	0.0	1.2	0.2	0.0	0.3
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	0.5	0.0	0.4	1.4	0.0	1.2	1.1	0.0	4.0	0.6	0.0	1.7
LnGrp Delay(d),s/veh	11.6	0.0	11.7	12.7	0.0	13.2	8.9	0.0	8.7	12.3	0.0	6.5
LnGrp LOS	B		B	B		B	A		A	B		A
Approach Vol, veh/h		112			302			670			333	
Approach Delay, s/veh		11.6			12.9			8.8			7.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		21.4		12.7		21.4		12.7
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		42.0		26.0		42.0		26.0
Max Q Clear Time (g_c+I1), s		10.6		4.8		13.2		5.0
Green Ext Time (p_c), s		4.5		0.6		2.2		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	40	35	0	0	0	125	300	85	85	70	230
Future Vol, veh/h	20	40	35	0	0	0	125	300	85	85	70	230
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	29	57	50	0	0	0	134	323	91	104	85	280

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1070	1115	225			365	0	0	414	0	0
Stage 1	433	433	-			-	-	-	-	-	-
Stage 2	637	682	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	236	201	795			1151	-	-	1103	-	-
Stage 1	637	568	-			-	-	-	-	-	-
Stage 2	512	438	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	189	0	795			1151	-	-	1103	-	-
Mov Cap-2 Maneuver	189	0	-			-	-	-	-	-	-
Stage 1	510	0	-			-	-	-	-	-	-
Stage 2	512	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.2	2.1	1.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	189	795	1103	-	-
HCM Lane V/C Ratio	0.117	-	-	0.454	0.063	0.094	-	-
HCM Control Delay (s)	8.5	-	-	39	9.8	8.6	-	-
HCM Lane LOS	A	-	-	E	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.1	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	215	35	0	0	0	0	0	0	20	15	0
Future Vol, veh/h	0	215	35	0	0	0	0	0	0	20	15	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	265	43	0	0	0	0	0	0	28	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.7	8.2
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	57%
Vol Thru, %	100%	67%	43%
Vol Right, %	0%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	143	107	35
LT Vol	0	0	20
Through Vol	143	72	15
RT Vol	0	35	0
Lane Flow Rate	177	132	49
Geometry Grp	7	7	2
Degree of Util (X)	0.234	0.166	0.066
Departure Headway (Hd)	4.755	4.525	4.887
Convergence, Y/N	Yes	Yes	Yes
Cap	752	790	737
Service Time	2.501	2.271	2.887
HCM Lane V/C Ratio	0.235	0.167	0.066
HCM Control Delay	9	8.2	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.6	0.2

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	80	5	15	0	5	20	450	0	0	125	10
Future Vol, veh/h	5	80	5	15	0	5	20	450	0	0	125	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	7	107	7	19	0	6	25	563	0	0	187	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	811	808	195	865	815	563	202	0	-	-	-	0
Stage 1	195	195	-	613	613	-	-	-	-	-	-	-
Stage 2	616	613	-	252	202	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	289	306	826	265	303	511	1323	-	0	0	-	-
Stage 1	789	725	-	466	471	-	-	-	0	0	-	-
Stage 2	465	471	-	735	719	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	281	300	826	203	297	511	1323	-	-	-	-	-
Mov Cap-2 Maneuver	372	381	-	326	378	-	-	-	-	-	-	-
Stage 1	774	725	-	457	462	-	-	-	-	-	-	-
Stage 2	451	462	-	622	719	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.2	15.8	0.3	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1323	-	392	358	-	-
HCM Lane V/C Ratio	0.019	-	0.306	0.069	-	-
HCM Control Delay (s)	7.8	-	18.2	15.8	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	105	50	40	135	550	5	10	20	270	10	15
Future Volume (veh/h)	65	105	50	40	135	550	5	10	20	270	10	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	66	106	51	43	145	544	7	14	28	413	0	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	81	1052	479	55	762	682	60	19	38	573	301	0
Arrive On Green	0.05	0.48	0.48	0.03	0.46	0.46	0.04	0.04	0.04	0.17	0.00	0.00
Sat Flow, veh/h	1645	2193	999	1645	1641	1468	1645	515	1030	3290	1727	0
Grp Volume(v), veh/h	66	78	79	43	145	544	7	0	42	413	0	0
Grp Sat Flow(s),veh/h/ln	1645	1641	1551	1645	1641	1468	1645	0	1545	1645	1727	0
Q Serve(g_s), s	2.5	1.6	1.7	1.6	3.2	19.7	0.3	0.0	1.7	7.4	0.0	0.0
Cycle Q Clear(g_c), s	2.5	1.6	1.7	1.6	3.2	19.7	0.3	0.0	1.7	7.4	0.0	0.0
Prop In Lane	1.00		0.64	1.00		1.00	1.00		0.67	1.00		0.00
Lane Grp Cap(c), veh/h	81	787	744	55	762	682	60	0	57	573	301	0
V/C Ratio(X)	0.82	0.10	0.11	0.78	0.19	0.80	0.12	0.00	0.74	0.72	0.00	0.00
Avail Cap(c_a), veh/h	140	1814	1715	201	1875	1677	483	0	454	1742	915	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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.4	8.9	8.9	29.9	9.8	14.2	29.0	0.0	29.7	24.3	0.0	0.0
Incr Delay (d2), s/veh	7.4	0.1	0.1	8.3	0.1	2.6	0.8	0.0	17.1	1.7	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	1.3	0.7	0.8	0.9	1.5	8.4	0.1	0.0	1.0	3.5	0.0	0.0
LnGrp Delay(d),s/veh	36.8	8.9	9.0	38.2	10.0	16.8	29.9	0.0	46.8	26.0	0.0	0.0
LnGrp LOS	D	A	A	D	A	B	C		D	C		
Approach Vol, veh/h		223			732			49			413	
Approach Delay, s/veh		17.2			16.7			44.4			26.0	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.3	34.5		15.0	7.3	33.5		6.5
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 7.6	68.9		* 33	* 5.3	71.2		18.3
Max Q Clear Time (g_c+I1), s	3.6	3.7		9.4	4.5	21.7		3.7
Green Ext Time (p_c), s	0.0	1.2		1.5	0.0	7.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	380	5	300	305	0	0	0	0	405	25	415
Future Volume (veh/h)	0	380	5	300	305	0	0	0	0	405	25	415
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	452	0	345	351	0				475	0	390
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2098	938	437	2740	0				823	0	367
Arrive On Green	0.00	0.64	0.00	0.09	0.56	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	452	0	345	351	0				475	0	390
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	4.6	0.0	8.5	4.1	0.0				10.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	4.6	0.0	8.5	4.1	0.0				10.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2098	938	437	2740	0				823	0	367
V/C Ratio(X)	0.00	0.22	0.00	0.79	0.13	0.00				0.58	0.00	1.06
Avail Cap(c_a), veh/h	0	2098	938	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.00	0.51	0.51	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.0	0.0	35.2	3.8	0.0				26.3	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.6	0.0	0.0				0.7	0.0	64.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	0.0	3.8	1.9	0.0				4.6	0.0	14.6
LnGrp Delay(d),s/veh	0.0	6.3	0.0	35.8	3.9	0.0				27.0	0.0	94.5
LnGrp LOS		A		D	A					C		F
Approach Vol, veh/h		452			696						865	
Approach Delay, s/veh		6.3			19.7						57.4	
Approach LOS		A			B						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.7	56.7		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	10.5	6.6		22.0		6.1		
Green Ext Time (p_c), s	0.5	4.9		0.0		5.0		

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	435	0	0	555	400	55	260	640	0	0	0
Future Volume (veh/h)	355	435	0	0	555	400	55	260	640	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	403	494	0	0	631	413	62	433	443			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	480	2063	0	0	799	522	411	432	367			
Arrive On Green	0.30	1.00	0.00	0.00	0.42	0.42	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1990	1245	1645	1727	1468			
Grp Volume(v), veh/h	403	494	0	0	544	500	62	433	443			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1508	1645	1727	1468			
Q Serve(g_s), s	9.5	0.0	0.0	0.0	23.0	23.0	2.3	20.0	20.0			
Cycle Q Clear(g_c), s	9.5	0.0	0.0	0.0	23.0	23.0	2.3	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.83	1.00		1.00			
Lane Grp Cap(c), veh/h	480	2063	0	0	689	633	411	432	367			
V/C Ratio(X)	0.84	0.24	0.00	0.00	0.79	0.79	0.15	1.00	1.21			
Avail Cap(c_a), veh/h	798	2063	0	0	689	633	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.1	0.0	0.0	0.0	20.2	20.2	23.4	30.0	30.0			
Incr Delay (d2), s/veh	1.5	0.2	0.0	0.0	9.0	9.7	0.1	44.0	116.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.2	0.1	0.0	0.0	12.1	11.3	1.1	14.8	19.9			
LnGrp Delay(d),s/veh	28.6	0.2	0.0	0.0	29.1	29.9	23.4	74.0	146.1			
LnGrp LOS	C	A			C	C	C	F	F			
Approach Vol, veh/h		897			1044			938				
Approach Delay, s/veh		13.0			29.5			104.7				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.7	38.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.5	25.0		22.0
Green Ext Time (p_c), s		7.5			0.6	0.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.8
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	7.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	185	50	0	140	45
Future Vol, veh/h	0	185	50	0	140	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	0	276	82	0	197	63

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	539	82	0	0	82	0
Stage 1	82	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	490	956	-	-	1515	-
Stage 1	921	-	-	-	-	-
Stage 2	621	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	426	956	-	-	1515	-
Mov Cap-2 Maneuver	426	-	-	-	-	-
Stage 1	801	-	-	-	-	-
Stage 2	621	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	5.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	956	1515	-
HCM Lane V/C Ratio	-	-	-	0.289	0.13	-
HCM Control Delay (s)	-	-	0	10.3	7.7	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	1.2	0.4	-

Intersection	
Int Delay, s/veh	56

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	670	50	505	240	0	10	0	130	0	0	0
Future Vol, veh/h	0	670	50	505	240	0	10	0	130	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1136	85	732	348	0	13	0	167	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1221	0	0	2991	-	1179	-	3033	348
Stage 1	-	-	-	-	-	-	1179	-	-	-	1812	-
Stage 2	-	-	-	-	-	-	1812	-	-	-	1221	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	~ 544	-	0	~ 8	0	223	0	12	677
Stage 1	0	-	-	-	-	0	224	0	-	0	124	-
Stage 2	0	-	-	-	-	0	96	0	-	0	244	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	~ 544	-	-	-	-	223	-	0	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	0	-
Stage 1	-	-	-	-	-	-	224	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	-	-	-	244	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	128.5		0
HCM LOS			-	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	223	-	-	~ 544	-	-
HCM Lane V/C Ratio	-	0.747	-	-	1.345	-	-
HCM Control Delay (s)	-	57.4	-	-	189.6	0	0
HCM Lane LOS	-	F	-	-	F	A	A
HCM 95th %tile Q(veh)	-	5.1	-	-	32	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	300	0	410	70	110	40	15	245	135	80	210	1105
Future Volume (vph)	300	0	410	70	110	40	15	245	135	80	210	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.98		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3210		1641	1658		1641	3098		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3210		1641	1658		1641	3098		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	349	0	477	81	157	57	21	278	153	91	239	1256
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	349	550	0	157	78	0	278	244	0	239	1256
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		20.2	20.2		15.4	15.4		20.2	35.4		15.1	30.3
Effective Green, g (s)		20.2	20.2		15.4	15.4		20.2	35.4		15.1	30.3
Actuated g/C Ratio		0.17	0.17		0.13	0.13		0.17	0.31		0.13	0.26
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		286	559		218	220		286	947		213	858
v/s Ratio Prot		c0.21	0.17		c0.10	0.05		c0.17	0.08		c0.15	c0.38
v/s Ratio Perm												
v/c Ratio		1.22	0.98		0.72	0.35		0.97	0.26		1.12	1.46
Uniform Delay, d1		47.8	47.6		48.1	45.7		47.5	30.3		50.4	42.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		126.5	33.5		9.5	0.4		45.1	0.3		98.3	215.2
Delay (s)		174.3	81.2		57.6	46.0		92.6	30.6		148.7	257.9
Level of Service		F	F		E	D		F	C		F	F
Approach Delay (s)			117.0			53.8			63.6			201.7
Approach LOS			F			D			E			F

Intersection Summary			
HCM 2000 Control Delay	150.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	115.8	Sum of lost time (s)	25.5
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	435	20	20
Future Volume (vph)	435	20	20
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	494	22	22
RTOR Reduction (vph)	116	0	0
Lane Group Flow (vph)	378	22	22
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	30.3	4.2	4.2
Effective Green, g (s)	30.3	4.2	4.2
Actuated g/C Ratio	0.26	0.04	0.04
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	384	59	53
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.26		
v/c Ratio	0.98	0.37	0.42
Uniform Delay, d1	42.5	54.5	54.6
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	41.8	1.4	1.9
Delay (s)	84.3	56.0	56.5
Level of Service	F	E	E
Approach Delay (s)		56.2	
Approach LOS		E	

Intersection Summary

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	0	0	0	5	105	55	20	400	5
Future Vol, veh/h	0	0	5	0	0	0	5	105	55	20	400	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	13	0	0	0	7	142	74	22	440	5

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	680	717	443	445	0	0	216	0	0
Stage 1	487	487	-	-	-	-	-	-	-
Stage 2	193	230	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	405	346	598	1074	-	-	1308	-	-
Stage 1	602	537	-	-	-	-	-	-	-
Stage 2	821	699	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	395	0	598	1074	-	-	1308	-	-
Mov Cap-2 Maneuver	395	0	-	-	-	-	-	-	-
Stage 1	588	0	-	-	-	-	-	-	-
Stage 2	821	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.3	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1074	-	-	598	1308	-	-
HCM Lane V/C Ratio	0.006	-	-	0.022	0.017	-	-
HCM Control Delay (s)	8.4	-	-	11.2	7.8	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Future Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	16	213	6	90	12	100	0	0	398	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	581	533	409	541	544	100	420	0	-	-	-	0
Stage 1	409	409	-	124	124	-	-	-	-	-	-	-
Stage 2	172	124	-	417	420	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	413	442	625	440	435	934	1097	-	0	0	-	-
Stage 1	604	582	-	861	778	-	-	-	0	0	-	-
Stage 2	811	778	-	598	576	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	367	437	625	425	430	934	1097	-	-	-	-	-
Mov Cap-2 Maneuver	462	491	-	487	480	-	-	-	-	-	-	-
Stage 1	597	582	-	852	769	-	-	-	-	-	-	-
Stage 2	720	769	-	583	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	15.4	0.9	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1097	-	531	487	885	-	-
HCM Lane V/C Ratio	0.011	-	0.061	0.438	0.108	-	-
HCM Control Delay (s)	8.3	-	12.2	18	9.6	-	-
HCM Lane LOS	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	2.2	0.4	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Future Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	39	312	0	0	0	0	0	47	53
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	9.3	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	27%	0%	0%
Vol Thru, %	73%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	110	160	75
LT Vol	30	0	0
Through Vol	80	160	35
RT Vol	0	0	40
Lane Flow Rate	143	208	100
Geometry Grp	7	7	2
Degree of Util (X)	0.198	0.28	0.127
Departure Headway (Hd)	4.983	4.846	4.569
Convergence, Y/N	Yes	Yes	Yes
Cap	714	736	789
Service Time	2.758	2.621	2.569
HCM Lane V/C Ratio	0.2	0.283	0.127
HCM Control Delay	9	9.5	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	1.1	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	95	25	20	15	20	10	500	135	35	55	25
Future Volume (veh/h)	65	95	25	20	15	20	10	500	135	35	55	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	90	132	32	22	16	22	13	633	170	50	79	36
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	261	290	74	225	125	185	785	735	197	257	630	287
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.56	0.56	0.56	0.56	0.56	0.56
Sat Flow, veh/h	767	1732	442	526	746	1105	1180	1313	353	626	1124	512
Grp Volume(v), veh/h	146	0	108	33	0	27	13	0	803	50	0	115
Grp Sat Flow(s),veh/h/ln	1447	0	1494	1001	0	1377	1180	0	1665	626	0	1637
Q Serve(g_s), s	3.1	0.0	2.9	0.1	0.0	0.7	0.2	0.0	18.1	3.3	0.0	1.5
Cycle Q Clear(g_c), s	4.0	0.0	2.9	2.9	0.0	0.7	1.7	0.0	18.1	21.3	0.0	1.5
Prop In Lane	0.62		0.30	0.67		0.80	1.00		0.21	1.00		0.31
Lane Grp Cap(c), veh/h	375	0	251	305	0	231	785	0	932	257	0	916
V/C Ratio(X)	0.39	0.00	0.43	0.11	0.00	0.12	0.02	0.00	0.86	0.19	0.00	0.13
Avail Cap(c_a), veh/h	970	0	882	842	0	812	981	0	1209	361	0	1189
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	0.0	16.4	15.6	0.0	15.6	5.0	0.0	8.2	17.3	0.0	4.6
Incr Delay (d2), s/veh	0.7	0.0	1.2	0.2	0.0	0.2	0.0	0.0	5.2	0.4	0.0	0.1
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	1.7	0.0	1.3	0.3	0.0	0.3	0.1	0.0	9.4	0.6	0.0	0.7
LnGrp Delay(d),s/veh	17.5	0.0	17.6	15.7	0.0	15.8	5.0	0.0	13.5	17.7	0.0	4.7
LnGrp LOS	B		B	B		B	A		B	B		A
Approach Vol, veh/h		254			60			816			165	
Approach Delay, s/veh		17.6			15.8			13.3			8.6	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		30.7		13.4		30.7		13.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		20.1		6.0		23.3		4.9
Green Ext Time (p_c), s		4.6		1.4		0.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	19.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	165	100	0	0	0	30	70	70	175	290	100
Future Vol, veh/h	40	165	100	0	0	0	30	70	70	175	290	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	179	109	0	0	0	32	74	74	190	315	109

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	925	962	370	424	0	0	148	0	0
Stage 1	750	750	-	-	-	-	-	-	-
Stage 2	175	212	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	289	248	658	1094	-	-	1386	-	-
Stage 1	453	407	-	-	-	-	-	-	-
Stage 2	836	712	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	242	0	658	1094	-	-	1386	-	-
Mov Cap-2 Maneuver	242	0	-	-	-	-	-	-	-
Stage 1	380	0	-	-	-	-	-	-	-
Stage 2	836	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	59.3	1.5	2.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	242	658	1386	-	-
HCM Lane V/C Ratio	0.029	-	-	0.921	0.165	0.137	-	-
HCM Control Delay (s)	8.4	-	-	82.6	11.6	8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	8	0.6	0.5	-	-

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	460	20	0	0	0	0	0	0	30	15	0
Future Vol, veh/h	0	460	20	0	0	0	0	0	0	30	15	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	597	26	0	0	0	0	0	0	43	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	11.7	9.1
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	88%	33%
Vol Right, %	0%	12%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	307	173	45
LT Vol	0	0	30
Through Vol	307	153	15
RT Vol	0	20	0
Lane Flow Rate	398	225	64
Geometry Grp	7	7	2
Degree of Util (X)	0.529	0.294	0.098
Departure Headway (Hd)	4.783	4.702	5.501
Convergence, Y/N	Yes	Yes	Yes
Cap	745	756	655
Service Time	2.564	2.483	3.501
HCM Lane V/C Ratio	0.534	0.298	0.098
HCM Control Delay	12.9	9.5	9.1
HCM Lane LOS	B	A	A
HCM 95th-tile Q	3.1	1.2	0.3

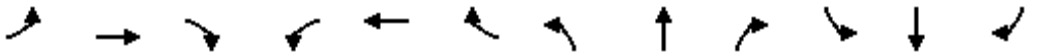
Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	105	20	30	5	10	15	155	0	0	410	15
Future Vol, veh/h	5	105	20	30	5	10	15	155	0	0	410	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	119	23	45	7	15	20	209	0	0	477	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	746	735	486	806	744	209	495	0	-	-	-	0
Stage 1	486	486	-	249	249	-	-	-	-	-	-	-
Stage 2	260	249	-	557	495	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	320	337	565	291	333	812	1029	-	0	0	-	-
Stage 1	548	538	-	738	686	-	-	-	0	0	-	-
Stage 2	727	686	-	501	533	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	305	331	565	215	327	812	1029	-	-	-	-	-
Mov Cap-2 Maneuver	411	420	-	296	409	-	-	-	-	-	-	-
Stage 1	538	538	-	724	673	-	-	-	-	-	-	-
Stage 2	692	673	-	374	533	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	17.4	0.8	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1029	-	437	357	-	-
HCM Lane V/C Ratio	0.02	-	0.338	0.188	-	-
HCM Control Delay (s)	8.6	-	17.4	17.4	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.7	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	130	20	85	265	335	0	5	35	600	20	20
Future Volume (vph)	45	130	20	85	265	335	0	5	35	600	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.92			0.87		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3217		1641	3007			1499		1559	1557	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3217		1641	3007			1499		1559	1557	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	55	159	24	94	294	372	0	6	45	706	24	24
RTOR Reduction (vph)	0	12	0	0	227	0	0	43	0	0	2	0
Lane Group Flow (vph)	55	171	0	94	439	0	0	8	0	381	371	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	3.9	15.5		6.6	18.2			3.5		23.8	23.8	
Effective Green, g (s)	3.9	15.5		6.6	18.2			3.5		23.8	23.8	
Actuated g/C Ratio	0.06	0.23		0.10	0.27			0.05		0.36	0.36	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	96	748		162	821			78		557	556	
v/s Ratio Prot	0.03	0.05		c0.06	c0.15			c0.01		c0.24	0.24	
v/s Ratio Perm												
v/c Ratio	0.57	0.23		0.58	0.53			0.11		0.68	0.67	
Uniform Delay, d1	30.5	20.7		28.7	20.6			30.1		18.2	18.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.0	0.2		3.4	0.8			0.6		3.5	3.0	
Delay (s)	35.6	20.9		32.1	21.3			30.7		21.7	21.1	
Level of Service	D	C		C	C			C		C	C	
Approach Delay (s)		24.3			22.7			30.7			21.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	580	185	585	145	0	0	0	0	520	25	540
Future Volume (veh/h)	0	580	185	585	145	0	0	0	0	520	25	540
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	690	0	672	167	0				604	0	522
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1769	792	757	2740	0				823	0	367
Arrive On Green	0.00	0.54	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	690	0	672	167	0				604	0	522
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.8	0.0	16.7	3.0	0.0				13.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	9.8	0.0	16.7	3.0	0.0				13.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1769	792	757	2740	0				823	0	367
V/C Ratio(X)	0.00	0.39	0.00	0.89	0.06	0.00				0.73	0.00	1.42
Avail Cap(c_a), veh/h	0	1769	792	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.84	0.00	0.36	0.36	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.8	0.0	35.8	5.9	0.0				27.6	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	4.4	0.0	0.0				3.0	0.0	205.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.5	0.0	7.8	1.4	0.0				6.5	0.0	29.0
LnGrp Delay(d),s/veh	0.0	11.3	0.0	40.2	5.9	0.0				30.6	0.0	235.3
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		690			839						1126	
Approach Delay, s/veh		11.3			33.4						125.5	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.7	48.7		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	18.7	11.8		22.0		5.0		
Green Ext Time (p_c), s	0.3	6.3		0.0		2.2		

Intersection Summary	
HCM 2010 Ctrl Delay	66.7
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	645	0	0	710	550	25	10	490	0	0	0
Future Volume (veh/h)	455	645	0	0	710	550	25	10	490	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	517	733	0	0	807	568	22	0	463			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	588	2274	0	0	836	577	306	0	545			
Arrive On Green	0.37	1.00	0.00	0.00	0.45	0.45	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1945	1283	1645	0	2936			
Grp Volume(v), veh/h	517	733	0	0	710	665	22	0	463			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1501	1645	0	1468			
Q Serve(g_s), s	12.1	0.0	0.0	0.0	33.6	35.0	0.9	0.0	12.2			
Cycle Q Clear(g_c), s	12.1	0.0	0.0	0.0	33.6	35.0	0.9	0.0	12.2			
Prop In Lane	1.00		0.00	0.00		0.85	1.00		1.00			
Lane Grp Cap(c), veh/h	588	2274	0	0	738	675	306	0	545			
V/C Ratio(X)	0.88	0.32	0.00	0.00	0.96	0.98	0.07	0.00	0.85			
Avail Cap(c_a), veh/h	798	2274	0	0	738	675	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.4	0.0	0.0	0.0	21.3	21.7	26.9	0.0	31.5			
Incr Delay (d2), s/veh	4.8	0.3	0.0	0.0	25.1	31.0	0.0	0.0	5.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.6	0.1	0.0	0.0	20.3	20.2	0.4	0.0	5.4			
LnGrp Delay(d),s/veh	29.2	0.3	0.0	0.0	46.5	52.8	26.9	0.0	37.0			
LnGrp LOS	C	A			D	D	C		D			
Approach Vol, veh/h		1250			1375			485				
Approach Delay, s/veh		12.2			49.5			36.5				
Approach LOS		B			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.5			19.4	41.1		19.5
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			14.1	37.0		14.2
Green Ext Time (p_c), s		12.2			0.6	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	13.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	130	30	0	350	50
Future Vol, veh/h	25	130	30	0	350	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	52	271	40	0	686	98

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1510	40	0	0	40	0
Stage 1	40	-	-	-	-	-
Stage 2	1470	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	127	1009	-	-	1570	-
Stage 1	962	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	72	1009	-	-	1570	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	202	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30	0	7.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	72	1009	1570	-
HCM Lane V/C Ratio	-	-	0.723	0.268	0.437	-
HCM Control Delay (s)	-	-	134.7	9.9	9.1	-
HCM Lane LOS	-	-	F	A	A	-
HCM 95th %tile Q(veh)	-	-	3.3	1.1	2.3	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	40	85	95	60	345
Future Vol, veh/h	110	40	85	95	60	345
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	159	58	120	134	68	392

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	217	0	562	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1307	-	475	834
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	678	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1307	-	428	834
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	428	834	-	-	1307	-
HCM Lane V/C Ratio	0.159	0.47	-	-	0.092	-
HCM Control Delay (s)	15	13.1	-	-	8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	2.5	-	-	0.3	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	170	0	240	45	70	30	95	70	550	5	180	40
Future Volume (vph)	170	0	240	45	70	30	95	70	550	5	180	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.98		1.00	0.89		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3204		1641	1530		1641	3158			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3204		1641	1530		1641	3158			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	198	0	279	52	100	43	136	80	625	5	205	45
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	198	321	0	100	179	0	80	835	0	0	45
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		17.8	17.8		16.2	16.2		8.0	31.6			4.6
Effective Green, g (s)		17.8	17.8		16.2	16.2		8.0	31.6			4.6
Actuated g/C Ratio		0.18	0.18		0.16	0.16		0.08	0.32			0.05
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		294	575		268	250		132	1006			76
v/s Ratio Prot		c0.12	0.10		0.06	c0.12		c0.05	c0.26			0.03
v/s Ratio Perm												
v/c Ratio		0.67	0.56		0.37	0.72		0.61	0.83			0.59
Uniform Delay, d1		37.9	37.1		36.9	39.3		44.0	31.3			46.3
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		4.7	0.7		0.3	7.9		5.3	6.6			8.0
Delay (s)		42.7	37.7		37.2	47.1		49.3	37.8			54.3
Level of Service		D	D		D	D		D	D			D
Approach Delay (s)			39.6			43.6			38.8			
Approach LOS			D			D			D			

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	120	65	15	15
Future Volume (vph)	120	65	15	15
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	136	74	16	16
RTOR Reduction (vph)	0	53	0	0
Lane Group Flow (vph)	136	21	16	16
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	28.2	28.2	3.4	3.4
Effective Green, g (s)	28.2	28.2	3.4	3.4
Actuated g/C Ratio	0.28	0.28	0.03	0.03
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	933	417	56	50
v/s Ratio Prot	0.04		0.01	c0.01
v/s Ratio Perm		0.01		
v/c Ratio	0.15	0.05	0.29	0.32
Uniform Delay, d1	26.5	25.7	46.7	46.7
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0	1.3
Delay (s)	26.6	25.8	47.7	48.1
Level of Service	C	C	D	D
Approach Delay (s)	31.3		47.9	
Approach LOS	C		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	10	295	80	20	190	5
Future Vol, veh/h	5	0	5	0	0	0	10	295	80	20	190	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	12	364	99	23	216	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	703	752	219	222	0	0	463	0	0
Stage 1	265	265	-	-	-	-	-	-	-
Stage 2	438	487	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	392	330	801	1301	-	-	1057	-	-
Stage 1	761	675	-	-	-	-	-	-	-
Stage 2	634	537	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	380	0	801	1301	-	-	1057	-	-
Mov Cap-2 Maneuver	380	0	-	-	-	-	-	-	-
Stage 1	737	0	-	-	-	-	-	-	-
Stage 2	634	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.2	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1301	-	-	515	1057	-	-
HCM Lane V/C Ratio	0.009	-	-	0.031	0.022	-	-
HCM Control Delay (s)	7.8	-	-	12.2	8.5	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	250	5	125	25	310	0	0	195	10
Future Vol, veh/h	5	0	5	250	5	125	25	310	0	0	195	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	89	89	89	75	75	75	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	281	6	140	33	413	0	0	229	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	787	714	235	724	720	413	241	0	-	-	-	0
Stage 1	235	235	-	479	479	-	-	-	-	-	-	-
Stage 2	552	479	-	245	241	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	300	347	785	331	344	622	1280	-	0	0	-	-
Stage 1	750	696	-	553	542	-	-	-	0	0	-	-
Stage 2	504	542	-	741	692	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	225	338	785	316	335	622	1280	-	-	-	-	-
Mov Cap-2 Maneuver	312	422	-	416	416	-	-	-	-	-	-	-
Stage 1	731	696	-	539	528	-	-	-	-	-	-	-
Stage 2	376	528	-	722	692	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	24	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1280	-	447	416	610	-	-
HCM Lane V/C Ratio	0.026	-	0.089	0.675	0.239	-	-
HCM Control Delay (s)	7.9	-	13.8	29.9	12.8	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	4.8	0.9	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Future Vol, veh/h	0	0	0	20	350	0	0	0	0	0	25	30
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	25	432	0	0	0	0	0	31	37
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	15%	0%	0%
Vol Thru, %	85%	100%	45%
Vol Right, %	0%	0%	55%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	137	233	55
LT Vol	20	0	0
Through Vol	117	233	25
RT Vol	0	0	30
Lane Flow Rate	169	288	68
Geometry Grp	7	7	2
Degree of Util (X)	0.228	0.383	0.09
Departure Headway (Hd)	4.862	4.789	4.758
Convergence, Y/N	Yes	Yes	Yes
Cap	734	746	758
Service Time	2.621	2.548	2.758
HCM Lane V/C Ratio	0.23	0.386	0.09
HCM Control Delay	9.1	10.5	8.2
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.9	1.8	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	30	35	190	30	120	80	40	50	80	110
Future Volume (veh/h)	20	30	30	35	190	30	120	80	40	50	80	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	28	42	42	38	209	33	152	101	50	71	114	148
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	258	260	244	209	505	80	511	410	203	608	257	333
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	375	1273	1198	254	2477	392	1032	1092	540	1142	683	887
Grp Volume(v), veh/h	64	0	48	153	0	127	152	0	151	71	0	262
Grp Sat Flow(s),veh/h/ln	1486	0	1360	1620	0	1503	1032	0	1632	1142	0	1571
Q Serve(g_s), s	0.0	0.0	0.8	0.2	0.0	2.1	3.7	0.0	1.8	1.3	0.0	3.6
Cycle Q Clear(g_c), s	0.9	0.0	0.8	2.2	0.0	2.1	7.3	0.0	1.8	3.1	0.0	3.6
Prop In Lane	0.44		0.88	0.25		0.26	1.00		0.33	1.00		0.56
Lane Grp Cap(c), veh/h	484	0	278	488	0	307	511	0	613	608	0	590
V/C Ratio(X)	0.13	0.00	0.17	0.31	0.00	0.41	0.30	0.00	0.25	0.12	0.00	0.44
Avail Cap(c_a), veh/h	1439	0	1240	1594	0	1370	1281	0	1831	1460	0	1762
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.4	9.9	0.0	9.9	9.4	0.0	6.1	7.2	0.0	6.7
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.4	0.0	0.9	0.3	0.0	0.2	0.1	0.0	0.5
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	0.4	0.0	0.3	1.1	0.0	0.9	1.1	0.0	0.8	0.4	0.0	1.6
LnGrp Delay(d),s/veh	9.5	0.0	9.7	10.3	0.0	10.8	9.7	0.0	6.3	7.3	0.0	7.2
LnGrp LOS	A		A	B		B	A		A	A		A
Approach Vol, veh/h		112			280			303			333	
Approach Delay, s/veh		9.6			10.5			8.0			7.2	
Approach LOS		A			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		16.7		11.8		16.7		11.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		9.3		2.9		5.6		4.2
Green Ext Time (p_c), s		1.5		0.6		1.9		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	40	35	0	0	0	120	305	85	85	70	230
Future Vol, veh/h	20	40	35	0	0	0	120	305	85	85	70	230
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	29	57	50	0	0	0	129	328	91	104	85	280

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1065	1110	225			365	0	0	419	0	0
Stage 1	433	433	-			-	-	-	-	-	-
Stage 2	632	677	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	238	202	795			1151	-	-	1098	-	-
Stage 1	637	568	-			-	-	-	-	-	-
Stage 2	515	440	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	191	0	795			1151	-	-	1098	-	-
Mov Cap-2 Maneuver	191	0	-			-	-	-	-	-	-
Stage 1	512	0	-			-	-	-	-	-	-
Stage 2	515	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.8	2	1.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	191	795	1098	-	-
HCM Lane V/C Ratio	0.112	-	-	0.449	0.063	0.094	-	-
HCM Control Delay (s)	8.5	-	-	38.3	9.8	8.6	-	-
HCM Lane LOS	A	-	-	E	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.1	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	145	35	0	0	0	0	0	0	20	15	0
Future Vol, veh/h	0	145	35	0	0	0	0	0	0	20	15	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	179	43	0	0	0	0	0	0	28	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.2	8
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	57%
Vol Thru, %	100%	58%	43%
Vol Right, %	0%	42%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	97	83	35
LT Vol	0	0	20
Through Vol	97	48	15
RT Vol	0	35	0
Lane Flow Rate	119	103	49
Geometry Grp	7	7	2
Degree of Util (X)	0.158	0.127	0.063
Departure Headway (Hd)	4.755	4.461	4.699
Convergence, Y/N	Yes	Yes	Yes
Cap	753	801	767
Service Time	2.495	2.2	2.699
HCM Lane V/C Ratio	0.158	0.129	0.064
HCM Control Delay	8.4	7.9	8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.4	0.2

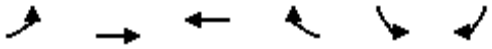
Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	5	5	5	15	0	5	20	450	0	0	120	10
Future Vol, veh/h	5	5	5	15	0	5	20	450	0	0	120	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	20	20	19	0	6	25	563	0	0	179	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	803	800	187	820	807	563	194	0	-	-	-	0
Stage 1	187	187	-	613	613	-	-	-	-	-	-	-
Stage 2	616	613	-	207	194	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	292	309	835	285	306	511	1333	-	0	0	-	-
Stage 1	797	730	-	466	471	-	-	-	0	0	-	-
Stage 2	465	471	-	777	725	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	284	303	835	263	300	511	1333	-	-	-	-	-
Mov Cap-2 Maneuver	373	382	-	364	379	-	-	-	-	-	-	-
Stage 1	782	730	-	457	462	-	-	-	-	-	-	-
Stage 2	451	462	-	738	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	14.8	0.3	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1333	-	462	392	-	-
HCM Lane V/C Ratio	0.019	-	0.13	0.063	-	-
HCM Control Delay (s)	7.8	-	14	14.8	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.2	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	130	340	215	75	90
Future Volume (veh/h)	40	130	340	215	75	90
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	51	165	410	241	95	109
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	318	865	511	300	277	247
Arrive On Green	0.50	0.50	0.50	0.50	0.17	0.17
Sat Flow, veh/h	721	1727	1020	599	1645	1468
Grp Volume(v), veh/h	51	165	0	651	95	109
Grp Sat Flow(s),veh/h/ln	721	1727	0	1619	1645	1468
Q Serve(g_s), s	2.3	1.9	0.0	12.2	1.8	2.4
Cycle Q Clear(g_c), s	14.5	1.9	0.0	12.2	1.8	2.4
Prop In Lane	1.00			0.37	1.00	1.00
Lane Grp Cap(c), veh/h	318	865	0	811	277	247
V/C Ratio(X)	0.16	0.19	0.00	0.80	0.34	0.44
Avail Cap(c_a), veh/h	493	1286	0	1206	1180	1053
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.6	5.0	0.0	7.6	13.3	13.5
Incr Delay (d2), s/veh	0.2	0.1	0.0	2.5	0.7	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.9	0.0	5.8	0.9	1.1
LnGrp Delay(d),s/veh	13.8	5.1	0.0	10.0	14.0	14.8
LnGrp LOS	B	A		B	B	B
Approach Vol, veh/h		216	651		204	
Approach Delay, s/veh		7.2	10.0		14.4	
Approach LOS		A	B		B	

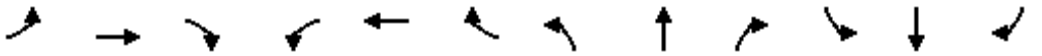
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		24.2				24.2		12.1
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		16.5				14.2		4.4
Green Ext Time (p_c), s		0.9				3.8		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	10.3
HCM 2010 LOS	B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	225	75	210	460	35	215
Future Volume (vph)	225	75	210	460	35	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.97		1.00	1.00	0.88	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1669		1641	1727	1635	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	1669		1641	1727	1635	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	288	96	244	535	50	307
RTOR Reduction (vph)	11	0	0	0	0	0
Lane Group Flow (vph)	373	0	244	535	357	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	22.1		15.6	41.7	20.4	
Effective Green, g (s)	22.1		15.6	41.7	20.4	
Actuated g/C Ratio	0.31		0.22	0.58	0.29	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	517		359	1010	467	
v/s Ratio Prot	c0.22		c0.15	0.31	c0.22	
v/s Ratio Perm						
v/c Ratio	0.72		0.68	0.53	0.76	
Uniform Delay, d1	21.9		25.6	8.9	23.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	4.9		4.0	0.5	6.6	
Delay (s)	26.8		29.6	9.4	29.8	
Level of Service	C		C	A	C	
Approach Delay (s)	26.8			15.7	29.8	
Approach LOS	C			B	C	

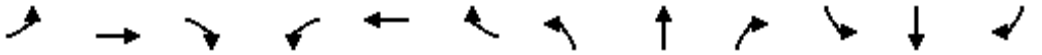
Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	17.7
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	325	50	40	625	550	5	10	20	270	10	40
Future Volume (vph)	65	325	50	40	625	550	5	10	20	270	10	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.93		1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1641	3216		1641	3051		1641	1553		1559	1526	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (perm)	1641	3216		1641	3051		1641	1553		1559	1526	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	66	328	51	43	672	591	7	14	29	386	14	57
RTOR Reduction (vph)	0	8	0	0	107	0	0	27	0	0	9	0
Lane Group Flow (vph)	66	371	0	43	1156	0	7	16	0	232	216	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.8	51.3		5.3	50.8		5.4	5.4		21.8	21.8	
Effective Green, g (s)	5.8	51.3		5.3	50.8		5.4	5.4		21.8	21.8	
Actuated g/C Ratio	0.06	0.51		0.05	0.50		0.05	0.05		0.22	0.22	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	94	1633		86	1534		87	83		336	329	
v/s Ratio Prot	c0.04	0.12		0.03	c0.38		0.00	c0.01		c0.15	0.14	
v/s Ratio Perm												
v/c Ratio	0.70	0.23		0.50	0.75		0.08	0.19		0.69	0.66	
Uniform Delay, d1	46.8	13.8		46.6	20.1		45.4	45.7		36.5	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.6	0.1		1.7	2.2		0.4	1.1		6.0	4.7	
Delay (s)	64.3	13.9		48.2	22.3		45.8	46.8		42.5	40.9	
Level of Service	E	B		D	C		D	D		D	D	
Approach Delay (s)		21.4			23.2			46.7			41.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	440	170	300	795	0	0	0	0	405	25	420
Future Volume (veh/h)	0	440	170	300	795	0	0	0	0	405	25	420
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	524	0	345	914	0				475	0	396
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2094	937	441	2740	0				823	0	367
Arrive On Green	0.00	0.64	0.00	0.05	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	524	0	345	914	0				475	0	396
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.5	0.0	8.6	17.8	0.0				10.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	5.5	0.0	8.6	17.8	0.0				10.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2094	937	441	2740	0				823	0	367
V/C Ratio(X)	0.00	0.25	0.00	0.78	0.33	0.00				0.58	0.00	1.08
Avail Cap(c_a), veh/h	0	2094	937	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.2	0.0	37.0	11.2	0.0				26.3	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.1	0.0	0.0				0.7	0.0	69.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	0.0	3.8	8.1	0.0				4.6	0.0	15.2
LnGrp Delay(d),s/veh	0.0	6.5	0.0	37.1	11.2	0.0				27.0	0.0	99.7
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		524			1259						871	
Approach Delay, s/veh		6.5			18.3						60.0	
Approach LOS		A			B						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.8	56.6		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	10.6	7.5		22.0		19.8		
Green Ext Time (p_c), s	0.5	5.6		0.0		13.7		

Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	495	0	0	560	400	535	260	640	0	0	0
Future Volume (veh/h)	355	495	0	0	560	400	535	260	640	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	403	562	0	0	636	413	497	532	493			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	480	2063	0	0	801	520	411	432	367			
Arrive On Green	0.30	1.00	0.00	0.00	0.42	0.42	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1996	1239	1645	1727	1468			
Grp Volume(v), veh/h	403	562	0	0	546	503	497	532	493			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1509	1645	1727	1468			
Q Serve(g_s), s	9.5	0.0	0.0	0.0	23.2	23.2	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	9.5	0.0	0.0	0.0	23.2	23.2	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.82	1.00		1.00			
Lane Grp Cap(c), veh/h	480	2063	0	0	689	633	411	432	367			
V/C Ratio(X)	0.84	0.27	0.00	0.00	0.79	0.79	1.21	1.23	1.34			
Avail Cap(c_a), veh/h	798	2063	0	0	689	633	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	27.1	0.0	0.0	0.0	20.2	20.2	30.0	30.0	30.0			
Incr Delay (d2), s/veh	1.5	0.3	0.0	0.0	9.1	9.9	114.6	123.2	171.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.2	0.1	0.0	0.0	12.2	11.4	22.1	24.2	25.6			
LnGrp Delay(d),s/veh	28.6	0.3	0.0	0.0	29.3	30.1	144.6	153.2	201.7			
LnGrp LOS	C	A			C	C	F	F	F			
Approach Vol, veh/h		965			1049			1522				
Approach Delay, s/veh		12.1			29.7			166.1				
Approach LOS		B			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			16.7	38.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			11.5	25.2		22.0
Green Ext Time (p_c), s		8.7			0.6	0.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	83.6
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	9.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	50	455	75	10	130
Future Vol, veh/h	170	50	455	75	10	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	288	85	659	109	13	167

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	373	0	1758	331
Stage 1	-	-	-	-	331	-
Stage 2	-	-	-	-	1427	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1143	-	89	693
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	212	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1143	-	34	693
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	212	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.6	22.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	34	693	-	-	1143	-
HCM Lane V/C Ratio	0.377	0.241	-	-	0.577	-
HCM Control Delay (s)	164.7	11.8	-	-	12.4	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	1.2	0.9	-	-	3.8	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Future Volume (vph)	60	0	170	70	110	40	15	35	135	80	210	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.96		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3139		1641	1658		1641	3098		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3139		1641	1658		1641	3098		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	70	0	198	81	157	57	21	40	153	91	239	1256
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	250	0	157	78	0	40	244	0	239	1256
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		12.2	12.2		13.7	13.7		4.3	20.8		15.8	32.3
Effective Green, g (s)		12.2	12.2		13.7	13.7		4.3	20.8		15.8	32.3
Actuated g/C Ratio		0.13	0.13		0.15	0.15		0.05	0.23		0.17	0.35
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		218	417		245	247		76	702		282	1156
v/s Ratio Prot		0.04	c0.08		c0.10	0.05		0.02	0.08		c0.15	c0.38
v/s Ratio Perm												
v/c Ratio		0.32	0.60		0.64	0.32		0.53	0.35		0.85	1.09
Uniform Delay, d1		36.0	37.4		36.7	34.8		42.7	29.8		36.8	29.7
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	1.5		4.2	0.3		3.0	0.6		19.6	53.2
Delay (s)		36.3	39.0		40.9	35.1		45.7	30.4		56.4	82.9
Level of Service		D	D		D	D		D	C		E	F
Approach Delay (s)			38.4			39.0			32.5			67.5
Approach LOS			D			D			C			E

Intersection Summary			
HCM 2000 Control Delay	57.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	25.5
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	435	20	20
Future Volume (vph)	435	20	20
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	494	22	22
RTOR Reduction (vph)	102	0	0
Lane Group Flow (vph)	392	22	22
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	32.3	3.7	3.7
Effective Green, g (s)	32.3	3.7	3.7
Actuated g/C Ratio	0.35	0.04	0.04
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	517	66	59
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.27		
v/c Ratio	0.76	0.33	0.37
Uniform Delay, d1	26.3	42.8	42.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	7.5	1.1	1.4
Delay (s)	33.7	43.9	44.3
Level of Service	C	D	D
Approach Delay (s)		44.1	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	0	0	0	5	105	55	20	350	5
Future Vol, veh/h	0	0	5	0	0	0	5	105	55	20	350	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	13	0	0	0	7	142	74	22	385	5

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	625	662	388	390	0	0	216	0	0
Stage 1	432	432	-	-	-	-	-	-	-
Stage 2	193	230	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	436	372	643	1126	-	-	1308	-	-
Stage 1	638	569	-	-	-	-	-	-	-
Stage 2	821	699	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	426	0	643	1126	-	-	1308	-	-
Mov Cap-2 Maneuver	426	0	-	-	-	-	-	-	-
Stage 1	623	0	-	-	-	-	-	-	-
Stage 2	821	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.2	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	643	1308	-	-
HCM Lane V/C Ratio	0.006	-	-	0.02	0.017	-	-
HCM Control Delay (s)	8.2	-	-	10.7	7.8	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Future Vol, veh/h	5	0	5	190	5	80	10	85	0	0	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	16	213	6	90	12	100	0	0	398	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	581	533	409	541	544	100	420	0	-	-	-	0
Stage 1	409	409	-	124	124	-	-	-	-	-	-	-
Stage 2	172	124	-	417	420	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	413	442	625	440	435	934	1097	-	0	0	-	-
Stage 1	604	582	-	861	778	-	-	-	0	0	-	-
Stage 2	811	778	-	598	576	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	367	437	625	425	430	934	1097	-	-	-	-	-
Mov Cap-2 Maneuver	462	491	-	487	480	-	-	-	-	-	-	-
Stage 1	597	582	-	852	769	-	-	-	-	-	-	-
Stage 2	720	769	-	583	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	15.4	0.9	0
HCM LOS	B	C		

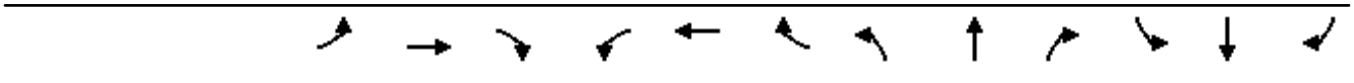
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1097	-	531	487	885	-	-
HCM Lane V/C Ratio	0.011	-	0.061	0.438	0.108	-	-
HCM Control Delay (s)	8.3	-	12.2	18	9.6	-	-
HCM Lane LOS	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	2.2	0.4	-	-

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Future Vol, veh/h	0	0	0	30	240	0	0	0	0	0	35	40
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	39	312	0	0	0	0	0	47	53
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	9.3	8.2
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	27%	0%	0%
Vol Thru, %	73%	100%	47%
Vol Right, %	0%	0%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	110	160	75
LT Vol	30	0	0
Through Vol	80	160	35
RT Vol	0	0	40
Lane Flow Rate	143	208	100
Geometry Grp	7	7	2
Degree of Util (X)	0.198	0.28	0.127
Departure Headway (Hd)	4.983	4.846	4.569
Convergence, Y/N	Yes	Yes	Yes
Cap	714	736	789
Service Time	2.758	2.621	2.569
HCM Lane V/C Ratio	0.2	0.283	0.127
HCM Control Delay	9	9.5	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	1.1	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	95	25	10	15	10	10	25	20	35	55	25
Future Volume (veh/h)	65	95	25	10	15	10	10	25	20	35	55	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	90	132	32	11	16	11	13	32	24	50	79	36
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	378	389	100	311	312	211	592	290	218	643	355	162
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	712	1796	460	467	1439	974	1180	918	688	1244	1124	512
Grp Volume(v), veh/h	150	0	104	22	0	16	13	0	56	50	0	115
Grp Sat Flow(s),veh/h/ln	1477	0	1491	1479	0	1400	1180	0	1606	1244	0	1637
Q Serve(g_s), s	1.2	0.0	1.5	0.0	0.0	0.2	0.2	0.0	0.6	0.8	0.0	1.3
Cycle Q Clear(g_c), s	2.1	0.0	1.5	0.3	0.0	0.2	1.5	0.0	0.6	1.4	0.0	1.3
Prop In Lane	0.60		0.31	0.50		0.70	1.00		0.43	1.00		0.31
Lane Grp Cap(c), veh/h	544	0	323	530	0	303	592	0	508	643	0	517
V/C Ratio(X)	0.28	0.00	0.32	0.04	0.00	0.05	0.02	0.00	0.11	0.08	0.00	0.22
Avail Cap(c_a), veh/h	1679	0	1509	1618	0	1417	1689	0	2001	1800	0	2040
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	0.0	8.5	8.0	0.0	8.0	7.0	0.0	6.2	6.7	0.0	6.5
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.7	0.1	0.0	0.1	0.1	0.0	0.3	0.3	0.0	0.6
LnGrp Delay(d),s/veh	8.9	0.0	9.0	8.0	0.0	8.0	7.0	0.0	6.3	6.8	0.0	6.7
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		254			38			69			165	
Approach Delay, s/veh		9.0			8.0			6.5			6.7	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.1		11.6		14.1		11.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		3.5		4.1		3.4		2.3
Green Ext Time (p_c), s		0.3		1.4		0.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	17.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱				↰	↱		↰	↱	
Traffic Vol, veh/h	40	165	100	0	0	0	20	70	70	175	290	100
Future Vol, veh/h	40	165	100	0	0	0	20	70	70	175	290	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	179	109	0	0	0	21	74	74	190	315	109

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	903	940	370	424	0	0	148	0	0
Stage 1	750	750	-	-	-	-	-	-	-
Stage 2	153	190	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	298	256	658	1094	-	-	1386	-	-
Stage 1	453	407	-	-	-	-	-	-	-
Stage 2	856	728	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	252	0	658	1094	-	-	1386	-	-
Mov Cap-2 Maneuver	252	0	-	-	-	-	-	-	-
Stage 1	384	0	-	-	-	-	-	-	-
Stage 2	856	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52.9	1	2.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	252	658	1386	-	-
HCM Lane V/C Ratio	0.019	-	-	0.884	0.165	0.137	-	-
HCM Control Delay (s)	8.4	-	-	73	11.6	8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.5	0.6	0.5	-	-

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	360	20	0	0	0	0	0	0	30	15	0
Future Vol, veh/h	0	360	20	0	0	0	0	0	0	30	15	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	468	26	0	0	0	0	0	0	43	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	10.2	8.8
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	86%	33%
Vol Right, %	0%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	240	140	45
LT Vol	0	0	30
Through Vol	240	120	15
RT Vol	0	20	0
Lane Flow Rate	312	182	64
Geometry Grp	7	7	2
Degree of Util (X)	0.414	0.237	0.094
Departure Headway (Hd)	4.783	4.683	5.279
Convergence, Y/N	Yes	Yes	Yes
Cap	745	760	683
Service Time	2.556	2.456	3.279
HCM Lane V/C Ratio	0.419	0.239	0.094
HCM Control Delay	10.9	8.9	8.8
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2	0.9	0.3

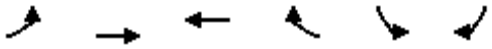
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	20	30	5	10	15	155	0	0	400	15
Future Vol, veh/h	5	0	20	30	5	10	15	155	0	0	400	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	23	45	7	15	20	209	0	0	465	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	734	723	474	735	732	209	483	0	-	-	-	0
Stage 1	474	474	-	249	249	-	-	-	-	-	-	-
Stage 2	260	249	-	486	483	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	326	343	574	325	339	812	1039	-	0	0	-	-
Stage 1	556	545	-	738	686	-	-	-	0	0	-	-
Stage 2	727	686	-	548	540	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	311	336	574	307	333	812	1039	-	-	-	-	-
Mov Cap-2 Maneuver	416	425	-	403	414	-	-	-	-	-	-	-
Stage 1	545	545	-	724	673	-	-	-	-	-	-	-
Stage 2	692	673	-	526	540	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	14.3	0.8	0
HCM LOS	B	B		

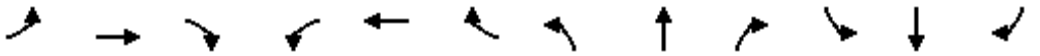
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1039	-	533	455	-	-
HCM Lane V/C Ratio	0.02	-	0.053	0.148	-	-
HCM Control Delay (s)	8.5	-	12.1	14.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.5	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	85	295	85	50	105	45
Future Volume (veh/h)	85	295	85	50	105	45
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	108	373	102	58	133	57
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	589	610	366	208	326	291
Arrive On Green	0.35	0.35	0.35	0.35	0.20	0.20
Sat Flow, veh/h	1132	1727	1035	588	1645	1468
Grp Volume(v), veh/h	108	373	0	160	133	57
Grp Sat Flow(s),veh/h/ln	1132	1727	0	1623	1645	1468
Q Serve(g_s), s	2.0	4.8	0.0	1.9	1.9	0.9
Cycle Q Clear(g_c), s	3.9	4.8	0.0	1.9	1.9	0.9
Prop In Lane	1.00			0.36	1.00	1.00
Lane Grp Cap(c), veh/h	589	610	0	574	326	291
V/C Ratio(X)	0.18	0.61	0.00	0.28	0.41	0.20
Avail Cap(c_a), veh/h	1333	1744	0	1639	1599	1427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.6	7.1	0.0	6.2	9.4	8.9
Incr Delay (d2), s/veh	0.1	1.0	0.0	0.3	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.3	0.0	0.9	0.9	0.4
LnGrp Delay(d),s/veh	7.8	8.1	0.0	6.5	10.2	9.3
LnGrp LOS	A	A		A	B	A
Approach Vol, veh/h		481	160		190	
Approach Delay, s/veh		8.0	6.5		9.9	
Approach LOS		A	A		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		15.4				15.4		11.3
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		6.8				3.9		3.9
Green Ext Time (p_c), s		2.7				0.9		0.5

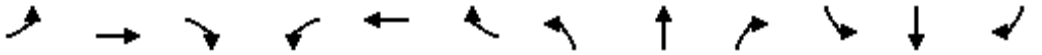
Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	605	20	85	470	335	0	5	35	600	20	50
Future Volume (vph)	45	605	20	85	470	335	0	5	35	600	20	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.87		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3266		1641	3077			1499		1559	1543	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3266		1641	3077			1499		1559	1543	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	55	738	24	94	522	372	0	6	45	706	24	59
RTOR Reduction (vph)	0	2	0	0	108	0	0	43	0	0	6	0
Lane Group Flow (vph)	55	760	0	94	786	0	0	8	0	395	388	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	4.3	26.5		7.9	30.1			3.8		26.8	26.8	
Effective Green, g (s)	4.3	26.5		7.9	30.1			3.8		26.8	26.8	
Actuated g/C Ratio	0.05	0.32		0.10	0.37			0.05		0.33	0.33	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	85	1052		157	1126			69		508	503	
v/s Ratio Prot	0.03	0.23		c0.06	c0.26			c0.01		c0.25	0.25	
v/s Ratio Perm												
v/c Ratio	0.65	0.72		0.60	0.70			0.12		0.78	0.77	
Uniform Delay, d1	38.2	24.6		35.6	22.2			37.6		25.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	12.0	2.6		4.0	2.0			0.8		7.4	7.2	
Delay (s)	50.2	27.2		39.7	24.2			38.4		32.4	32.1	
Level of Service	D	C		D	C			D		C	C	
Approach Delay (s)		28.7			25.6			38.4			32.3	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	695	540	585	355	0	0	0	0	520	25	540
Future Volume (veh/h)	0	695	540	585	355	0	0	0	0	520	25	540
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	827	0	672	408	0				604	0	522
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1769	792	757	2740	0				823	0	367
Arrive On Green	0.00	0.54	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	827	0	672	408	0				604	0	522
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	12.4	0.0	16.7	7.5	0.0				13.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	12.4	0.0	16.7	7.5	0.0				13.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1769	792	757	2740	0				823	0	367
V/C Ratio(X)	0.00	0.47	0.00	0.89	0.15	0.00				0.73	0.00	1.42
Avail Cap(c_a), veh/h	0	1769	792	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.59	0.00	0.30	0.30	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.4	0.0	35.8	7.5	0.0				27.6	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	3.7	0.0	0.0				3.0	0.0	205.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.6	0.0	7.8	3.4	0.0				6.5	0.0	29.0
LnGrp Delay(d),s/veh	0.0	11.9	0.0	39.5	7.5	0.0				30.6	0.0	235.3
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		827			1080						1126	
Approach Delay, s/veh		11.9			27.4						125.5	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.7	48.7		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	18.7	14.4		22.0		9.5		
Green Ext Time (p_c), s	0.3	6.3		0.0		5.8		

Intersection Summary	
HCM 2010 Ctrl Delay	59.6
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	765	0	0	710	550	235	10	490	0	0	0
Future Volume (veh/h)	455	765	0	0	710	550	235	10	490	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	517	869	0	0	807	568	180	0	548			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	575	2252	0	0	831	574	317	0	565			
Arrive On Green	0.36	1.00	0.00	0.00	0.45	0.45	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1945	1283	1645	0	2936			
Grp Volume(v), veh/h	517	869	0	0	710	665	180	0	548			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1501	1645	0	1468			
Q Serve(g_s), s	12.3	0.0	0.0	0.0	33.8	35.1	7.9	0.0	14.8			
Cycle Q Clear(g_c), s	12.3	0.0	0.0	0.0	33.8	35.1	7.9	0.0	14.8			
Prop In Lane	1.00		0.00	0.00		0.85	1.00		1.00			
Lane Grp Cap(c), veh/h	575	2252	0	0	734	671	317	0	565			
V/C Ratio(X)	0.90	0.39	0.00	0.00	0.97	0.99	0.57	0.00	0.97			
Avail Cap(c_a), veh/h	610	2252	0	0	734	671	317	0	565			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.55	0.55	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.9	0.0	0.0	0.0	21.6	21.9	29.3	0.0	32.1			
Incr Delay (d2), s/veh	9.2	0.3	0.0	0.0	26.3	32.4	1.5	0.0	30.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.0	0.1	0.0	0.0	20.5	20.4	3.7	0.0	8.4			
LnGrp Delay(d),s/veh	34.1	0.3	0.0	0.0	47.8	54.4	30.8	0.0	62.1			
LnGrp LOS	C	A			D	D	C		E			
Approach Vol, veh/h		1386			1375			728				
Approach Delay, s/veh		12.9			51.0			54.3				
Approach LOS		B			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.0			19.1	40.9		20.0
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		54.9			* 15	34.9		15.4
Max Q Clear Time (g_c+I1), s		2.0			14.3	37.1		16.8
Green Ext Time (p_c), s		15.9			0.2	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	36.5
HCM 2010 LOS	D

Notes

Appendix I
SANDAG Series 13 Travel Demand Model – Year 2050 ADTs

SANDAG SERIES 13 MODEL – 2050 ADTs



Appendix J
Peak Hour Intersection LOS Worksheets – Future Year 2050 Base Conditions

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	150	50	70	110	0	65	0	345	0	35	35
Future Vol, veh/h	0	150	50	70	110	0	65	0	345	0	35	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	217	72	99	155	0	74	0	392	0	36	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	289	0	0	642	-	253	-	642	155
Stage 1	-	-	-	-	-	-	253	-	-	-	353	-
Stage 2	-	-	-	-	-	-	389	-	-	-	289	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1228	-	0	376	0	767	0	382	870
Stage 1	0	-	-	-	-	0	734	0	-	0	617	-
Stage 2	0	-	-	-	-	0	619	0	-	0	659	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1228	-	-	309	-	767	-	348	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	309	-	-	-	348	-
Stage 1	-	-	-	-	-	-	734	-	-	-	563	-
Stage 2	-	-	-	-	-	-	506	-	-	-	659	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.2	15.4	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	309	767	-	-	1228	-	497
HCM Lane V/C Ratio	0.239	0.511	-	-	0.08	-	0.147
HCM Control Delay (s)	20.3	14.5	-	-	8.2	0	13.5
HCM Lane LOS	C	B	-	-	A	A	B
HCM 95th %tile Q(veh)	0.9	3	-	-	0.3	-	0.5



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	180	0	260	55	85	50	100	100	600	5	210	55
Future Volume (vph)	180	0	260	55	85	50	100	100	600	5	210	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.97		1.00	0.90		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3196		1641	1554		1641	3152			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3196		1641	1554		1641	3152			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	209	0	302	64	121	71	143	114	682	5	239	62
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	209	355	0	121	214	0	114	926	0	0	63
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		17.3	17.3		21.1	21.1		10.8	37.8			5.1
Effective Green, g (s)		17.3	17.3		21.1	21.1		10.8	37.8			5.1
Actuated g/C Ratio		0.15	0.15		0.18	0.18		0.09	0.33			0.04
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		246	480		300	284		153	1035			72
v/s Ratio Prot		c0.13	0.11		0.07	c0.14		c0.07	c0.29			0.04
v/s Ratio Perm												
v/c Ratio		0.85	0.74		0.40	0.75		0.75	0.89			0.88
Uniform Delay, d1		47.6	46.7		41.4	44.5		50.8	36.8			54.7
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		22.2	5.1		0.3	9.6		15.7	10.7			63.2
Delay (s)		69.8	51.8		41.8	54.2		66.5	47.5			117.8
Level of Service		E	D		D	D		E	D			F
Approach Delay (s)			58.4			49.7			49.6			
Approach LOS			E			D			D			

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	115.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	130	30	30
Future Volume (vph)	130	30	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	3282	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	3282	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	148	33	33
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	148	33	33
Turn Type	NA	Prot	Prot
Protected Phases	2	4	4
Permitted Phases			
Actuated Green, G (s)	32.1	8.3	8.3
Effective Green, g (s)	32.1	8.3	8.3
Actuated g/C Ratio	0.28	0.07	0.07
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	915	118	105
v/s Ratio Prot	0.05	0.02	c0.02
v/s Ratio Perm			
v/c Ratio	0.16	0.28	0.31
Uniform Delay, d1	31.3	50.6	50.7
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.5	0.6
Delay (s)	31.5	51.0	51.3
Level of Service	C	D	D
Approach Delay (s)	57.3	51.2	
Approach LOS	E	D	

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	10	0	20	15	300	15	25	200	5
Future Vol, veh/h	5	0	5	10	0	20	15	300	15	25	200	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	23	0	45	19	370	19	28	227	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	726	713	230	708	707	380	233	0	0	389	0	0
Stage 1	286	286	-	418	418	-	-	-	-	-	-	-
Stage 2	440	427	-	290	289	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	330	348	790	339	350	650	1289	-	-	1127	-	-
Stage 1	704	661	-	597	577	-	-	-	-	-	-	-
Stage 2	581	572	-	701	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	298	334	790	325	336	650	1289	-	-	1127	-	-
Mov Cap-2 Maneuver	298	334	-	325	336	-	-	-	-	-	-	-
Stage 1	693	644	-	588	568	-	-	-	-	-	-	-
Stage 2	532	563	-	677	643	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	13.6	0.4	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	433	488	1127	-	-
HCM Lane V/C Ratio	0.014	-	-	0.037	0.14	0.025	-	-
HCM Control Delay (s)	7.8	-	-	13.6	13.6	8.3	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	250	10	100	20	260	0	0	200	15
Future Vol, veh/h	5	0	5	250	10	100	20	260	0	0	200	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	90	90	90	92	92	92	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	278	11	111	22	283	0	0	235	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	632	571	244	581	580	283	253	0	-	-	-	0
Stage 1	244	244	-	327	327	-	-	-	-	-	-	-
Stage 2	388	327	-	254	253	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	382	420	776	413	415	737	1267	-	0	0	-	-
Stage 1	742	690	-	669	634	-	-	-	0	0	-	-
Stage 2	620	634	-	733	683	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	314	413	776	397	408	737	1267	-	-	-	-	-
Mov Cap-2 Maneuver	407	486	-	489	479	-	-	-	-	-	-	-
Stage 1	729	690	-	658	623	-	-	-	-	-	-	-
Stage 2	508	623	-	714	683	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	18.4	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1267	-	534	489	703	-	-
HCM Lane V/C Ratio	0.017	-	0.075	0.568	0.174	-	-
HCM Control Delay (s)	7.9	-	12.3	21.6	11.2	-	-
HCM Lane LOS	A	-	B	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	3.5	0.6	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	350	50	20	20	0	0	30	15
Future Vol, veh/h	0	0	0	30	350	50	20	20	0	0	30	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	67	67	67	81	81	81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	37	432	62	30	30	0	0	37	19

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	309	568	-	-	537	247
Stage 1	-	-	-	0	0	-	-	537	-
Stage 2	-	-	-	309	568	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	600	414	0	0	432	729
Stage 1	-	-	-	-	-	0	0	502	-
Stage 2	-	-	-	654	485	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	547	414	-	-	432	729
Mov Cap-2 Maneuver	-	-	-	547	414	-	-	432	-
Stage 1	-	-	-	-	-	-	-	502	-
Stage 2	-	-	-	590	485	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		13.8	13.1
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	471	-	-	-	500
HCM Lane V/C Ratio	0.127	-	-	-	0.111
HCM Control Delay (s)	13.8	-	-	-	13.1
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	25	45	50	200	50	150	100	50	80	120	140
Future Volume (veh/h)	25	25	45	50	200	50	150	100	50	80	120	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	35	35	62	55	220	55	190	127	62	114	171	191
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	229	166	277	201	454	113	477	497	243	624	338	378
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	366	799	1336	327	2188	544	942	1097	536	1103	746	834
Grp Volume(v), veh/h	70	0	62	181	0	149	190	0	189	114	0	362
Grp Sat Flow(s),veh/h/ln	1165	0	1336	1583	0	1476	942	0	1633	1103	0	1580
Q Serve(g_s), s	0.1	0.0	1.4	1.3	0.0	3.2	6.3	0.0	2.5	2.5	0.0	5.7
Cycle Q Clear(g_c), s	3.2	0.0	1.4	3.4	0.0	3.2	12.1	0.0	2.5	5.1	0.0	5.7
Prop In Lane	0.50		1.00	0.30		0.37	1.00		0.33	1.00		0.53
Lane Grp Cap(c), veh/h	394	0	277	461	0	306	477	0	740	624	0	716
V/C Ratio(X)	0.18	0.00	0.22	0.39	0.00	0.49	0.40	0.00	0.26	0.18	0.00	0.51
Avail Cap(c_a), veh/h	1071	0	982	1265	0	1085	902	0	1477	1122	0	1429
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	11.6	12.4	0.0	12.4	11.1	0.0	6.0	7.5	0.0	6.9
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.5	0.0	1.2	0.5	0.0	0.2	0.1	0.0	0.6
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	0.6	0.0	0.5	1.6	0.0	1.4	1.7	0.0	1.1	0.8	0.0	2.5
LnGrp Delay(d),s/veh	11.8	0.0	12.1	13.0	0.0	13.6	11.7	0.0	6.2	7.7	0.0	7.4
LnGrp LOS	B		B	B		B	B		A	A		A
Approach Vol, veh/h		132			330			379			476	
Approach Delay, s/veh		11.9			13.2			8.9			7.5	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.0		13.3		22.0		13.3
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		14.1		5.2		7.7		5.4
Green Ext Time (p_c), s		1.9		0.7		2.8		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	50	30	0	0	0	130	250	50	100	75	250
Future Vol, veh/h	30	50	30	0	0	0	130	250	50	100	75	250
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	71	43	0	0	0	140	269	54	122	91	305

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1064	1091	244	396	0	0	323	0	0
Stage 1	488	488	-	-	-	-	-	-	-
Stage 2	576	603	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	238	208	776	1120	-	-	1193	-	-
Stage 1	601	537	-	-	-	-	-	-	-
Stage 2	547	476	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	187	0	776	1120	-	-	1193	-	-
Mov Cap-2 Maneuver	187	0	-	-	-	-	-	-	-
Stage 1	472	0	-	-	-	-	-	-	-
Stage 2	547	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	39.5	2.6	2
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1120	-	-	187	776	1193	-	-
HCM Lane V/C Ratio	0.125	-	-	0.611	0.055	0.102	-	-
HCM Control Delay (s)	8.7	-	-	50.6	9.9	8.4	-	-
HCM Lane LOS	A	-	-	F	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	3.4	0.2	0.3	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	150	20	0	0	0	0	20	20	30	20	0
Future Vol, veh/h	50	150	20	0	0	0	0	20	20	30	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	25	25	25	58	58	58	72	72	72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	62	185	25	0	0	0	0	34	34	42	28	0

Major/Minor	Major1					Minor1			Minor2		
Conflicting Flow All	0	0	0			-	322	105	234	334	-
Stage 1	-	-	-			-	322	-	0	0	-
Stage 2	-	-	-			-	0	-	234	334	-
Critical Hdwy	4.3	-	-			-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-			-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-			-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-			-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-			0	576	904	680	567	0
Stage 1	-	-	-			0	630	-	-	-	0
Stage 2	-	-	-			0	-	-	726	622	0
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-			-	576	904	624	567	-
Mov Cap-2 Maneuver	-	-	-			-	576	-	624	567	-
Stage 1	-	-	-			-	630	-	-	-	-
Stage 2	-	-	-			-	-	-	660	622	-

Approach	EB	NB	SB
HCM Control Delay, s		10.7	11.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	704	-	-	-	600
HCM Lane V/C Ratio	0.098	-	-	-	0.116
HCM Control Delay (s)	10.7	-	-	-	11.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	15	30	0	10	45	380	35	10	150	15
Future Vol, veh/h	10	5	15	30	0	10	45	380	35	10	150	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	7	20	37	0	12	56	475	44	15	224	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	880	896	235	888	885	497	246	0	0	519	0	0
Stage 1	265	265	-	609	609	-	-	-	-	-	-	-
Stage 2	615	631	-	279	276	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	259	271	785	256	276	557	1275	-	-	1007	-	-
Stage 1	723	675	-	469	473	-	-	-	-	-	-	-
Stage 2	465	462	-	710	667	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	242	255	785	234	260	557	1275	-	-	1007	-	-
Mov Cap-2 Maneuver	242	255	-	234	260	-	-	-	-	-	-	-
Stage 1	691	665	-	448	452	-	-	-	-	-	-	-
Stage 2	435	442	-	675	657	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	21	0.8	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1275	-	-	375	274	1007	-	-
HCM Lane V/C Ratio	0.044	-	-	0.107	0.18	0.015	-	-
HCM Control Delay (s)	8	-	-	15.7	21	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.6	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	300	20	200	350	400	20	50	40	80	80	110
Future Volume (veh/h)	40	300	20	200	350	400	20	50	40	80	80	110
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	51	380	25	241	422	465	34	86	67	101	101	135
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	302	1508	99	534	791	708	283	223	174	354	166	222
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	579	3127	205	905	1641	1468	1057	901	702	1140	671	897
Grp Volume(v), veh/h	51	199	206	241	422	465	34	0	153	101	0	236
Grp Sat Flow(s),veh/h/ln	579	1641	1691	905	1641	1468	1057	0	1603	1140	0	1569
Q Serve(g_s), s	3.3	3.2	3.2	9.5	8.0	10.7	1.3	0.0	3.5	3.6	0.0	5.9
Cycle Q Clear(g_c), s	13.9	3.2	3.2	12.7	8.0	10.7	7.2	0.0	3.5	7.1	0.0	5.9
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.44	1.00		0.57
Lane Grp Cap(c), veh/h	302	791	816	534	791	708	283	0	397	354	0	388
V/C Ratio(X)	0.17	0.25	0.25	0.45	0.53	0.66	0.12	0.00	0.39	0.29	0.00	0.61
Avail Cap(c_a), veh/h	414	1109	1143	709	1109	992	926	0	1373	1047	0	1343
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	6.8	6.8	10.5	8.0	8.7	18.0	0.0	13.9	16.9	0.0	14.8
Incr Delay (d2), s/veh	0.3	0.2	0.2	0.6	0.6	1.0	0.2	0.0	0.6	0.4	0.0	1.5
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	0.5	1.5	1.5	2.4	3.6	4.5	0.4	0.0	1.6	1.2	0.0	2.7
LnGrp Delay(d),s/veh	14.2	6.9	6.9	11.1	8.6	9.7	18.2	0.0	14.5	17.3	0.0	16.3
LnGrp LOS	B	A	A	B	A	A	B		B	B		B
Approach Vol, veh/h		456			1128			187			337	
Approach Delay, s/veh		7.7			9.6			15.2			16.6	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.4		17.0		27.4		17.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		15.9		9.2		14.7		9.1
Green Ext Time (p_c), s		2.5		1.0		6.7		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	300	100	100	550	50	100
Future Volume (veh/h)	300	100	100	550	50	100
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	385	128	116	640	71	136
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.86	0.86	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	679	223	252	1790	348	553
Arrive On Green	0.28	0.28	0.15	0.55	0.20	0.20
Sat Flow, veh/h	2516	798	1645	3368	1774	1583
Grp Volume(v), veh/h	258	255	116	640	71	136
Grp Sat Flow(s),veh/h/ln	1641	1586	1645	1641	1774	1583
Q Serve(g_s), s	4.8	4.9	2.3	3.9	1.2	2.2
Cycle Q Clear(g_c), s	4.8	4.9	2.3	3.9	1.2	2.2
Prop In Lane		0.50	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	458	443	252	1790	348	553
V/C Ratio(X)	0.56	0.57	0.46	0.36	0.20	0.25
Avail Cap(c_a), veh/h	1173	1134	416	3545	1617	1686
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	11.0	13.7	4.6	12.0	8.2
Incr Delay (d2), s/veh	1.1	1.2	0.5	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	2.3	1.1	1.7	0.6	1.0
LnGrp Delay(d),s/veh	12.0	12.2	14.2	4.7	12.1	8.3
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	513			756	207	
Approach Delay, s/veh	12.1			6.1	9.6	
Approach LOS	B			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	14.5				24.0		11.6
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	9.0	25.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	4.3	6.9				5.9		4.2
Green Ext Time (p_c), s	0.1	3.0				5.0		0.2

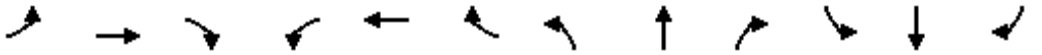
Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	250	50	50	600	350	5	10	20	145	5	45
Future Volume (veh/h)	100	250	50	50	600	350	5	10	20	145	5	45
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	101	253	51	54	645	347	7	14	28	138	103	63
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	125	1811	351	67	869	467	63	20	39	255	156	95
Arrive On Green	0.08	0.46	0.46	0.04	0.42	0.42	0.04	0.04	0.04	0.16	0.16	0.16
Sat Flow, veh/h	1645	3967	768	1645	2063	1110	1645	515	1030	1645	1004	614
Grp Volume(v), veh/h	101	198	106	54	513	479	7	0	42	138	0	166
Grp Sat Flow(s),veh/h/ln	1645	1572	1592	1645	1641	1531	1645	0	1545	1645	0	1619
Q Serve(g_s), s	3.4	2.0	2.1	1.8	14.6	14.6	0.2	0.0	1.5	4.3	0.0	5.4
Cycle Q Clear(g_c), s	3.4	2.0	2.1	1.8	14.6	14.6	0.2	0.0	1.5	4.3	0.0	5.4
Prop In Lane	1.00		0.48	1.00		0.72	1.00		0.67	1.00		0.38
Lane Grp Cap(c), veh/h	125	1435	727	67	691	645	63	0	59	255	0	251
V/C Ratio(X)	0.81	0.14	0.15	0.81	0.74	0.74	0.11	0.00	0.71	0.54	0.00	0.66
Avail Cap(c_a), veh/h	160	1703	862	189	919	857	542	0	509	977	0	962
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	8.8	8.8	26.4	13.5	13.5	25.8	0.0	26.4	21.7	0.0	22.1
Incr Delay (d2), s/veh	16.3	0.1	0.1	8.2	2.6	2.7	0.8	0.0	14.6	1.8	0.0	3.0
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	2.1	0.9	1.0	1.0	7.0	6.6	0.1	0.0	0.9	2.1	0.0	2.6
LnGrp Delay(d),s/veh	41.5	8.8	8.9	34.6	16.1	16.3	26.6	0.0	41.0	23.4	0.0	25.1
LnGrp LOS	D	A	A	C	B	B	C		D	C		C
Approach Vol, veh/h		405			1046			49			304	
Approach Delay, s/veh		17.0			17.1			39.0			24.3	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	30.0		12.8	8.4	28.0		6.3
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 6.4	30.1		* 33	* 5.4	31.1		18.3
Max Q Clear Time (g_c+I1), s	3.8	4.1		7.4	5.4	16.6		3.5
Green Ext Time (p_c), s	0.0	2.3		1.3	0.0	6.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	165	250	345	755	0	0	0	0	450	10	245
Future Volume (veh/h)	0	165	250	345	755	0	0	0	0	450	10	245
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	196	0	397	868	0				514	0	242
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1521	680	495	2222	0				643	0	287
Arrive On Green	0.00	0.46	0.00	0.05	0.22	0.00				0.20	0.00	0.20
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	196	0	397	868	0				514	0	242
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	2.7	0.0	9.8	18.0	0.0				11.9	0.0	12.7
Cycle Q Clear(g_c), s	0.0	2.7	0.0	9.8	18.0	0.0				11.9	0.0	12.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1521	680	495	2222	0				643	0	287
V/C Ratio(X)	0.00	0.13	0.00	0.80	0.39	0.00				0.80	0.00	0.84
Avail Cap(c_a), veh/h	0	1521	680	798	2222	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.00	0.19	0.19	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.2	0.0	36.7	17.0	0.0				30.7	0.0	31.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.2	0.1	0.0				3.3	0.0	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	0.0	4.4	8.2	0.0				5.7	0.0	6.0
LnGrp Delay(d),s/veh	0.0	12.4	0.0	37.0	17.1	0.0				34.0	0.0	42.0
LnGrp LOS		B		D	B					C		D
Approach Vol, veh/h		196			1265						756	
Approach Delay, s/veh		12.4			23.3						36.6	
Approach LOS		B			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.1	42.2		20.7		59.3		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 45		
Max Q Clear Time (g_c+I1), s	11.8	4.7		14.7		20.0		
Green Ext Time (p_c), s	0.6	2.0		0.9		11.7		

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	500	0	0	550	500	550	270	600	0	0	0
Future Volume (veh/h)	115	500	0	0	550	500	550	270	600	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	131	568	0	0	625	526	460	523	225			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	200	2063	0	0	861	721	411	432	367			
Arrive On Green	0.13	1.00	0.00	0.00	0.51	0.51	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1783	1421	1645	1727	1468			
Grp Volume(v), veh/h	131	568	0	0	604	547	460	523	225			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1477	1645	1727	1468			
Q Serve(g_s), s	3.1	0.0	0.0	0.0	23.0	23.2	20.0	20.0	10.9			
Cycle Q Clear(g_c), s	3.1	0.0	0.0	0.0	23.0	23.2	20.0	20.0	10.9			
Prop In Lane	1.00		0.00	0.00		0.96	1.00		1.00			
Lane Grp Cap(c), veh/h	200	2063	0	0	832	749	411	432	367			
V/C Ratio(X)	0.65	0.28	0.00	0.00	0.73	0.73	1.12	1.21	0.61			
Avail Cap(c_a), veh/h	794	2063	0	0	832	749	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	34.2	0.0	0.0	0.0	15.4	15.4	30.0	30.0	26.6			
Incr Delay (d2), s/veh	1.2	0.3	0.0	0.0	5.5	6.2	80.7	114.8	2.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	0.1	0.0	0.0	11.5	10.7	18.2	23.2	4.6			
LnGrp Delay(d),s/veh	35.3	0.3	0.0	0.0	20.9	21.6	110.7	144.8	28.8			
LnGrp LOS	D	A			C	C	F	F	C			
Approach Vol, veh/h		699			1151			1208				
Approach Delay, s/veh		6.8			21.2			110.2				
Approach LOS		A			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			9.7	45.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.7			* 20	25.7		20.0
Max Q Clear Time (g_c+I1), s		2.0			5.1	25.2		22.0
Green Ext Time (p_c), s		7.1			0.2	0.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.1
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	30	0	5	10	0	10	0	40	0	40	85	50
Future Vol, veh/h	30	0	5	10	0	10	0	40	0	40	85	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	30	30	30	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	0	7	33	0	33	0	53	0	58	123	72

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	345	328	159	332	364	53	195	0	0	53	0	0
Stage 1	275	275	-	53	53	-	-	-	-	-	-	-
Stage 2	70	53	-	279	311	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	594	578	866	606	551	992	1331	-	-	1503	-	-
Stage 1	714	668	-	940	835	-	-	-	-	-	-	-
Stage 2	920	835	-	710	644	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	555	553	866	581	527	992	1331	-	-	1503	-	-
Mov Cap-2 Maneuver	555	553	-	581	527	-	-	-	-	-	-	-
Stage 1	714	639	-	940	835	-	-	-	-	-	-	-
Stage 2	889	835	-	673	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	10.4	0	1.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1331	-	-	585	733	1503	-	-
HCM Lane V/C Ratio	-	-	-	0.087	0.091	0.039	-	-
HCM Control Delay (s)	0	-	-	11.7	10.4	7.5	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	25	10	35	30	40	10	20	15	30	40	15
Future Vol, veh/h	5	25	10	35	30	40	10	20	15	30	40	15
Peak Hour Factor	0.54	0.54	0.54	0.52	0.52	0.52	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	9	46	19	67	58	77	13	27	20	40	53	20
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	8.3	8.5	8.6	9.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	22%	100%	0%	0%	100%	0%	0%	35%
Vol Thru, %	44%	0%	100%	0%	0%	100%	20%	47%
Vol Right, %	33%	0%	0%	100%	0%	0%	80%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	5	25	10	35	20	50	85
LT Vol	10	5	0	0	35	0	0	30
Through Vol	20	0	25	0	0	20	10	40
RT Vol	15	0	0	10	0	0	40	15
Lane Flow Rate	60	9	46	19	67	38	96	113
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.089	0.015	0.069	0.024	0.107	0.056	0.125	0.171
Departure Headway (Hd)	5.316	5.86	5.356	4.651	5.734	5.231	4.667	5.427
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	673	611	668	768	625	685	768	661
Service Time	3.053	3.597	3.093	2.387	3.465	2.961	2.397	3.161
HCM Lane V/C Ratio	0.089	0.015	0.069	0.025	0.107	0.055	0.125	0.171
HCM Control Delay	8.6	8.7	8.5	7.5	9.2	8.3	8.1	9.3
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.3	0	0.2	0.1	0.4	0.2	0.4	0.6

Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	40	55	0	30	45
Future Vol, veh/h	15	40	55	0	30	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	22	60	90	0	42	63

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	237	90	0	0	90	0
Stage 1	90	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	734	946	-	-	1505	-
Stage 1	914	-	-	-	-	-
Stage 2	861	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	713	946	-	-	1505	-
Mov Cap-2 Maneuver	713	-	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	861	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	713	946	1505	-
HCM Lane V/C Ratio	-	-	0.031	0.063	0.028	-
HCM Control Delay (s)	-	-	10.2	9.1	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	0.1	-

Intersection	
Int Delay, s/veh	65.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	200	100	80	50	0	10	0	150	0	300	50
Future Vol, veh/h	0	200	100	80	50	0	10	0	150	0	300	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	339	169	116	72	0	13	0	192	0	345	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	508	0	0	929	-	424	-	812	72
Stage 1	-	-	-	-	-	-	424	-	-	-	304	-
Stage 2	-	-	-	-	-	-	505	-	-	-	508	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	1017	-	0	240	0	613	0	~ 304	968
Stage 1	0	-	-	-	-	0	592	0	-	0	649	-
Stage 2	0	-	-	-	-	0	535	0	-	0	526	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1017	-	-	-	-	613	-	~ 268	968
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	~ 268	-
Stage 1	-	-	-	-	-	-	592	-	-	-	572	-
Stage 2	-	-	-	-	-	-	176	-	-	-	526	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	5.5		210.2
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	613	-	-	1017	-	299
HCM Lane V/C Ratio	-	0.314	-	-	0.114	-	1.345
HCM Control Delay (s)	-	13.5	-	-	9	0	210.2
HCM Lane LOS	-	B	-	-	A	A	F
HCM 95th %tile Q(veh)	-	1.3	-	-	0.4	-	20.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	80	0	180	90	115	50	20	50	150	100	250	1155
Future Volume (vph)	80	0	180	90	115	50	20	50	150	100	250	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.95		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3117		1641	1652		1641	3084		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3117		1641	1652		1641	3084		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	93	0	209	105	164	71	29	57	170	114	284	1312
RTOR Reduction (vph)	0	0	42	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	272	0	164	100	0	57	284	0	284	1313
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		13.5	13.5		17.0	17.0		7.0	23.7		16.3	33.0
Effective Green, g (s)		13.5	13.5		17.0	17.0		7.0	23.7		16.3	33.0
Actuated g/C Ratio		0.13	0.13		0.16	0.16		0.07	0.23		0.16	0.32
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		213	405		269	270		110	704		257	1044
v/s Ratio Prot		0.06	c0.09		c0.10	0.06		0.03	0.09		c0.17	c0.40
v/s Ratio Perm												
v/c Ratio		0.44	0.67		0.61	0.37		0.52	0.40		1.11	1.26
Uniform Delay, d1		41.6	43.0		40.3	38.6		46.7	34.0		43.7	35.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	3.4		2.7	0.3		1.7	0.8		87.2	123.8
Delay (s)		42.1	46.4		42.9	38.9		48.4	34.8		130.9	159.2
Level of Service		D	D		D	D		D	C		F	F
Approach Delay (s)			45.4			41.4			37.1			154.2
Approach LOS			D			D			D			F

Intersection Summary			
HCM 2000 Control Delay	108.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	103.7	Sum of lost time (s)	25.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWL	SWR
Lane Configurations		
Traffic Volume (vph)	30	30
Future Volume (vph)	30	30
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.1	5.1
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.95	1.00
Satd. Flow (prot)	1641	1468
Flt Permitted	0.95	1.00
Satd. Flow (perm)	1641	1468
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	33	33
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	33	33
Turn Type	Prot	Prot
Protected Phases	4	4
Permitted Phases		
Actuated Green, G (s)	7.7	7.7
Effective Green, g (s)	7.7	7.7
Actuated g/C Ratio	0.07	0.07
Clearance Time (s)	5.1	5.1
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	121	109
v/s Ratio Prot	0.02	c0.02
v/s Ratio Perm		
v/c Ratio	0.27	0.30
Uniform Delay, d1	45.4	45.5
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.6
Delay (s)	45.8	46.0
Level of Service	D	D
Approach Delay (s)	45.9	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	5	0	5	5	0	30	0	70	5	25	400	10
Future Vol, veh/h	5	0	5	5	0	30	0	70	5	25	400	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	0	13	7	0	40	0	95	7	27	440	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	619	602	446	605	604	99	451	0	0	102	0	0
Stage 1	500	500	-	99	99	-	-	-	-	-	-	-
Stage 2	119	102	-	506	505	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	390	403	596	398	402	935	1068	-	-	1441	-	-
Stage 1	538	530	-	888	798	-	-	-	-	-	-	-
Stage 2	866	795	-	534	527	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	368	395	596	384	394	935	1068	-	-	1441	-	-
Mov Cap-2 Maneuver	368	395	-	384	394	-	-	-	-	-	-	-
Stage 1	538	520	-	888	798	-	-	-	-	-	-	-
Stage 2	829	795	-	512	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	9.9	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1068	-	-	455	776	1441	-	-
HCM Lane V/C Ratio	-	-	-	0.058	0.06	0.019	-	-
HCM Control Delay (s)	0	-	-	13.4	9.9	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	10	200	10	50	5	50	0	0	380	20
Future Vol, veh/h	5	0	10	200	10	50	5	50	0	0	380	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	32	225	11	56	6	59	0	0	409	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	525	491	420	507	502	59	431	0	-	-	-	0
Stage 1	420	420	-	71	71	-	-	-	-	-	-	-
Stage 2	105	71	-	436	431	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	451	467	617	463	460	985	1087	-	0	0	-	-
Stage 1	595	576	-	919	820	-	-	-	0	0	-	-
Stage 2	881	820	-	584	569	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	416	464	617	437	457	985	1087	-	-	-	-	-
Mov Cap-2 Maneuver	491	501	-	481	492	-	-	-	-	-	-	-
Stage 1	591	576	-	913	815	-	-	-	-	-	-	-
Stage 2	815	815	-	553	569	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	16.8	0.8	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1087	-	568	481	844	-	-
HCM Lane V/C Ratio	0.005	-	0.085	0.467	0.08	-	-
HCM Control Delay (s)	8.3	-	11.9	18.9	9.6	-	-
HCM Lane LOS	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	2.4	0.3	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	250	50	5	20	0	0	40	20
Future Vol, veh/h	0	0	0	40	250	50	5	20	0	0	40	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	77	77	77	75	75	75	75	75	75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	52	325	65	7	27	0	0	53	27

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	293	494	-	-	462	195
Stage 1	-	-	-	0	0	-	-	462	-
Stage 2	-	-	-	293	494	-	-	0	-
Critical Hdwy	4.3	-	-	7.7	6.7	-	-	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.7	-
Critical Hdwy Stg 2	-	-	-	6.7	5.7	-	-	-	-
Follow-up Hdwy	2.3	-	-	3.6	4.1	-	-	4.1	3.4
Pot Cap-1 Maneuver	-	-	-	616	458	0	0	478	789
Stage 1	-	-	-	-	-	0	0	543	-
Stage 2	-	-	-	669	525	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	545	458	-	-	478	789
Mov Cap-2 Maneuver	-	-	-	545	458	-	-	478	-
Stage 1	-	-	-	-	-	-	-	543	-
Stage 2	-	-	-	583	525	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		13.2	12.7
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	473	-	-	-	550
HCM Lane V/C Ratio	0.07	-	-	-	0.145
HCM Control Delay (s)	13.2	-	-	-	12.7
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	100	40	20	20	20	50	100	100	50	70	40
Future Volume (veh/h)	80	100	40	20	20	20	50	100	100	50	70	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	111	139	53	22	22	22	63	127	126	71	100	57
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	380	360	143	323	240	248	566	276	274	484	358	204
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	750	1546	615	525	1032	1064	1136	797	791	1040	1034	589
Grp Volume(v), veh/h	177	0	126	37	0	29	63	0	253	71	0	157
Grp Sat Flow(s),veh/h/ln	1447	0	1463	1236	0	1384	1136	0	1588	1040	0	1623
Q Serve(g_s), s	1.9	0.0	2.1	0.0	0.0	0.5	1.2	0.0	3.5	1.6	0.0	2.0
Cycle Q Clear(g_c), s	2.9	0.0	2.1	2.1	0.0	0.5	3.2	0.0	3.5	5.2	0.0	2.0
Prop In Lane	0.63		0.42	0.59		0.77	1.00		0.50	1.00		0.36
Lane Grp Cap(c), veh/h	543	0	341	488	0	322	566	0	550	484	0	562
V/C Ratio(X)	0.33	0.00	0.37	0.08	0.00	0.09	0.11	0.00	0.46	0.15	0.00	0.28
Avail Cap(c_a), veh/h	1493	0	1335	1367	0	1263	1448	0	1783	1292	0	1822
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.2	8.6	0.0	8.6	7.9	0.0	7.2	9.3	0.0	6.7
Incr Delay (d2), s/veh	0.3	0.0	0.7	0.1	0.0	0.1	0.1	0.0	0.6	0.1	0.0	0.3
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	1.2	0.0	0.9	0.2	0.0	0.2	0.4	0.0	1.6	0.5	0.0	0.9
LnGrp Delay(d),s/veh	9.8	0.0	9.8	8.6	0.0	8.7	8.0	0.0	7.9	9.4	0.0	7.0
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		303			66			316			228	
Approach Delay, s/veh		9.8			8.7			7.9			7.8	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.9		12.6		15.9		12.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		5.5		4.9		7.2		4.1
Green Ext Time (p_c), s		1.8		1.7		1.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	200	100	0	0	0	15	30	35	180	300	200
Future Vol, veh/h	55	200	100	0	0	0	15	30	35	180	300	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	60	217	109	0	0	0	16	32	37	196	326	217

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	910	928	435			543	0	0	69	0	0
Stage 1	827	827	-			-	-	-	-	-	-
Stage 2	83	101	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	295	260	605			987	-	-	1483	-	-
Stage 1	416	375	-			-	-	-	-	-	-
Stage 2	920	796	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	252	0	605			987	-	-	1483	-	-
Mov Cap-2 Maneuver	252	0	-			-	-	-	-	-	-
Stage 1	355	0	-			-	-	-	-	-	-
Stage 2	920	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	96	1.6	2.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	987	-	-	252	605	1483	-	-
HCM Lane V/C Ratio	0.016	-	-	1.1	0.18	0.132	-	-
HCM Control Delay (s)	8.7	-	-	128.8	12.2	7.8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	11.9	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	350	10	0	0	0	0	10	15	40	20	0
Future Vol, veh/h	50	350	10	0	0	0	0	10	15	40	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	25	25	25	53	53	53	70	70	70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	65	455	13	0	0	0	0	19	28	57	29	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	592	234	367	598	-
Stage 1	-	-	-	-	592	-	0	0	-
Stage 2	-	-	-	-	0	-	367	598	-
Critical Hdwy	4.3	-	-	-	6.7	7.1	7.7	6.7	-
Critical Hdwy Stg 1	-	-	-	-	5.7	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	-	4.1	3.4	3.6	4.1	-
Pot Cap-1 Maneuver	-	-	-	0	401	744	545	398	0
Stage 1	-	-	-	0	473	-	-	-	0
Stage 2	-	-	-	0	-	-	603	470	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	401	744	505	398	-
Mov Cap-2 Maneuver	-	-	-	-	401	-	505	398	-
Stage 1	-	-	-	-	473	-	-	-	-
Stage 2	-	-	-	-	-	-	557	470	-

Approach	EB	NB	SB
HCM Control Delay, s		12.1	14.5
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	554	-	-	-	463
HCM Lane V/C Ratio	0.085	-	-	-	0.185
HCM Control Delay (s)	12.1	-	-	-	14.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.7

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	30	45	5	10	20	100	25	30	400	35
Future Vol, veh/h	5	0	30	45	5	10	20	100	25	30	400	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	34	67	7	15	27	135	34	35	465	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	773	779	486	779	783	152	507	0	0	169	0	0
Stage 1	556	556	-	206	206	-	-	-	-	-	-	-
Stage 2	217	223	-	573	577	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	307	318	565	304	316	874	1018	-	-	1361	-	-
Stage 1	501	500	-	778	717	-	-	-	-	-	-	-
Stage 2	767	704	-	491	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	284	301	565	275	300	874	1018	-	-	1361	-	-
Mov Cap-2 Maneuver	284	301	-	275	300	-	-	-	-	-	-	-
Stage 1	487	487	-	757	698	-	-	-	-	-	-	-
Stage 2	726	685	-	450	476	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	21	1.2	0.5
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1018	-	-	495	313	1361	-	-
HCM Lane V/C Ratio	0.027	-	-	0.08	0.286	0.026	-	-
HCM Control Delay (s)	8.6	-	-	12.9	21	7.7	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	1.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	250	50	70	80	80	20	50	80	120	80	50
Future Volume (veh/h)	100	250	50	70	80	80	20	50	80	120	80	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	127	316	63	84	96	94	34	86	129	152	101	63
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.58	0.58	0.58	0.79	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	490	805	159	406	486	430	519	212	319	472	339	211
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1102	2735	538	927	1650	1460	1128	625	937	1077	996	621
Grp Volume(v), veh/h	127	188	191	84	95	95	34	0	215	152	0	164
Grp Sat Flow(s),veh/h/ln	1102	1641	1632	927	1641	1470	1128	0	1562	1077	0	1618
Q Serve(g_s), s	3.2	3.0	3.1	2.6	1.4	1.6	0.7	0.0	3.5	4.1	0.0	2.4
Cycle Q Clear(g_c), s	4.8	3.0	3.1	5.7	1.4	1.6	3.2	0.0	3.5	7.6	0.0	2.4
Prop In Lane	1.00		0.33	1.00		0.99	1.00		0.60	1.00		0.38
Lane Grp Cap(c), veh/h	490	483	481	406	483	433	519	0	531	472	0	550
V/C Ratio(X)	0.26	0.39	0.40	0.21	0.20	0.22	0.07	0.00	0.40	0.32	0.00	0.30
Avail Cap(c_a), veh/h	1173	1500	1492	980	1500	1343	1441	0	1808	1353	0	1873
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.5	9.2	9.3	11.5	8.7	8.7	9.1	0.0	8.3	11.2	0.0	8.0
Incr Delay (d2), s/veh	0.3	0.5	0.5	0.3	0.2	0.3	0.1	0.0	0.5	0.4	0.0	0.3
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	1.0	1.4	1.5	0.7	0.7	0.7	0.2	0.0	1.6	1.3	0.0	1.1
LnGrp Delay(d),s/veh	10.8	9.7	9.8	11.8	8.9	9.0	9.2	0.0	8.8	11.6	0.0	8.3
LnGrp LOS	B	A	A	B	A	A	A		A	B		A
Approach Vol, veh/h		506			274			249			316	
Approach Delay, s/veh		10.0			9.8			8.8			9.9	
Approach LOS		B			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.7		17.2		15.7		17.2
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		30.0		38.0		30.0		38.0
Max Q Clear Time (g_c+I1), s		6.8		5.5		7.7		9.6
Green Ext Time (p_c), s		2.9		1.5		1.5		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	550	20	80	200	20	100
Future Volume (veh/h)	550	20	80	200	20	100
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1900	1727	1727	1863	1863
Adj Flow Rate, veh/h	705	26	87	217	37	166
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.78	0.78	0.92	0.92	0.54	0.54
Percent Heavy Veh, %	10	10	10	10	2	2
Cap, veh/h	1122	41	207	1894	326	491
Arrive On Green	0.35	0.35	0.13	0.58	0.18	0.18
Sat Flow, veh/h	3315	119	1645	3368	1774	1583
Grp Volume(v), veh/h	358	373	87	217	37	166
Grp Sat Flow(s),veh/h/ln	1641	1706	1645	1641	1774	1583
Q Serve(g_s), s	7.0	7.0	1.9	1.2	0.7	3.1
Cycle Q Clear(g_c), s	7.0	7.0	1.9	1.2	0.7	3.1
Prop In Lane		0.07	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	570	593	207	1894	326	491
V/C Ratio(X)	0.63	0.63	0.42	0.11	0.11	0.34
Avail Cap(c_a), veh/h	1125	1169	342	3272	1492	1531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.5	10.5	15.5	3.7	13.1	10.2
Incr Delay (d2), s/veh	1.1	1.1	0.5	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	3.4	0.9	0.5	0.3	1.3
LnGrp Delay(d),s/veh	11.6	11.6	16.0	3.7	13.2	10.4
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	731			304	203	
Approach Delay, s/veh	11.6			7.2	10.9	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.8	18.0				26.8		11.7
Change Period (Y+Rc), s	4.0	4.6				4.6		4.6
Max Green Setting (Gmax), s	8.0	26.4				38.4		32.4
Max Q Clear Time (g_c+I1), s	3.9	9.0				3.2		5.1
Green Ext Time (p_c), s	0.0	4.4				1.5		0.2

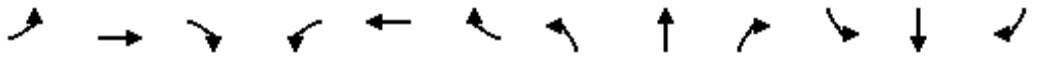
Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	580	20	100	230	90	0	5	40	400	25	50
Future Volume (veh/h)	50	580	20	100	230	90	0	5	40	400	25	50
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	61	707	24	111	256	94	0	6	48	546	0	0
Adj No. of Lanes	1	3	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	76	1304	44	139	749	268	70	7	57	776	407	0
Arrive On Green	0.05	0.28	0.28	0.08	0.32	0.32	0.00	0.04	0.04	0.24	0.00	0.00
Sat Flow, veh/h	1645	4684	159	1645	2370	849	1645	166	1327	3290	1727	0
Grp Volume(v), veh/h	61	474	257	111	175	175	0	0	54	546	0	0
Grp Sat Flow(s),veh/h/ln	1645	1572	1699	1645	1641	1578	1645	0	1493	1645	1727	0
Q Serve(g_s), s	1.8	6.1	6.2	3.2	3.9	4.1	0.0	0.0	1.7	7.3	0.0	0.0
Cycle Q Clear(g_c), s	1.8	6.1	6.2	3.2	3.9	4.1	0.0	0.0	1.7	7.3	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.54	1.00		0.89	1.00		0.00
Lane Grp Cap(c), veh/h	76	875	473	139	519	499	70	0	64	776	407	0
V/C Ratio(X)	0.80	0.54	0.54	0.80	0.34	0.35	0.00	0.00	0.85	0.70	0.00	0.00
Avail Cap(c_a), veh/h	182	1626	879	374	1040	1000	628	0	570	2319	1218	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	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.6	14.7	14.7	21.6	12.5	12.6	0.0	0.0	22.8	16.8	0.0	0.0
Incr Delay (d2), s/veh	7.0	0.6	1.2	4.0	0.5	0.5	0.0	0.0	24.6	1.2	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	0.9	2.7	3.0	1.6	1.8	1.8	0.0	0.0	1.1	3.4	0.0	0.0
LnGrp Delay(d),s/veh	29.6	15.3	15.9	25.5	13.0	13.1	0.0	0.0	47.4	18.0	0.0	0.0
LnGrp LOS	C	B	B	C	B	B			D	B		
Approach Vol, veh/h		792			461			54			546	
Approach Delay, s/veh		16.6			16.1			47.4			18.0	
Approach LOS		B			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.2	17.9		15.5	6.4	19.8		6.3
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 11	24.8		* 34	* 5.3	30.4		18.3
Max Q Clear Time (g_c+I1), s	5.2	8.2		9.3	3.8	6.1		3.7
Green Ext Time (p_c), s	0.1	5.2		2.0	0.0	2.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	425	595	600	320	0	0	0	0	555	5	100
Future Volume (veh/h)	0	425	595	600	320	0	0	0	0	555	5	100
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	506	0	690	368	0				628	0	103
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1165	521	771	2151	0				714	0	319
Arrive On Green	0.00	0.35	0.00	0.08	0.22	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	506	0	690	368	0				628	0	103
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.4	0.0	17.1	7.3	0.0				14.8	0.0	4.7
Cycle Q Clear(g_c), s	0.0	9.4	0.0	17.1	7.3	0.0				14.8	0.0	4.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1165	521	771	2151	0				714	0	319
V/C Ratio(X)	0.00	0.43	0.00	0.89	0.17	0.00				0.88	0.00	0.32
Avail Cap(c_a), veh/h	0	1165	521	798	2151	0				806	0	360
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.83	0.00	0.25	0.25	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.7	0.0	35.8	13.7	0.0				30.3	0.0	26.4
Incr Delay (d2), s/veh	0.0	1.0	0.0	3.5	0.0	0.0				9.3	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.4	0.0	8.0	3.3	0.0				7.6	0.0	1.9
LnGrp Delay(d),s/veh	0.0	20.7	0.0	39.3	13.7	0.0				39.6	0.0	26.6
LnGrp LOS		C		D	B					D		C
Approach Vol, veh/h		506			1058						731	
Approach Delay, s/veh		20.7			30.4						37.8	
Approach LOS		C			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	24.0	33.5		22.5		57.5		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.5		19.6		* 51		
Max Q Clear Time (g_c+I1), s	19.1	11.4		16.8		9.3		
Green Ext Time (p_c), s	0.2	4.8		0.6		5.2		

Intersection Summary	
HCM 2010 Ctrl Delay	30.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	780	0	0	700	705	220	5	550	0	0	0
Future Volume (veh/h)	200	780	0	0	700	705	220	5	550	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	227	886	0	0	795	744	167	0	607			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	305	2124	0	0	812	721	381	0	680			
Arrive On Green	0.19	1.00	0.00	0.00	0.49	0.49	0.23	0.00	0.23			
Sat Flow, veh/h	3191	3368	0	0	1733	1463	1645	0	2936			
Grp Volume(v), veh/h	227	886	0	0	792	747	167	0	607			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1469	1645	0	1468			
Q Serve(g_s), s	5.4	0.0	0.0	0.0	37.9	39.4	6.9	0.0	16.0			
Cycle Q Clear(g_c), s	5.4	0.0	0.0	0.0	37.9	39.4	6.9	0.0	16.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	305	2124	0	0	809	724	381	0	680			
V/C Ratio(X)	0.74	0.42	0.00	0.00	0.98	1.03	0.44	0.00	0.89			
Avail Cap(c_a), veh/h	798	2124	0	0	809	724	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.76	0.76	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.4	0.0	0.0	0.0	19.9	20.3	26.3	0.0	29.8			
Incr Delay (d2), s/veh	1.0	0.5	0.0	0.0	27.0	41.8	0.3	0.0	12.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.4	0.1	0.0	0.0	23.0	24.3	3.2	0.0	7.6			
LnGrp Delay(d),s/veh	32.4	0.5	0.0	0.0	46.9	62.1	26.6	0.0	41.8			
LnGrp LOS	C	A			D	F	C		D			
Approach Vol, veh/h		1113			1539			774				
Approach Delay, s/veh		7.0			54.3			38.5				
Approach LOS		A			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		56.9			12.4	44.5		23.1
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		25.2			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			7.4	41.4		18.0
Green Ext Time (p_c), s		11.4			0.3	0.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	35.4
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	0	5	5	0	5	30	105	65	25	95	35
Future Vol, veh/h	20	0	5	5	0	5	30	105	65	25	95	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	67	67	67	75	75	75	69	69	69
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	24	0	6	7	0	7	40	140	87	36	138	51

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	503	543	164	503	525	184	189	0	0	227	0	0
Stage 1	236	236	-	264	264	-	-	-	-	-	-	-
Stage 2	267	307	-	239	261	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	466	436	860	466	446	838	1338	-	-	1295	-	-
Stage 1	750	695	-	724	676	-	-	-	-	-	-	-
Stage 2	721	647	-	747	678	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	439	408	860	440	417	838	1338	-	-	1295	-	-
Mov Cap-2 Maneuver	439	408	-	440	417	-	-	-	-	-	-	-
Stage 1	724	673	-	699	652	-	-	-	-	-	-	-
Stage 2	690	624	-	719	657	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	11.4	1.2	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	487	577	1295	-	-
HCM Lane V/C Ratio	0.03	-	-	0.063	0.026	0.028	-	-
HCM Control Delay (s)	7.8	0	-	12.9	11.4	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	5	25	20	20	5	15	15	45	35	10
Future Vol, veh/h	5	10	5	25	20	20	5	15	15	45	35	10
Peak Hour Factor	0.50	0.50	0.50	0.44	0.44	0.44	0.56	0.56	0.56	0.97	0.97	0.97
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	10	20	10	57	45	45	9	27	27	46	36	10
Number of Lanes	1	1	1	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	8	8.2	8.2	8.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	14%	100%	0%	0%	100%	0%	0%	50%
Vol Thru, %	43%	0%	100%	0%	0%	100%	25%	39%
Vol Right, %	43%	0%	0%	100%	0%	0%	75%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	5	10	5	25	13	27	90
LT Vol	5	5	0	0	25	0	0	45
Through Vol	15	0	10	0	0	13	7	35
RT Vol	15	0	0	5	0	0	20	10
Lane Flow Rate	62	10	20	10	57	30	61	93
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.086	0.016	0.029	0.013	0.089	0.043	0.078	0.138
Departure Headway (Hd)	4.98	5.741	5.238	4.534	5.639	5.136	4.608	5.345
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	721	625	685	791	638	699	779	673
Service Time	2.701	3.463	2.96	2.255	3.357	2.854	2.326	3.064
HCM Lane V/C Ratio	0.086	0.016	0.029	0.013	0.089	0.043	0.078	0.138
HCM Control Delay	8.2	8.6	8.1	7.3	8.9	8.1	7.7	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.3	0	0.1	0	0.3	0.1	0.3	0.5

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	25	40	0	60	80
Future Vol, veh/h	25	25	40	0	60	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	52	52	53	0	118	157

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	446	53	0	0	53	0
Stage 1	53	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	555	992	-	-	1553	-
Stage 1	949	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	992	-	-	1553	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	513	992	1553	-
HCM Lane V/C Ratio	-	-	0.102	0.053	0.076	-
HCM Control Delay (s)	-	-	12.8	8.8	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.2	-

Appendix K
Peak Hour Intersection LOS Worksheets – Future Year 2050 Plus Project Conditions

Intersection	
Int Delay, s/veh	7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	150	50	110	145	65	350
Future Vol, veh/h	150	50	110	145	65	350
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	217	72	155	204	74	398

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	289	0	767	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	514	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1228	-	359	767
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	584	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1228	-	308	767
Mov Cap-2 Maneuver	-	-	-	-	308	-
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	15.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	308	767	-	-	1228	-
HCM Lane V/C Ratio	0.24	0.519	-	-	0.126	-
HCM Control Delay (s)	20.3	14.6	-	-	8.4	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	3	-	-	0.4	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	185	0	260	55	85	50	100	100	600	5	210	55
Future Volume (vph)	185	0	260	55	85	50	100	100	600	5	210	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.97		1.00	0.90		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3196		1641	1554		1641	3152			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3196		1641	1554		1641	3152			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	215	0	302	64	121	71	143	114	682	5	239	62
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	215	355	0	121	214	0	114	926	0	0	63
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		17.0	17.0		19.3	19.3		10.6	37.1			5.1
Effective Green, g (s)		17.0	17.0		19.3	19.3		10.6	37.1			5.1
Actuated g/C Ratio		0.15	0.15		0.18	0.18		0.10	0.34			0.05
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		253	493		287	272		158	1063			76
v/s Ratio Prot		c0.13	0.11		0.07	c0.14		c0.07	c0.29			0.04
v/s Ratio Perm												
v/c Ratio		0.85	0.72		0.42	0.79		0.72	0.87			0.83
Uniform Delay, d1		45.3	44.2		40.4	43.4		48.3	34.2			52.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		21.7	4.4		0.4	12.9		12.9	8.6			47.8
Delay (s)		67.0	48.6		40.7	56.3		61.1	42.8			99.9
Level of Service		E	D		D	E		E	D			F
Approach Delay (s)			55.4			50.7			44.8			
Approach LOS			E			D			D			

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	130	75	30	30
Future Volume (vph)	130	75	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	148	85	33	33
RTOR Reduction (vph)	0	61	0	0
Lane Group Flow (vph)	148	24	33	33
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	31.6	31.6	6.0	6.0
Effective Green, g (s)	31.6	31.6	6.0	6.0
Actuated g/C Ratio	0.29	0.29	0.05	0.05
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	942	421	89	80
v/s Ratio Prot	0.05		0.02	c0.02
v/s Ratio Perm		0.02		
v/c Ratio	0.16	0.06	0.37	0.41
Uniform Delay, d1	29.3	28.4	50.2	50.3
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0	1.3
Delay (s)	29.4	28.5	51.1	51.6
Level of Service	C	C	D	D
Approach Delay (s)	44.2		51.3	
Approach LOS	D		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	15	365	115	25	205	5
Future Vol, veh/h	5	0	5	0	0	0	15	365	115	25	205	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	19	451	142	28	233	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	852	923	236	239	0	0	593	0	0
Stage 1	292	292	-	-	-	-	-	-	-
Stage 2	560	631	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	320	262	784	1282	-	-	945	-	-
Stage 1	740	657	-	-	-	-	-	-	-
Stage 2	556	462	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	306	0	784	1282	-	-	945	-	-
Mov Cap-2 Maneuver	306	0	-	-	-	-	-	-	-
Stage 1	707	0	-	-	-	-	-	-	-
Stage 2	556	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1282	-	-	440	945	-	-
HCM Lane V/C Ratio	0.014	-	-	0.037	0.03	-	-
HCM Control Delay (s)	7.8	-	-	13.5	8.9	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	275	10	170	40	355	0	0	205	15
Future Vol, veh/h	5	0	5	275	10	170	40	355	0	0	205	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	92	92	92	92	92	92	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	299	11	185	43	386	0	0	241	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	820	722	250	732	731	386	259	0	-	-	-	0
Stage 1	250	250	-	472	472	-	-	-	-	-	-	-
Stage 2	570	472	-	260	259	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	285	343	770	327	339	645	1260	-	0	0	-	-
Stage 1	737	685	-	558	546	-	-	-	0	0	-	-
Stage 2	493	546	-	727	679	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	194	331	770	310	327	645	1260	-	-	-	-	-
Mov Cap-2 Maneuver	277	417	-	410	409	-	-	-	-	-	-	-
Stage 1	712	685	-	539	527	-	-	-	-	-	-	-
Stage 2	333	527	-	708	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	25.9	0.8	0
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1260	-	407	410	625	-	-
HCM Lane V/C Ratio	0.035	-	0.098	0.729	0.313	-	-
HCM Control Delay (s)	8	-	14.8	34	13.4	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	5.7	1.3	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Future Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	37	506	0	0	0	0	0	37	56
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10.9	8.6
HCM LOS	B	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	0%	0%
Vol Thru, %	82%	100%	40%
Vol Right, %	0%	0%	60%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	167	273	75
LT Vol	30	0	0
Through Vol	137	273	30
RT Vol	0	0	45
Lane Flow Rate	206	337	93
Geometry Grp	7	7	2
Degree of Util (X)	0.281	0.453	0.126
Departure Headway (Hd)	4.922	4.832	4.886
Convergence, Y/N	Yes	Yes	Yes
Cap	722	736	738
Service Time	2.71	2.619	2.886
HCM Lane V/C Ratio	0.285	0.458	0.126
HCM Control Delay	9.7	11.6	8.6
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	2.4	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	35	45	50	210	50	150	100	50	80	120	140
Future Volume (veh/h)	25	35	45	50	210	50	150	100	50	80	120	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	35	49	62	55	231	55	190	127	62	114	171	191
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	215	217	264	197	470	111	475	497	242	622	338	377
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	328	1025	1251	315	2222	525	942	1097	536	1103	746	834
Grp Volume(v), veh/h	79	0	67	186	0	155	190	0	189	114	0	362
Grp Sat Flow(s),veh/h/ln	1253	0	1351	1583	0	1479	942	0	1633	1103	0	1580
Q Serve(g_s), s	0.1	0.0	1.5	1.3	0.0	3.3	6.4	0.0	2.6	2.5	0.0	5.8
Cycle Q Clear(g_c), s	3.4	0.0	1.5	3.6	0.0	3.3	12.2	0.0	2.6	5.1	0.0	5.8
Prop In Lane	0.44		0.93	0.30		0.36	1.00		0.33	1.00		0.53
Lane Grp Cap(c), veh/h	410	0	286	465	0	313	475	0	739	622	0	715
V/C Ratio(X)	0.19	0.00	0.23	0.40	0.00	0.50	0.40	0.00	0.26	0.18	0.00	0.51
Avail Cap(c_a), veh/h	1089	0	984	1251	0	1077	893	0	1464	1111	0	1416
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.7	0.0	11.7	12.5	0.0	12.4	11.3	0.0	6.0	7.6	0.0	6.9
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.6	0.0	1.2	0.5	0.0	0.2	0.1	0.0	0.6
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	0.7	0.0	0.6	1.7	0.0	1.4	1.7	0.0	1.2	0.8	0.0	2.6
LnGrp Delay(d),s/veh	11.9	0.0	12.1	13.0	0.0	13.6	11.8	0.0	6.2	7.8	0.0	7.5
LnGrp LOS	B		B	B		B	B		A	A		A
Approach Vol, veh/h		146			341			379			476	
Approach Delay, s/veh		12.0			13.3			9.0			7.6	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.2		13.5		22.2		13.5
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		14.2		5.4		7.8		5.6
Green Ext Time (p_c), s		1.9		0.8		2.8		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	11.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	50	40	0	0	0	140	365	115	110	85	250
Future Vol, veh/h	30	50	40	0	0	0	140	365	115	110	85	250
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	92	92	92	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	71	57	0	0	0	152	397	125	134	104	305

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1289	1351	257	409	0	0	522	0	0
Stage 1	525	525	-	-	-	-	-	-	-
Stage 2	764	826	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	174	145	763	1108	-	-	1005	-	-
Stage 1	578	516	-	-	-	-	-	-	-
Stage 2	446	375	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	130	0	763	1108	-	-	1005	-	-
Mov Cap-2 Maneuver	130	0	-	-	-	-	-	-	-
Stage 1	432	0	-	-	-	-	-	-	-
Stage 2	446	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	79.1	2	2.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	130	763	1005	-	-
HCM Lane V/C Ratio	0.137	-	-	0.879	0.075	0.133	-	-
HCM Control Delay (s)	8.8	-	-	113.6	10.1	9.1	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	5.6	0.2	0.5	-	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	180	55	0	0	0	0	0	0	30	20	0
Future Vol, veh/h	0	180	55	0	0	0	0	0	0	30	20	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	222	68	0	0	0	0	0	0	42	28	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.5	8.4
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	60%
Vol Thru, %	100%	52%	40%
Vol Right, %	0%	48%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	120	115	50
LT Vol	0	0	30
Through Vol	120	60	20
RT Vol	0	55	0
Lane Flow Rate	148	142	69
Geometry Grp	7	7	2
Degree of Util (X)	0.197	0.176	0.094
Departure Headway (Hd)	4.793	4.458	4.848
Convergence, Y/N	Yes	Yes	Yes
Cap	744	798	744
Service Time	2.556	2.221	2.848
HCM Lane V/C Ratio	0.199	0.178	0.093
HCM Control Delay	8.7	8.2	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.6	0.3

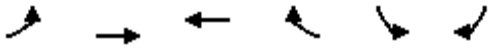
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	15	30	0	10	45	510	0	0	170	15
Future Vol, veh/h	10	5	15	30	0	10	45	510	0	0	170	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	7	20	37	0	12	56	638	0	0	254	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1021	1015	265	1029	1026	638	276	0	-	-	-	0
Stage 1	265	265	-	750	750	-	-	-	-	-	-	-
Stage 2	756	750	-	279	276	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	207	231	755	205	227	463	1242	-	0	0	-	-
Stage 1	723	675	-	391	407	-	-	-	0	0	-	-
Stage 2	388	407	-	710	667	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	195	221	755	190	217	463	1242	-	-	-	-	-
Mov Cap-2 Maneuver	292	314	-	291	308	-	-	-	-	-	-	-
Stage 1	690	675	-	373	389	-	-	-	-	-	-	-
Stage 2	361	389	-	684	667	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	18.2	0.7	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1242	-	428	321	-	-
HCM Lane V/C Ratio	0.045	-	0.093	0.154	-	-
HCM Control Delay (s)	8	-	14.3	18.2	-	-
HCM Lane LOS	A	-	B	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.5	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	350	525	420	120	155
Future Volume (veh/h)	90	350	525	420	120	155
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	114	443	633	488	152	191
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	297	1810	974	749	305	272
Arrive On Green	0.55	0.55	0.55	0.55	0.19	0.19
Sat Flow, veh/h	464	3368	1853	1358	1645	1468
Grp Volume(v), veh/h	114	443	588	533	152	191
Grp Sat Flow(s),veh/h/ln	464	1641	1641	1483	1645	1468
Q Serve(g_s), s	10.4	3.2	11.4	11.5	3.8	5.6
Cycle Q Clear(g_c), s	21.9	3.2	11.4	11.5	3.8	5.6
Prop In Lane	1.00			0.92	1.00	1.00
Lane Grp Cap(c), veh/h	297	1810	905	818	305	272
V/C Ratio(X)	0.38	0.24	0.65	0.65	0.50	0.70
Avail Cap(c_a), veh/h	316	1943	972	878	938	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	5.3	7.1	7.2	16.7	17.4
Incr Delay (d2), s/veh	0.8	0.1	1.4	1.6	1.3	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.4	5.4	4.9	1.8	2.5
LnGrp Delay(d),s/veh	15.6	5.4	8.5	8.7	17.9	20.7
LnGrp LOS	B	A	A	A	B	C
Approach Vol, veh/h		557	1121		343	
Approach Delay, s/veh		7.5	8.6		19.5	
Approach LOS		A	A		B	

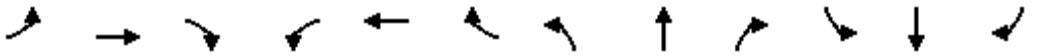
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		31.2				31.2		14.4
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		23.9				13.5		7.6
Green Ext Time (p_c), s		1.3				6.5		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	295	140	255	525	70	270
Future Volume (vph)	295	140	255	525	70	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.95		1.00	1.00	0.89	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3124		1641	3282	1646	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3124		1641	3282	1646	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	378	179	297	610	100	386
RTOR Reduction (vph)	58	0	0	0	0	0
Lane Group Flow (vph)	499	0	297	610	486	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	18.0		18.1	40.1	28.0	
Effective Green, g (s)	18.0		18.1	40.1	28.0	
Actuated g/C Ratio	0.23		0.23	0.52	0.36	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	727		384	1702	596	
v/s Ratio Prot	c0.16		c0.18	0.19	c0.30	
v/s Ratio Perm						
v/c Ratio	0.69		0.77	0.36	0.82	
Uniform Delay, d1	27.1		27.7	11.0	22.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.7		8.6	0.1	8.0	
Delay (s)	29.8		36.2	11.1	30.3	
Level of Service	C		D	B	C	
Approach Delay (s)	29.8			19.4	30.3	
Approach LOS	C			B	C	

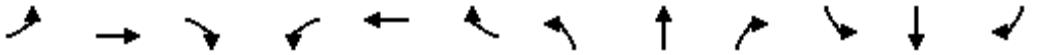
Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	17.7
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	405	50	50	725	560	5	10	20	335	5	55
Future Volume (vph)	110	405	50	50	725	560	5	10	20	335	5	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.93		1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1641	3227		1641	3067		1641	1553		1559	1519	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (perm)	1641	3227		1641	3067		1641	1553		1559	1519	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	111	409	51	54	780	602	7	14	29	479	7	79
RTOR Reduction (vph)	0	6	0	0	90	0	0	28	0	0	10	0
Lane Group Flow (vph)	111	454	0	54	1292	0	7	15	0	287	268	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.6	60.1		5.5	60.0		5.5	5.5		27.2	27.2	
Effective Green, g (s)	5.6	60.1		5.5	60.0		5.5	5.5		27.2	27.2	
Actuated g/C Ratio	0.05	0.52		0.05	0.52		0.05	0.05		0.24	0.24	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	79	1679		78	1593		78	73		367	357	
v/s Ratio Prot	c0.07	0.14		0.03	c0.42		0.00	c0.01		c0.18	0.18	
v/s Ratio Perm												
v/c Ratio	1.41	0.27		0.69	0.81		0.09	0.21		0.78	0.75	
Uniform Delay, d1	55.0	15.5		54.2	23.0		52.6	52.9		41.4	41.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	241.8	0.1		19.2	3.3		0.5	1.4		10.4	8.6	
Delay (s)	296.8	15.6		73.4	26.4		53.1	54.4		51.7	49.6	
Level of Service	F	B		E	C		D	D		D	D	
Approach Delay (s)		70.2			28.1			54.2			50.7	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	17.2
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	480	275	345	830	0	0	0	0	450	10	505
Future Volume (veh/h)	0	480	275	345	830	0	0	0	0	450	10	505
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	571	0	397	954	0				514	0	491
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2039	912	495	2740	0				823	0	367
Arrive On Green	0.00	0.62	0.00	0.05	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	571	0	397	954	0				514	0	491
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	6.4	0.0	9.8	18.6	0.0				11.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	6.4	0.0	9.8	18.6	0.0				11.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2039	912	495	2740	0				823	0	367
V/C Ratio(X)	0.00	0.28	0.00	0.80	0.35	0.00				0.62	0.00	1.34
Avail Cap(c_a), veh/h	0	2039	912	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.9	0.0	36.7	11.5	0.0				26.7	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.1	0.0	0.0				1.1	0.0	169.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.9	0.0	4.4	8.5	0.0				5.1	0.0	25.3
LnGrp Delay(d),s/veh	0.0	7.3	0.0	36.8	11.6	0.0				27.8	0.0	199.4
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		571			1351						1005	
Approach Delay, s/veh		7.3			19.0						111.6	
Approach LOS		A			B						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.1	55.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	11.8	8.4		22.0		20.6		
Green Ext Time (p_c), s	0.6	6.0		0.0		14.2		

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	545	0	0	595	500	580	270	600	0	0	0
Future Volume (veh/h)	390	545	0	0	595	500	580	270	600	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	443	619	0	0	676	526	518	566	466			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	518	2063	0	0	719	556	411	432	367			
Arrive On Green	0.32	1.00	0.00	0.00	0.41	0.41	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1851	1363	1645	1727	1468			
Grp Volume(v), veh/h	443	619	0	0	628	574	518	566	466			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1487	1645	1727	1468			
Q Serve(g_s), s	10.4	0.0	0.0	0.0	29.4	29.8	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	10.4	0.0	0.0	0.0	29.4	29.8	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.92	1.00		1.00			
Lane Grp Cap(c), veh/h	518	2063	0	0	669	606	411	432	367			
V/C Ratio(X)	0.85	0.30	0.00	0.00	0.94	0.95	1.26	1.31	1.27			
Avail Cap(c_a), veh/h	798	2063	0	0	669	606	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.84	0.84	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	26.1	0.0	0.0	0.0	22.7	22.9	30.0	30.0	30.0			
Incr Delay (d2), s/veh	3.0	0.3	0.0	0.0	22.8	25.6	135.2	155.6	141.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	17.5	16.4	24.5	28.1	22.4			
LnGrp Delay(d),s/veh	29.1	0.3	0.0	0.0	45.5	48.4	165.2	185.6	171.2			
LnGrp LOS	C	A			D	D	F	F	F			
Approach Vol, veh/h		1062			1202			1550				
Approach Delay, s/veh		12.3			46.9			174.4				
Approach LOS		B			D			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			17.7	37.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.4	31.8		22.0
Green Ext Time (p_c), s		9.8			0.6	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	89.1
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	190	110	0	145	95
Future Vol, veh/h	15	190	110	0	145	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	22	284	180	0	204	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	722	180	0	0	180	0
Stage 1	180	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	382	843	-	-	1396	-
Stage 1	832	-	-	-	-	-
Stage 2	567	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	843	-	-	1396	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	4.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	326	843	1396	-
HCM Lane V/C Ratio	-	-	0.069	0.336	0.146	-
HCM Control Delay (s)	-	-	16.9	11.4	8	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	1.5	0.5	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	200	100	385	100	10	155
Future Vol, veh/h	200	100	385	100	10	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	339	169	558	145	13	199

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	508	0	1685	424
Stage 1	-	-	-	-	424	-
Stage 2	-	-	-	-	1261	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1017	-	99	613
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	257	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1017	-	40	613
Mov Cap-2 Maneuver	-	-	-	-	40	-
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	257	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.1	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	40	613	-	-	1017	-
HCM Lane V/C Ratio	0.321	0.324	-	-	0.549	-
HCM Control Delay (s)	132.8	13.7	-	-	12.8	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	1.1	1.4	-	-	3.4	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	85	0	180	90	115	50	20	50	150	100	250	1155
Future Volume (vph)	85	0	180	90	115	50	20	50	150	100	250	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.95		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3117		1641	1652		1641	3084		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3117		1641	1652		1641	3084		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	99	0	209	105	164	71	29	57	170	114	284	1312
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	99	273	0	164	100	0	57	284	0	284	1313
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		13.3	13.3		14.5	14.5		6.7	22.7		15.8	31.8
Effective Green, g (s)		13.3	13.3		14.5	14.5		6.7	22.7		15.8	31.8
Actuated g/C Ratio		0.14	0.14		0.15	0.15		0.07	0.23		0.16	0.33
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		224	425		244	245		112	718		266	1071
v/s Ratio Prot		0.06	c0.09		c0.10	0.06		0.03	0.09		c0.17	c0.40
v/s Ratio Perm												
v/c Ratio		0.44	0.64		0.67	0.41		0.51	0.40		1.07	1.23
Uniform Delay, d1		38.6	39.8		39.2	37.6		43.8	31.6		40.8	32.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	2.5		5.6	0.4		1.3	0.8		74.2	110.1
Delay (s)		39.1	42.3		44.8	38.0		45.1	32.3		115.0	142.9
Level of Service		D	D		D	D		D	C		F	F
Approach Delay (s)			41.5			42.2			34.4			116.4
Approach LOS			D			D			C			F

Intersection Summary			
HCM 2000 Control Delay	89.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	25.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	355	30	30
Future Volume (vph)	355	30	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	403	33	33
RTOR Reduction (vph)	106	0	0
Lane Group Flow (vph)	297	33	33
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	31.8	5.6	5.6
Effective Green, g (s)	31.8	5.6	5.6
Actuated g/C Ratio	0.33	0.06	0.06
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	479	94	84
v/s Ratio Prot		0.02	c0.02
v/s Ratio Perm	0.20		
v/c Ratio	0.62	0.35	0.39
Uniform Delay, d1	27.7	44.2	44.3
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.8	1.1
Delay (s)	31.2	45.0	45.4
Level of Service	C	D	D
Approach Delay (s)		45.2	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	0	135	105	25	405	10
Future Vol, veh/h	5	0	5	0	0	0	0	135	105	25	405	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	0	13	0	0	0	0	182	142	27	445	11

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	758	829	451			456	0	0	324	0	0
Stage 1	505	505	-			-	-	-	-	-	-
Stage 2	253	324	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	364	297	592			1064	-	-	1192	-	-
Stage 1	590	527	-			-	-	-	-	-	-
Stage 2	771	636	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	356	0	592			1064	-	-	1192	-	-
Mov Cap-2 Maneuver	356	0	-			-	-	-	-	-	-
Stage 1	576	0	-			-	-	-	-	-	-
Stage 2	771	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1064	-	-	445	1192	-	-
HCM Lane V/C Ratio	-	-	-	0.059	0.023	-	-
HCM Control Delay (s)	0	-	-	13.6	8.1	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	10	210	10	130	10	135	0	0	385	20
Future Vol, veh/h	5	0	10	210	10	130	10	135	0	0	385	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	32	236	11	146	12	159	0	0	414	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	687	608	425	624	619	159	436	0	-	-	-	0
Stage 1	425	425	-	183	183	-	-	-	-	-	-	-
Stage 2	262	183	-	441	436	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	351	400	612	387	394	866	1082	-	0	0	-	-
Stage 1	592	573	-	800	733	-	-	-	0	0	-	-
Stage 2	726	733	-	580	566	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	284	396	612	363	390	866	1082	-	-	-	-	-
Mov Cap-2 Maneuver	397	467	-	444	457	-	-	-	-	-	-	-
Stage 1	585	573	-	791	725	-	-	-	-	-	-	-
Stage 2	588	725	-	549	566	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	17.3	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1082	-	518	444	814	-	-
HCM Lane V/C Ratio	0.011	-	0.093	0.531	0.193	-	-
HCM Control Delay (s)	8.4	-	12.7	21.9	10.5	-	-
HCM Lane LOS	A	-	B	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	3	0.7	-	-

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	310	0	0	0	0	0	40	55
Future Vol, veh/h	0	0	0	40	310	0	0	0	0	0	40	55
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	52	403	0	0	0	0	0	53	73
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10.2	8.7
HCM LOS	B	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	28%	0%	0%
Vol Thru, %	72%	100%	42%
Vol Right, %	0%	0%	58%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	143	207	95
LT Vol	40	0	0
Through Vol	103	207	40
RT Vol	0	0	55
Lane Flow Rate	186	268	127
Geometry Grp	7	7	2
Degree of Util (X)	0.266	0.373	0.167
Departure Headway (Hd)	5.14	5.001	4.75
Convergence, Y/N	Yes	Yes	Yes
Cap	704	725	756
Service Time	2.84	2.701	2.769
HCM Lane V/C Ratio	0.264	0.37	0.168
HCM Control Delay	9.7	10.6	8.7
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.1	1.7	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	110	40	20	30	20	50	100	100	50	70	40
Future Volume (veh/h)	80	110	40	20	30	20	50	100	100	50	70	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	111	153	53	22	33	22	63	127	126	71	100	57
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	372	386	139	298	329	219	561	274	272	479	355	203
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	718	1619	582	459	1379	921	1136	797	791	1040	1034	589
Grp Volume(v), veh/h	183	0	134	43	0	34	63	0	253	71	0	157
Grp Sat Flow(s),veh/h/ln	1450	0	1469	1349	0	1409	1136	0	1588	1040	0	1623
Q Serve(g_s), s	2.0	0.0	2.2	0.0	0.0	0.5	1.2	0.0	3.6	1.6	0.0	2.0
Cycle Q Clear(g_c), s	3.0	0.0	2.2	2.2	0.0	0.5	3.2	0.0	3.6	5.2	0.0	2.0
Prop In Lane	0.61		0.40	0.51		0.65	1.00		0.50	1.00		0.36
Lane Grp Cap(c), veh/h	547	0	350	511	0	336	561	0	546	479	0	558
V/C Ratio(X)	0.34	0.00	0.38	0.08	0.00	0.10	0.11	0.00	0.46	0.15	0.00	0.28
Avail Cap(c_a), veh/h	1481	0	1330	1397	0	1276	1437	0	1770	1281	0	1809
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.2	8.5	0.0	8.5	8.0	0.0	7.4	9.4	0.0	6.8
Incr Delay (d2), s/veh	0.4	0.0	0.7	0.1	0.0	0.1	0.1	0.0	0.6	0.1	0.0	0.3
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	1.3	0.0	0.9	0.3	0.0	0.2	0.4	0.0	1.6	0.5	0.0	0.9
LnGrp Delay(d),s/veh	9.8	0.0	9.8	8.6	0.0	8.7	8.1	0.0	8.0	9.5	0.0	7.1
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		317			77			316			228	
Approach Delay, s/veh		9.8			8.6			8.0			7.9	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.9		12.8		15.9		12.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		5.6		5.0		7.2		4.2
Green Ext Time (p_c), s		1.8		1.8		1.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	200	110	0	0	0	25	120	85	210	315	200
Future Vol, veh/h	55	200	110	0	0	0	25	120	85	210	315	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	60	217	120	0	0	0	26	126	89	228	342	217

Major/Minor	Minor2				Major1			Major2		
Conflicting Flow All	1130	1174	451		559	0	0	215	0	0
Stage 1	907	907	-		-	-	-	-	-	-
Stage 2	223	267	-		-	-	-	-	-	-
Critical Hdwy	5.5	6.6	6.3		4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-		-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-		-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39		2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	297	~ 185	592		973	-	-	1309	-	-
Stage 1	381	344	-		-	-	-	-	-	-
Stage 2	796	674	-		-	-	-	-	-	-
Platoon blocked, %						-	-		-	-
Mov Cap-1 Maneuver	239	0	592		973	-	-	1309	-	-
Mov Cap-2 Maneuver	239	0	-		-	-	-	-	-	-
Stage 1	306	0	-		-	-	-	-	-	-
Stage 2	796	0	-		-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	109.8	1	2.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	973	-	-	239	592	1309	-	-
HCM Lane V/C Ratio	0.027	-	-	1.16	0.202	0.174	-	-
HCM Control Delay (s)	8.8	-	-	151.7	12.6	8.3	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	12.9	0.8	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	375	35	0	0	0	0	0	0	40	20	0
Future Vol, veh/h	0	375	35	0	0	0	0	0	0	40	20	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	487	45	0	0	0	0	0	0	57	29	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	10.6	9.1
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	78%	33%
Vol Right, %	0%	22%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	250	160	60
LT Vol	0	0	40
Through Vol	250	125	20
RT Vol	0	35	0
Lane Flow Rate	325	208	86
Geometry Grp	7	7	2
Degree of Util (X)	0.444	0.275	0.127
Departure Headway (Hd)	4.921	4.768	5.345
Convergence, Y/N	Yes	Yes	Yes
Cap	737	758	672
Service Time	2.621	2.468	3.364
HCM Lane V/C Ratio	0.441	0.274	0.128
HCM Control Delay	11.5	9.3	9.1
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.3	1.1	0.4

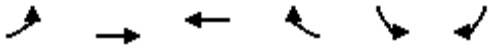
Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	30	45	5	10	20	195	0	0	425	35
Future Vol, veh/h	5	0	30	45	5	10	20	195	0	0	425	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	34	67	7	15	27	264	0	0	494	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	844	833	515	850	854	264	536	0	-	-	-	0
Stage 1	515	515	-	318	318	-	-	-	-	-	-	-
Stage 2	329	318	-	532	536	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	274	296	544	272	287	756	993	-	0	0	-	-
Stage 1	528	522	-	677	639	-	-	-	0	0	-	-
Stage 2	667	639	-	517	511	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	259	288	544	250	279	756	993	-	-	-	-	-
Mov Cap-2 Maneuver	374	389	-	354	372	-	-	-	-	-	-	-
Stage 1	514	522	-	659	622	-	-	-	-	-	-	-
Stage 2	628	622	-	485	511	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	17	0.8	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	993	-	511	390	-	-
HCM Lane V/C Ratio	0.027	-	0.078	0.23	-	-
HCM Control Delay (s)	8.7	-	12.6	17	-	-
HCM Lane LOS	A	-	B	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.9	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	340	125	95	165	90
Future Volume (veh/h)	150	340	125	95	165	90
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	190	430	151	112	209	114
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	581	1290	728	506	353	315
Arrive On Green	0.39	0.39	0.39	0.39	0.21	0.21
Sat Flow, veh/h	1031	3368	1939	1289	1645	1468
Grp Volume(v), veh/h	190	430	133	130	209	114
Grp Sat Flow(s),veh/h/ln	1031	1641	1641	1500	1645	1468
Q Serve(g_s), s	4.6	2.8	1.6	1.8	3.5	2.0
Cycle Q Clear(g_c), s	6.4	2.8	1.6	1.8	3.5	2.0
Prop In Lane	1.00			0.86	1.00	1.00
Lane Grp Cap(c), veh/h	581	1290	645	589	353	315
V/C Ratio(X)	0.33	0.33	0.21	0.22	0.59	0.36
Avail Cap(c_a), veh/h	1087	2900	1450	1325	1400	1249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.3	6.5	6.1	6.2	10.8	10.2
Incr Delay (d2), s/veh	0.3	0.2	0.2	0.2	1.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.3	0.8	0.8	1.7	0.9
LnGrp Delay(d),s/veh	8.6	6.6	6.3	6.4	12.4	10.9
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		620	263		323	
Approach Delay, s/veh		7.2	6.3		11.9	
Approach LOS		A	A		B	

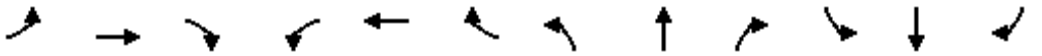
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		18.0				18.0		12.5
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		8.4				3.8		5.5
Green Ext Time (p_c), s		3.7				1.5		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	555	65	430	175	35	220
Future Volume (vph)	555	65	430	175	35	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.98		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3230		1641	3282	1650	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3230		1641	3282	1650	
Peak-hour factor, PHF	0.78	0.78	0.92	0.92	0.54	1.00
Adj. Flow (vph)	712	83	467	190	65	220
RTOR Reduction (vph)	9	0	0	0	0	0
Lane Group Flow (vph)	786	0	467	190	285	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	22.3		16.2	42.5	15.6	
Effective Green, g (s)	22.3		16.2	42.5	15.6	
Actuated g/C Ratio	0.33		0.24	0.63	0.23	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	1070		395	2072	382	
v/s Ratio Prot	c0.24		c0.28	0.06	c0.17	
v/s Ratio Perm						
v/c Ratio	0.73		1.18	0.09	0.75	
Uniform Delay, d1	19.9		25.5	4.9	24.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.6		105.1	0.0	6.8	
Delay (s)	22.5		130.6	4.9	30.8	
Level of Service	C		F	A	C	
Approach Delay (s)	22.5			94.3	30.8	
Approach LOS	C			F	C	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	17.7
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	690	20	100	545	360	0	5	40	630	25	60
Future Volume (vph)	65	690	20	100	545	360	0	5	40	630	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.87		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3268		1641	3086			1495		1559	1541	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3268		1641	3086			1495		1559	1541	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	79	841	24	111	606	400	0	6	52	741	29	71
RTOR Reduction (vph)	0	2	0	0	97	0	0	49	0	0	7	0
Lane Group Flow (vph)	79	863	0	111	909	0	0	9	0	422	412	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.9	28.2		8.1	30.4			5.3		28.8	28.8	
Effective Green, g (s)	5.9	28.2		8.1	30.4			5.3		28.8	28.8	
Actuated g/C Ratio	0.07	0.32		0.09	0.35			0.06		0.33	0.33	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	110	1052		151	1070			90		512	506	
v/s Ratio Prot	0.05	0.26		c0.07	c0.29			c0.01		c0.27	0.27	
v/s Ratio Perm												
v/c Ratio	0.72	0.82		0.74	0.85			0.10		0.82	0.81	
Uniform Delay, d1	40.0	27.4		38.7	26.5			38.9		27.1	27.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	16.9	5.4		14.7	6.6			0.5		10.4	9.8	
Delay (s)	57.0	32.7		53.4	33.1			39.4		37.4	36.7	
Level of Service	E	C		D	C			D		D	D	
Approach Delay (s)		34.8			35.1			39.4			37.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	730	625	600	430	0	0	0	0	555	5	575
Future Volume (veh/h)	0	730	625	600	430	0	0	0	0	555	5	575
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	869	0	690	494	0				628	0	561
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1754	785	771	2740	0				823	0	367
Arrive On Green	0.00	0.53	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	869	0	690	494	0				628	0	561
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	13.4	0.0	17.1	9.2	0.0				14.2	0.0	20.0
Cycle Q Clear(g_c), s	0.0	13.4	0.0	17.1	9.2	0.0				14.2	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1754	785	771	2740	0				823	0	367
V/C Ratio(X)	0.00	0.50	0.00	0.89	0.18	0.00				0.76	0.00	1.53
Avail Cap(c_a), veh/h	0	1754	785	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.47	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.8	0.0	35.8	8.1	0.0				27.8	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.3	0.0	0.0				3.9	0.0	251.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.2	0.0	7.7	4.2	0.0				6.8	0.0	33.7
LnGrp Delay(d),s/veh	0.0	12.3	0.0	37.1	8.1	0.0				31.7	0.0	281.2
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		869			1184						1189	
Approach Delay, s/veh		12.3			25.0						149.4	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	24.0	48.4		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	19.1	15.4		22.0		11.2		
Green Ext Time (p_c), s	0.2	6.0		0.0		7.2		

Intersection Summary	
HCM 2010 Ctrl Delay	67.2
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	465	825	0	0	760	705	270	5	550	0	0	0
Future Volume (veh/h)	465	825	0	0	760	705	270	5	550	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	528	938	0	0	864	744	204	0	627			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	610	2106	0	0	675	548	390	0	696			
Arrive On Green	0.25	0.85	0.00	0.00	0.39	0.39	0.24	0.00	0.24			
Sat Flow, veh/h	3191	3368	0	0	1810	1398	1645	0	2936			
Grp Volume(v), veh/h	528	938	0	0	820	788	204	0	627			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1481	1645	0	1468			
Q Serve(g_s), s	12.7	5.4	0.0	0.0	31.3	31.3	8.6	0.0	16.6			
Cycle Q Clear(g_c), s	12.7	5.4	0.0	0.0	31.3	31.3	8.6	0.0	16.6			
Prop In Lane	1.00		0.00	0.00		0.94	1.00		1.00			
Lane Grp Cap(c), veh/h	610	2106	0	0	643	580	390	0	696			
V/C Ratio(X)	0.87	0.45	0.00	0.00	1.28	1.36	0.52	0.00	0.90			
Avail Cap(c_a), veh/h	798	2106	0	0	643	580	411	0	734			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.47	0.47	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	28.9	2.5	0.0	0.0	24.3	24.3	26.6	0.0	29.6			
Incr Delay (d2), s/veh	3.2	0.3	0.0	0.0	135.9	172.3	0.4	0.0	13.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.8	2.4	0.0	0.0	38.4	40.5	4.0	0.0	8.0			
LnGrp Delay(d),s/veh	32.1	2.8	0.0	0.0	160.2	196.6	27.0	0.0	42.8			
LnGrp LOS	C	A			F	F	C		D			
Approach Vol, veh/h		1466			1608			831				
Approach Delay, s/veh		13.4			178.0			38.9				
Approach LOS		B			F			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		56.4			20.0	36.4		23.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		7.4			14.7	33.3		18.6
Green Ext Time (p_c), s		16.2			0.6	0.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	86.6
HCM 2010 LOS	F

Notes

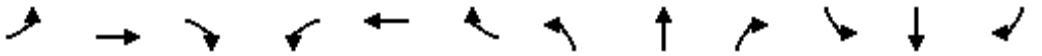
Intersection	
Int Delay, s/veh	8.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	185	85	0	330	70
Future Vol, veh/h	60	185	85	0	330	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	125	385	113	0	647	137

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1544	113	0	0	113	0
Stage 1	113	-	-	-	-	-
Stage 2	1431	-	-	-	-	-
Critical Hdwy	5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	230	919	-	-	1476	-
Stage 1	892	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	129	919	-	-	1476	-
Mov Cap-2 Maneuver	1117	-	-	-	-	-
Stage 1	501	-	-	-	-	-
Stage 2	212	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	7.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	1117	919	1476	-
HCM Lane V/C Ratio	-	-	0.112	0.419	0.438	-
HCM Control Delay (s)	-	-	8.6	11.7	9.3	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	2.1	2.3	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	620	50	225	550	0	65	0	345	0	0	0
Future Volume (Veh/h)	0	620	50	225	550	0	65	0	345	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.71	0.71	0.71	0.88	0.88	0.88	0.96	0.96	0.96
Hourly flow rate (vph)	0	899	72	317	775	0	74	0	392	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					178							
pX, platoon unblocked												
vC, conflicting volume	775			971			2344	2344	935	2736	2380	775
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	775			971			2344	2344	935	2736	2380	775
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			53			0	100	0	0	100	100
cM capacity (veh/h)	806			679			15	18	311	0	17	385

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	971	1092	74	392	0
Volume Left	0	317	74	0	0
Volume Right	72	0	0	392	0
cSH	1700	679	15	311	1700
Volume to Capacity	0.57	0.47	4.89	1.26	0.00
Queue Length 95th (ft)	0	62	Err	455	0
Control Delay (s)	0.0	13.4	Err	175.2	0.0
Lane LOS		B	F	F	A
Approach Delay (s)	0.0	13.4	1735.2		0.0
Approach LOS			F		A

Intersection Summary				
Average Delay	325.5			
Intersection Capacity Utilization	90.7%	ICU Level of Service		E
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	163.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	620	50	225	550	0	65	0	345	0	0	0
Future Vol, veh/h	0	620	50	225	550	0	65	0	345	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	71	71	71	88	88	88	96	96	96
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	899	72	317	775	0	74	0	392	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	971	0	0	2344	-	935	-	2380	775
Stage 1	-	-	-	-	-	-	935	-	-	-	1409	-
Stage 2	-	-	-	-	-	-	1409	-	-	-	971	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	679	-	0	~ 24	0	~ 311	0	32	385
Stage 1	0	-	-	-	-	0	308	0	-	0	197	-
Stage 2	0	-	-	-	-	0	165	0	-	0	321	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	679	-	-	~ 8	-	~ 311	-	6	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 8	-	-	-	6	-
Stage 1	-	-	-	-	-	-	308	-	-	-	35	-
Stage 2	-	-	-	-	-	-	~ 30	-	-	-	321	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.3	$ 878.2	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	8	311	-	-	679	-	-
HCM Lane V/C Ratio	9.233	1.261	-	-	0.467	-	-
HCM Control Delay (s)	$ 4609.8	175.2	-	-	14.9	0	0
HCM Lane LOS	F	F	-	-	B	A	A
HCM 95th %tile Q(veh)	10.8	18.2	-	-	2.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	410	0	490	55	85	50	100	625	600	5	210	55
Future Volume (vph)	410	0	490	55	85	50	100	625	600	5	210	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.98		1.00	0.90		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3232		1641	1554		1641	3152			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3232		1641	1554		1641	3152			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	477	0	570	64	121	71	143	710	682	5	239	62
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	477	628	0	121	214	0	710	926	0	0	63
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		20.5	20.5		19.5	19.5		20.5	31.8			7.4
Effective Green, g (s)		20.5	20.5		19.5	19.5		20.5	31.8			7.4
Actuated g/C Ratio		0.19	0.19		0.18	0.18		0.19	0.29			0.07
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		304	599		289	273		304	906			109
v/s Ratio Prot		c0.29	0.19		0.07	c0.14		c0.43	c0.29			0.04
v/s Ratio Perm												
v/c Ratio		1.57	1.05		0.42	0.78		2.34	1.02			0.58
Uniform Delay, d1		45.0	45.0		40.5	43.5		45.0	39.4			50.1
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		271.5	50.2		0.4	12.7		611.2	35.6			4.6
Delay (s)		316.5	95.3		40.9	56.2		656.2	75.0			54.6
Level of Service		F	F		D	E		F	E			D
Approach Delay (s)			190.3			50.7			327.2			
Approach LOS			F			D			F			

Intersection Summary			
HCM 2000 Control Delay	226.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	25.5
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	130	70	30	30
Future Volume (vph)	130	70	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	148	80	33	33
RTOR Reduction (vph)	0	66	0	0
Lane Group Flow (vph)	148	14	33	33
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	18.7	18.7	5.9	5.9
Effective Green, g (s)	18.7	18.7	5.9	5.9
Actuated g/C Ratio	0.17	0.17	0.05	0.05
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	554	248	87	78
v/s Ratio Prot	0.05		0.02	c0.02
v/s Ratio Perm		0.01		
v/c Ratio	0.27	0.05	0.38	0.42
Uniform Delay, d1	40.0	38.5	50.6	50.7
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.0	1.3
Delay (s)	40.5	38.7	51.6	52.0
Level of Service	D	D	D	D
Approach Delay (s)	43.1		51.8	
Approach LOS	D		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	15	360	115	25	320	5
Future Vol, veh/h	5	0	5	0	0	0	15	360	115	25	320	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	19	444	142	28	364	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	976	1047	367	370	0	0	586	0	0
Stage 1	423	423	-	-	-	-	-	-	-
Stage 2	553	624	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	269	221	661	1146	-	-	951	-	-
Stage 1	644	574	-	-	-	-	-	-	-
Stage 2	560	465	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	257	0	661	1146	-	-	951	-	-
Mov Cap-2 Maneuver	257	0	-	-	-	-	-	-	-
Stage 1	614	0	-	-	-	-	-	-	-
Stage 2	560	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.3	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	370	951	-	-
HCM Lane V/C Ratio	0.016	-	-	0.044	0.03	-	-
HCM Control Delay (s)	8.2	-	-	15.2	8.9	-	-
HCM Lane LOS	A	-	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	275	10	170	40	350	0	0	200	15
Future Vol, veh/h	5	0	5	275	10	170	40	350	0	0	200	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	90	90	90	92	92	92	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	306	11	189	43	380	0	0	235	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	810	710	244	720	719	380	253	0	-	-	-	0
Stage 1	244	244	-	466	466	-	-	-	-	-	-	-
Stage 2	566	466	-	254	253	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	289	349	776	333	345	650	1267	-	0	0	-	-
Stage 1	742	690	-	562	549	-	-	-	0	0	-	-
Stage 2	495	549	-	733	683	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	196	337	776	316	333	650	1267	-	-	-	-	-
Mov Cap-2 Maneuver	277	422	-	415	414	-	-	-	-	-	-	-
Stage 1	717	690	-	543	530	-	-	-	-	-	-	-
Stage 2	332	530	-	714	683	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	26	0.8	0
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1267	-	408	415	630	-	-
HCM Lane V/C Ratio	0.034	-	0.098	0.736	0.317	-	-
HCM Control Delay (s)	7.9	-	14.8	34.3	13.3	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	5.9	1.4	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Future Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	37	506	0	0	0	0	0	37	56
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10.9	8.6
HCM LOS	B	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	0%	0%
Vol Thru, %	82%	100%	40%
Vol Right, %	0%	0%	60%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	167	273	75
LT Vol	30	0	0
Through Vol	137	273	30
RT Vol	0	0	45
Lane Flow Rate	206	337	93
Geometry Grp	7	7	2
Degree of Util (X)	0.281	0.453	0.126
Departure Headway (Hd)	4.922	4.832	4.886
Convergence, Y/N	Yes	Yes	Yes
Cap	722	736	738
Service Time	2.71	2.619	2.886
HCM Lane V/C Ratio	0.285	0.458	0.126
HCM Control Delay	9.7	11.6	8.6
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	2.4	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	35	45	60	210	60	150	555	180	80	120	140
Future Volume (veh/h)	25	35	45	60	210	60	150	555	180	80	120	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	35	49	62	66	231	66	190	703	227	114	171	191
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	133	149	205	143	367	106	602	793	256	199	473	528
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	274	802	1103	378	1972	569	942	1252	404	556	746	834
Grp Volume(v), veh/h	69	0	77	192	0	171	190	0	930	114	0	362
Grp Sat Flow(s),veh/h/ln	802	0	1377	1449	0	1471	942	0	1656	556	0	1580
Q Serve(g_s), s	0.8	0.0	3.2	5.2	0.0	7.1	8.0	0.0	31.2	10.8	0.0	7.2
Cycle Q Clear(g_c), s	7.8	0.0	3.2	8.4	0.0	7.1	15.2	0.0	31.2	42.0	0.0	7.2
Prop In Lane	0.51		0.80	0.34		0.39	1.00		0.24	1.00		0.53
Lane Grp Cap(c), veh/h	231	0	256	342	0	273	602	0	1049	199	0	1001
V/C Ratio(X)	0.30	0.00	0.30	0.56	0.00	0.62	0.32	0.00	0.89	0.57	0.00	0.36
Avail Cap(c_a), veh/h	491	0	540	650	0	577	602	0	1049	199	0	1001
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	23.3	25.4	0.0	24.9	9.4	0.0	10.2	28.8	0.0	5.8
Incr Delay (d2), s/veh	0.7	0.0	0.7	1.5	0.0	2.3	0.3	0.0	9.4	3.9	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.3	3.5	0.0	3.0	2.1	0.0	16.7	2.3	0.0	3.2
LnGrp Delay(d),s/veh	24.5	0.0	23.9	26.8	0.0	27.2	9.7	0.0	19.5	32.7	0.0	6.0
LnGrp LOS	C		C	C		C	A		B	C		A
Approach Vol, veh/h		146			363			1120			476	
Approach Delay, s/veh		24.2			27.0			17.9			12.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		48.0		18.3		48.0		18.3
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		42.0		26.0		42.0		26.0
Max Q Clear Time (g_c+I1), s		33.2		9.8		44.0		10.4
Green Ext Time (p_c), s		5.1		0.7		0.0		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	50	40	0	0	0	145	360	115	110	85	250
Future Vol, veh/h	30	50	40	0	0	0	145	360	115	110	85	250
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	71	57	0	0	0	156	387	124	134	104	305

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1286	1348	257			409	0	0	511	0	0
Stage 1	525	525	-			-	-	-	-	-	-
Stage 2	761	823	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	175	145	763			1108	-	-	1014	-	-
Stage 1	578	516	-			-	-	-	-	-	-
Stage 2	447	377	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	131	0	763			1108	-	-	1014	-	-
Mov Cap-2 Maneuver	131	0	-			-	-	-	-	-	-
Stage 1	431	0	-			-	-	-	-	-	-
Stage 2	447	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	77.7	2.1	2.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	131	763	1014	-	-
HCM Lane V/C Ratio	0.141	-	-	0.872	0.075	0.132	-	-
HCM Control Delay (s)	8.8	-	-	111.5	10.1	9.1	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	5.6	0.2	0.5	-	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	295	55	0	0	0	0	0	0	30	20	0
Future Vol, veh/h	0	295	55	0	0	0	0	0	0	30	20	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	364	68	0	0	0	0	0	0	42	28	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	9.4	8.7
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	60%
Vol Thru, %	100%	64%	40%
Vol Right, %	0%	36%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	197	153	50
LT Vol	0	0	30
Through Vol	197	98	20
RT Vol	0	55	0
Lane Flow Rate	243	189	69
Geometry Grp	7	7	2
Degree of Util (X)	0.323	0.239	0.099
Departure Headway (Hd)	4.793	4.541	5.133
Convergence, Y/N	Yes	Yes	Yes
Cap	743	784	702
Service Time	2.566	2.314	3.133
HCM Lane V/C Ratio	0.327	0.241	0.098
HCM Control Delay	9.9	8.8	8.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.4	0.9	0.3

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑			↱	
Traffic Vol, veh/h	10	125	15	30	0	10	45	510	0	0	175	15
Future Vol, veh/h	10	125	15	30	0	10	45	510	0	0	175	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	167	20	37	0	12	56	638	0	0	261	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1028	1022	272	1116	1033	638	283	0	-	-	-	0
Stage 1	272	272	-	750	750	-	-	-	-	-	-	-
Stage 2	756	750	-	366	283	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	205	228	748	178	225	463	1235	-	0	0	-	-
Stage 1	717	670	-	391	407	-	-	-	0	0	-	-
Stage 2	388	407	-	637	663	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	193	218	748	97	215	463	1235	-	-	-	-	-
Mov Cap-2 Maneuver	291	312	-	222	306	-	-	-	-	-	-	-
Stage 1	685	670	-	373	389	-	-	-	-	-	-	-
Stage 2	361	389	-	466	663	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.3	22.5	0.7	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1235	-	330	255	-	-
HCM Lane V/C Ratio	0.046	-	0.606	0.194	-	-
HCM Control Delay (s)	8.1	-	31.3	22.5	-	-
HCM Lane LOS	A	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	3.8	0.7	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	115	50	50	195	560	5	10	20	335	5	25
Future Volume (veh/h)	110	115	50	50	195	560	5	10	20	335	5	25
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1727	1727	1900	1727	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	111	116	51	54	210	555	7	14	28	515	0	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	117	1114	466	66	759	679	58	18	36	658	345	0
Arrive On Green	0.07	0.49	0.49	0.04	0.46	0.46	0.04	0.04	0.04	0.20	0.00	0.00
Sat Flow, veh/h	1645	2257	945	1645	1641	1468	1645	515	1030	3290	1727	0
Grp Volume(v), veh/h	111	83	84	54	210	555	7	0	42	515	0	0
Grp Sat Flow(s),veh/h/ln	1645	1641	1561	1645	1641	1468	1645	0	1545	1645	1727	0
Q Serve(g_s), s	5.0	2.0	2.2	2.4	5.9	24.3	0.3	0.0	2.0	11.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	2.0	2.2	2.4	5.9	24.3	0.3	0.0	2.0	11.0	0.0	0.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		0.67	1.00		0.00
Lane Grp Cap(c), veh/h	117	810	770	66	759	679	58	0	55	658	345	0
V/C Ratio(X)	0.95	0.10	0.11	0.82	0.28	0.82	0.12	0.00	0.77	0.78	0.00	0.00
Avail Cap(c_a), veh/h	117	1520	1445	168	1570	1405	405	0	380	1459	766	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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.4	10.1	10.1	35.4	12.3	17.3	34.8	0.0	35.6	28.2	0.0	0.0
Incr Delay (d2), s/veh	65.9	0.1	0.1	8.9	0.2	3.0	0.9	0.0	19.9	2.1	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	4.4	0.9	0.9	1.3	2.7	10.3	0.2	0.0	1.2	5.2	0.0	0.0
LnGrp Delay(d),s/veh	100.3	10.1	10.2	44.4	12.6	20.3	35.7	0.0	55.5	30.3	0.0	0.0
LnGrp LOS	F	B	B	D	B	C	D		E	C		
Approach Vol, veh/h		278			819			49			515	
Approach Delay, s/veh		46.1			19.9			52.6			30.3	
Approach LOS		D			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	41.3		19.1	9.5	39.0		6.8
Change Period (Y+Rc), s	* 4.2	4.6		* 4.2	* 4.2	4.6		4.2
Max Green Setting (Gmax), s	* 7.6	68.9		* 33	* 5.3	71.2		18.3
Max Q Clear Time (g_c+I1), s	4.4	4.2		13.0	7.0	26.3		4.0
Green Ext Time (p_c), s	0.0	1.3		1.8	0.0	8.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.5
HCM 2010 LOS	C

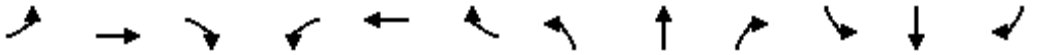
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	400	60	345	300	0	0	0	0	450	10	500
Future Volume (veh/h)	0	400	60	345	300	0	0	0	0	450	10	500
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	476	0	397	345	0				514	0	486
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2039	912	495	2740	0				823	0	367
Arrive On Green	0.00	0.62	0.00	0.05	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	476	0	397	345	0				514	0	486
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	5.1	0.0	9.8	6.3	0.0				11.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	5.1	0.0	9.8	6.3	0.0				11.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2039	912	495	2740	0				823	0	367
V/C Ratio(X)	0.00	0.23	0.00	0.80	0.13	0.00				0.62	0.00	1.32
Avail Cap(c_a), veh/h	0	2039	912	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.91	0.00	0.21	0.21	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.7	0.0	36.7	7.1	0.0				26.7	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.3	0.0	0.0				1.1	0.0	163.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.0	4.4	2.9	0.0				5.1	0.0	24.7
LnGrp Delay(d),s/veh	0.0	7.0	0.0	37.0	7.1	0.0				27.8	0.0	193.7
LnGrp LOS		A		D	A					C		F
Approach Vol, veh/h		476			742						1000	
Approach Delay, s/veh		7.0			23.1						108.4	
Approach LOS		A			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.1	55.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	11.8	7.1		22.0		8.3		
Green Ext Time (p_c), s	0.6	5.1		0.0		4.8		

Intersection Summary	
HCM 2010 Ctrl Delay	58.1
HCM 2010 LOS	E

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	465	0	0	590	500	60	270	600	0	0	0
Future Volume (veh/h)	390	465	0	0	590	500	60	270	600	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	443	528	0	0	670	526	67	417	426			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	518	2063	0	0	716	558	411	432	367			
Arrive On Green	0.32	1.00	0.00	0.00	0.41	0.41	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1843	1370	1645	1727	1468			
Grp Volume(v), veh/h	443	528	0	0	626	570	67	417	426			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1486	1645	1727	1468			
Q Serve(g_s), s	10.4	0.0	0.0	0.0	29.2	29.5	2.5	19.1	20.0			
Cycle Q Clear(g_c), s	10.4	0.0	0.0	0.0	29.2	29.5	2.5	19.1	20.0			
Prop In Lane	1.00		0.00	0.00		0.92	1.00		1.00			
Lane Grp Cap(c), veh/h	518	2063	0	0	669	605	411	432	367			
V/C Ratio(X)	0.85	0.26	0.00	0.00	0.94	0.94	0.16	0.97	1.16			
Avail Cap(c_a), veh/h	798	2063	0	0	669	605	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	26.1	0.0	0.0	0.0	22.7	22.8	23.5	29.7	30.0			
Incr Delay (d2), s/veh	3.1	0.3	0.0	0.0	22.1	24.8	0.1	34.2	98.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	17.1	16.2	1.2	13.1	18.1			
LnGrp Delay(d),s/veh	29.2	0.3	0.0	0.0	44.8	47.6	23.5	63.9	128.3			
LnGrp LOS	C	A			D	D	C	E	F			
Approach Vol, veh/h		971			1196			910				
Approach Delay, s/veh		13.5			46.1			91.1				
Approach LOS		B			D			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			17.7	37.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.4	31.5		22.0
Green Ext Time (p_c), s		8.1			0.6	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.1
HCM 2010 LOS	D

Notes

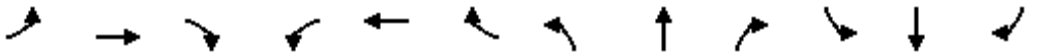
Intersection	
Int Delay, s/veh	6.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	190	100	0	145	85
Future Vol, veh/h	15	190	100	0	145	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	85	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	61	61	71	71
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	22	284	164	0	204	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	692	164	0	0	164	0
Stage 1	164	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	398	860	-	-	1414	-
Stage 1	846	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	341	860	-	-	1414	-
Mov Cap-2 Maneuver	341	-	-	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	576	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	341	860	1414	-
HCM Lane V/C Ratio	-	-	0.066	0.33	0.144	-
HCM Control Delay (s)	-	-	16.3	11.2	8	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	1.4	0.5	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	680	50	505	240	0	10	0	130	0	90	0
Future Volume (Veh/h)	0	680	50	505	240	0	10	0	130	0	90	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.78	0.78	0.78	0.87	0.87	0.87
Hourly flow rate (vph)	0	1153	85	732	348	0	13	0	167	0	103	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					177							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	348			1238			3059	3008	1196	3174	3050	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323			1238			3092	3040	1196	3210	3083	323
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			0			0	0	24	0	0	100
cM capacity (veh/h)	1168			536			0	0	218	0	0	685

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	1238	1080	13	167	103
Volume Left	0	732	13	0	0
Volume Right	85	0	0	167	0
cSH	1700	536	0	218	0
Volume to Capacity	0.73	1.37	Err	0.76	Err
Queue Length 95th (ft)	0	822	Err	133	Err
Control Delay (s)	0.0	198.6	Err	60.6	Err
Lane LOS		F	F	F	F
Approach Delay (s)	0.0	198.6	Err		Err
Approach LOS			F		F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	96.6%	ICU Level of Service	F	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	55.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	680	50	505	240	0	10	0	130	0	90	0
Future Vol, veh/h	0	680	50	505	240	0	10	0	130	0	90	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	69	69	69	78	78	78	87	87	87
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1153	85	732	348	0	13	0	167	0	103	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1238	0	0	3060	-	1196	-	3050	348
Stage 1	-	-	-	-	-	-	1196	-	-	-	1812	-
Stage 2	-	-	-	-	-	-	1864	-	-	-	1238	-
Critical Hdwy	-	-	-	4.2	-	-	7.2	-	6.3	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	-	-	-	5.6	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.59	-	3.39	-	4.09	3.39
Pot Cap-1 Maneuver	0	-	-	~ 536	-	0	~ 7	0	218	0	~ 12	677
Stage 1	0	-	-	-	-	0	219	0	-	0	124	-
Stage 2	0	-	-	-	-	0	89	0	-	0	239	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	~ 536	-	-	-	-	218	-	0	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	0	-
Stage 1	-	-	-	-	-	-	219	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	-	-	-	239	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	134.4		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	218	-	-	~ 536	-	-
HCM Lane V/C Ratio	-	0.765	-	-	1.365	-	-
HCM Control Delay (s)	-	60.7	-	-	198.3	0	-
HCM Lane LOS	-	F	-	-	F	A	-
HCM 95th %tile Q(veh)	-	5.3	-	-	32.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	305	0	415	70	110	40	15	245	135	80	210	1105
Future Volume (vph)	305	0	415	70	110	40	15	245	135	80	210	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.98		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3211		1641	1658		1641	3098		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3211		1641	1658		1641	3098		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	355	0	483	81	157	57	21	278	153	91	239	1256
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	355	556	0	157	78	0	278	244	0	239	1256
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		20.2	20.2		15.4	15.4		20.2	35.4		15.1	30.3
Effective Green, g (s)		20.2	20.2		15.4	15.4		20.2	35.4		15.1	30.3
Actuated g/C Ratio		0.17	0.17		0.13	0.13		0.17	0.31		0.13	0.26
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		286	560		218	220		286	947		213	858
v/s Ratio Prot		c0.22	0.17		c0.10	0.05		c0.17	0.08		c0.15	c0.38
v/s Ratio Perm												
v/c Ratio		1.24	0.99		0.72	0.35		0.97	0.26		1.12	1.46
Uniform Delay, d1		47.8	47.7		48.1	45.7		47.5	30.3		50.4	42.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		134.7	35.9		9.5	0.4		45.1	0.3		98.3	215.2
Delay (s)		182.5	83.6		57.6	46.0		92.6	30.6		148.7	257.9
Level of Service		F	F		E	D		F	C		F	F
Approach Delay (s)			121.8			53.8			63.6			199.9
Approach LOS			F			D			E			F

Intersection Summary			
HCM 2000 Control Delay	149.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	115.8	Sum of lost time (s)	25.5
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	350	20	20
Future Volume (vph)	350	20	20
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	398	22	22
RTOR Reduction (vph)	116	0	0
Lane Group Flow (vph)	282	22	22
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	30.3	4.2	4.2
Effective Green, g (s)	30.3	4.2	4.2
Actuated g/C Ratio	0.26	0.04	0.04
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	384	59	53
v/s Ratio Prot		0.01	c0.01
v/s Ratio Perm	0.19		
v/c Ratio	0.73	0.37	0.42
Uniform Delay, d1	39.1	54.5	54.6
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	8.6	1.4	1.9
Delay (s)	47.7	56.0	56.5
Level of Service	D	E	E
Approach Delay (s)		56.2	
Approach LOS		E	

Intersection Summary

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	0	0	0	5	120	105	20	400	5
Future Vol, veh/h	0	0	5	0	0	0	5	120	105	20	400	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	13	0	0	0	7	162	142	22	440	5

Major/Minor	Minor2				Major1			Major2		
Conflicting Flow All	734	805	443		445	0	0	304	0	0
Stage 1	487	487	-		-	-	-	-	-	-
Stage 2	247	318	-		-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3		4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-		-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-		-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39		2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	376	307	598		1074	-	-	1213	-	-
Stage 1	602	537	-		-	-	-	-	-	-
Stage 2	776	639	-		-	-	-	-	-	-
Platoon blocked, %						-	-		-	-
Mov Cap-1 Maneuver	367	0	598		1074	-	-	1213	-	-
Mov Cap-2 Maneuver	367	0	-		-	-	-	-	-	-
Stage 1	587	0	-		-	-	-	-	-	-
Stage 2	776	0	-		-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.2	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1074	-	-	598	1213	-	-
HCM Lane V/C Ratio	0.006	-	-	0.022	0.018	-	-
HCM Control Delay (s)	8.4	-	-	11.2	8	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

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	5	0	5	185	5	110	10	120	0	0	370	20
Future Vol, veh/h	5	0	5	185	5	110	10	120	0	0	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	16	208	6	124	12	141	0	0	398	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	639	574	409	582	585	141	420	0	-	-	-	0
Stage 1	409	409	-	165	165	-	-	-	-	-	-	-
Stage 2	230	165	-	417	420	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	378	418	625	413	412	886	1097	-	0	0	-	-
Stage 1	604	582	-	819	747	-	-	-	0	0	-	-
Stage 2	755	747	-	598	576	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	320	413	625	399	407	886	1097	-	-	-	-	-
Mov Cap-2 Maneuver	427	479	-	475	469	-	-	-	-	-	-	-
Stage 1	597	582	-	810	739	-	-	-	-	-	-	-
Stage 2	638	739	-	583	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	15.1	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1097	-	507	475	853	-	-
HCM Lane V/C Ratio	0.011	-	0.064	0.438	0.151	-	-
HCM Control Delay (s)	8.3	-	12.6	18.3	10	-	-
HCM Lane LOS	A	-	B	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	2.2	0.5	-	-

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	260	0	0	0	0	0	35	50
Future Vol, veh/h	0	0	0	30	260	0	0	0	0	0	35	50
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	39	338	0	0	0	0	0	47	67
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	9.5	8.4
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	26%	0%	0%
Vol Thru, %	74%	100%	41%
Vol Right, %	0%	0%	59%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	117	173	85
LT Vol	30	0	0
Through Vol	87	173	35
RT Vol	0	0	50
Lane Flow Rate	152	225	113
Geometry Grp	7	7	2
Degree of Util (X)	0.21	0.305	0.145
Departure Headway (Hd)	4.999	4.87	4.591
Convergence, Y/N	Yes	Yes	Yes
Cap	711	729	785
Service Time	2.786	2.657	2.591
HCM Lane V/C Ratio	0.214	0.309	0.144
HCM Control Delay	9.1	9.8	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	1.3	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	95	25	20	15	20	10	515	150	35	55	25
Future Volume (veh/h)	65	95	25	20	15	20	10	515	150	35	55	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	90	132	32	22	16	22	13	652	189	50	79	36
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	254	284	73	217	122	181	796	740	214	240	646	294
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	772	1726	441	521	738	1096	1180	1288	373	604	1124	512
Grp Volume(v), veh/h	146	0	108	32	0	28	13	0	841	50	0	115
Grp Sat Flow(s),veh/h/ln	1445	0	1494	977	0	1378	1180	0	1661	604	0	1637
Q Serve(g_s), s	3.4	0.0	3.0	0.1	0.0	0.8	0.2	0.0	20.1	3.6	0.0	1.5
Cycle Q Clear(g_c), s	4.2	0.0	3.0	3.1	0.0	0.8	1.7	0.0	20.1	23.7	0.0	1.5
Prop In Lane	0.62		0.30	0.68		0.80	1.00		0.22	1.00		0.31
Lane Grp Cap(c), veh/h	365	0	246	292	0	227	796	0	954	240	0	940
V/C Ratio(X)	0.40	0.00	0.44	0.11	0.00	0.12	0.02	0.00	0.88	0.21	0.00	0.12
Avail Cap(c_a), veh/h	929	0	844	801	0	779	939	0	1156	313	0	1139
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.7	0.0	17.3	16.4	0.0	16.4	4.9	0.0	8.4	18.6	0.0	4.5
Incr Delay (d2), s/veh	0.7	0.0	1.2	0.2	0.0	0.2	0.0	0.0	7.1	0.4	0.0	0.1
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	1.8	0.0	1.3	0.4	0.0	0.3	0.1	0.0	10.8	0.6	0.0	0.7
LnGrp Delay(d),s/veh	18.4	0.0	18.5	16.6	0.0	16.6	4.9	0.0	15.5	19.1	0.0	4.5
LnGrp LOS	B		B	B		B	A		B	B		A
Approach Vol, veh/h		254			60			854			165	
Approach Delay, s/veh		18.5			16.6			15.4			8.9	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		32.4		13.6		32.4		13.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		22.1		6.2		25.7		5.1
Green Ext Time (p_c), s		4.3		1.4		0.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	25.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	165	100	0	0	0	30	105	80	190	290	100
Future Vol, veh/h	40	165	100	0	0	0	30	105	80	190	290	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	179	109	0	0	0	32	111	84	207	315	109

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1001	1043	370			424	0	0	195	0	0
Stage 1	784	784	-			-	-	-	-	-	-
Stage 2	217	259	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	260	222	658			1094	-	-	1331	-	-
Stage 1	436	393	-			-	-	-	-	-	-
Stage 2	801	679	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	213	0	658			1094	-	-	1331	-	-
Mov Cap-2 Maneuver	213	0	-			-	-	-	-	-	-
Stage 1	358	0	-			-	-	-	-	-	-
Stage 2	801	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	85.9	1.2	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	213	658	1331	-	-
HCM Lane V/C Ratio	0.029	-	-	1.046	0.165	0.155	-	-
HCM Control Delay (s)	8.4	-	-	122.1	11.6	8.2	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	9.8	0.6	0.5	-	-

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	480	30	0	0	0	0	0	0	30	15	0
Future Vol, veh/h	0	480	30	0	0	0	0	0	0	30	15	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	623	39	0	0	0	0	0	0	43	21	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	12	9.2
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	84%	33%
Vol Right, %	0%	16%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	320	190	45
LT Vol	0	0	30
Through Vol	320	160	15
RT Vol	0	30	0
Lane Flow Rate	416	247	64
Geometry Grp	7	7	2
Degree of Util (X)	0.552	0.32	0.099
Departure Headway (Hd)	4.783	4.672	5.556
Convergence, Y/N	Yes	Yes	Yes
Cap	748	760	649
Service Time	2.566	2.455	3.556
HCM Lane V/C Ratio	0.556	0.325	0.099
HCM Control Delay	13.4	9.7	9.2
HCM Lane LOS	B	A	A
HCM 95th-tile Q	3.4	1.4	0.3

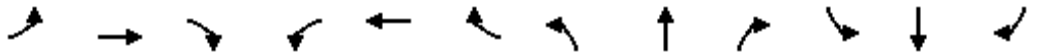
Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	120	20	30	5	10	15	170	0	0	410	15
Future Vol, veh/h	5	120	20	30	5	10	15	170	0	0	410	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	136	23	45	7	15	20	230	0	0	477	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	767	756	486	836	765	230	495	0	-	-	-	0
Stage 1	486	486	-	270	270	-	-	-	-	-	-	-
Stage 2	281	270	-	566	495	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	309	328	565	278	324	790	1029	-	0	0	-	-
Stage 1	548	538	-	718	672	-	-	-	0	0	-	-
Stage 2	709	672	-	495	533	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	294	322	565	196	318	790	1029	-	-	-	-	-
Mov Cap-2 Maneuver	404	414	-	279	404	-	-	-	-	-	-	-
Stage 1	538	538	-	704	659	-	-	-	-	-	-	-
Stage 2	674	659	-	355	533	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	18.2	0.7	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1029	-	429	339	-	-
HCM Lane V/C Ratio	0.02	-	0.384	0.198	-	-
HCM Control Delay (s)	8.6	-	18.5	18.2	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.8	0.7	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	140	20	85	265	335	0	5	35	600	20	20
Future Volume (vph)	45	140	20	85	265	335	0	5	35	600	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.92			0.87		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3221		1641	3007			1499		1559	1557	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3221		1641	3007			1499		1559	1557	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	55	171	24	94	294	372	0	6	45	706	24	24
RTOR Reduction (vph)	0	11	0	0	227	0	0	43	0	0	2	0
Lane Group Flow (vph)	55	184	0	94	439	0	0	8	0	381	371	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	3.9	15.5		6.6	18.2			3.5		23.8	23.8	
Effective Green, g (s)	3.9	15.5		6.6	18.2			3.5		23.8	23.8	
Actuated g/C Ratio	0.06	0.23		0.10	0.27			0.05		0.36	0.36	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	96	749		162	821			78		557	556	
v/s Ratio Prot	0.03	0.06		c0.06	c0.15			c0.01		c0.24	0.24	
v/s Ratio Perm												
v/c Ratio	0.57	0.25		0.58	0.53			0.11		0.68	0.67	
Uniform Delay, d1	30.5	20.8		28.7	20.6			30.1		18.2	18.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.0	0.2		3.4	0.8			0.6		3.5	3.0	
Delay (s)	35.6	21.0		32.1	21.3			30.7		21.7	21.1	
Level of Service	D	C		C	C			C		C	C	
Approach Delay (s)		24.2			22.7			30.7			21.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	580	190	585	145	0	0	0	0	520	25	540
Future Volume (veh/h)	0	580	190	585	145	0	0	0	0	520	25	540
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	690	0	672	167	0				604	0	522
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1769	792	757	2740	0				823	0	367
Arrive On Green	0.00	0.54	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	690	0	672	167	0				604	0	522
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	9.8	0.0	16.7	3.0	0.0				13.5	0.0	20.0
Cycle Q Clear(g_c), s	0.0	9.8	0.0	16.7	3.0	0.0				13.5	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1769	792	757	2740	0				823	0	367
V/C Ratio(X)	0.00	0.39	0.00	0.89	0.06	0.00				0.73	0.00	1.42
Avail Cap(c_a), veh/h	0	1769	792	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.84	0.00	0.36	0.36	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.8	0.0	35.8	5.9	0.0				27.6	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	4.4	0.0	0.0				3.0	0.0	205.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.5	0.0	7.8	1.4	0.0				6.5	0.0	29.0
LnGrp Delay(d),s/veh	0.0	11.3	0.0	40.2	5.9	0.0				30.6	0.0	235.3
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		690			839						1126	
Approach Delay, s/veh		11.3			33.4						125.5	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.7	48.7		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	18.7	11.8		22.0		5.0		
Green Ext Time (p_c), s	0.3	6.3		0.0		2.2		

Intersection Summary	
HCM 2010 Ctrl Delay	66.7
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	650	0	0	710	550	25	10	490	0	0	0
Future Volume (veh/h)	455	650	0	0	710	550	25	10	490	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	517	739	0	0	807	568	22	0	463			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	588	2274	0	0	836	577	306	0	545			
Arrive On Green	0.37	1.00	0.00	0.00	0.45	0.45	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1945	1283	1645	0	2936			
Grp Volume(v), veh/h	517	739	0	0	710	665	22	0	463			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1501	1645	0	1468			
Q Serve(g_s), s	12.1	0.0	0.0	0.0	33.6	35.0	0.9	0.0	12.2			
Cycle Q Clear(g_c), s	12.1	0.0	0.0	0.0	33.6	35.0	0.9	0.0	12.2			
Prop In Lane	1.00		0.00	0.00		0.85	1.00		1.00			
Lane Grp Cap(c), veh/h	588	2274	0	0	738	675	306	0	545			
V/C Ratio(X)	0.88	0.32	0.00	0.00	0.96	0.98	0.07	0.00	0.85			
Avail Cap(c_a), veh/h	798	2274	0	0	738	675	411	0	734			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.4	0.0	0.0	0.0	21.3	21.7	26.9	0.0	31.5			
Incr Delay (d2), s/veh	4.8	0.3	0.0	0.0	25.1	31.0	0.0	0.0	5.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.6	0.1	0.0	0.0	20.3	20.2	0.4	0.0	5.4			
LnGrp Delay(d),s/veh	29.2	0.3	0.0	0.0	46.5	52.8	26.9	0.0	37.0			
LnGrp LOS	C	A			D	D	C		D			
Approach Vol, veh/h		1256			1375			485				
Approach Delay, s/veh		12.2			49.5			36.5				
Approach LOS		B			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.5			19.4	41.1		19.5
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			14.1	37.0		14.2
Green Ext Time (p_c), s		12.3			0.6	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.4
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	7.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	130	60	0	350	65
Future Vol, veh/h	25	130	60	0	350	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	48	48	75	75	51	51
Heavy Vehicles, %	10	10	10	10	2	2
Mvmt Flow	52	271	80	0	686	127

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1579	80	0	0	80	0
Stage 1	80	-	-	-	-	-
Stage 2	1499	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.218	-
Pot Cap-1 Maneuver	115	958	-	-	1518	-
Stage 1	923	-	-	-	-	-
Stage 2	196	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	63	958	-	-	1518	-
Mov Cap-2 Maneuver	2090	-	-	-	-	-
Stage 1	506	-	-	-	-	-
Stage 2	196	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	7.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	2090	958	1518	-
HCM Lane V/C Ratio	-	-	0.025	0.283	0.452	-
HCM Control Delay (s)	-	-	6.8	13.8	9.3	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	1.2	2.4	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	150	50	110	145	65	350
Future Vol, veh/h	150	50	110	145	65	350
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	71	71	88	88
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	217	72	155	204	74	398

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	289	0	767	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	514	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1228	-	359	767
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	584	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1228	-	308	767
Mov Cap-2 Maneuver	-	-	-	-	308	-
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	15.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	308	767	-	-	1228	-
HCM Lane V/C Ratio	0.24	0.519	-	-	0.126	-
HCM Control Delay (s)	20.3	14.6	-	-	8.4	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	3	-	-	0.4	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Traffic Volume (vph)	185	0	260	55	85	50	100	100	600	5	210	55
Future Volume (vph)	185	0	260	55	85	50	100	100	600	5	210	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95			1.00
Frt		1.00	0.97		1.00	0.90		1.00	0.96			1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (prot)		1641	3196		1641	1554		1641	3152			1641
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00			0.95
Satd. Flow (perm)		1641	3196		1641	1554		1641	3152			1641
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	215	0	302	64	121	71	143	114	682	5	239	62
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	215	355	0	121	214	0	114	926	0	0	63
Turn Type	Split	Split	NA		Split	NA		Prot	NA			Prot
Protected Phases	3	3	3		7	7		1	6			5
Permitted Phases												
Actuated Green, G (s)		20.0	20.0		19.4	19.4		12.2	31.1			7.3
Effective Green, g (s)		20.0	20.0		19.4	19.4		12.2	31.1			7.3
Actuated g/C Ratio		0.18	0.18		0.18	0.18		0.11	0.29			0.07
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5			4.7
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0			2.0
Lane Grp Cap (vph)		300	585		291	276		183	898			109
v/s Ratio Prot		c0.13	0.11		0.07	c0.14		c0.07	c0.29			0.04
v/s Ratio Perm												
v/c Ratio		0.72	0.61		0.42	0.78		0.62	1.03			0.58
Uniform Delay, d1		41.9	40.9		39.8	42.8		46.3	39.0			49.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2		6.6	1.2		0.4	11.7		4.7	38.3			4.6
Delay (s)		48.5	42.2		40.2	54.5		50.9	77.3			54.0
Level of Service		D	D		D	D		D	E			D
Approach Delay (s)			44.5			49.3			74.4			
Approach LOS			D			D			E			

Intersection Summary			
HCM 2000 Control Delay	57.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	109.1	Sum of lost time (s)	25.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBT	SBR	SWL	SWR
Lane Configurations				
Traffic Volume (vph)	130	75	30	30
Future Volume (vph)	130	75	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.1	5.1
Lane Util. Factor	0.95	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3282	1468	1641	1468
Flt Permitted	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3282	1468	1641	1468
Peak-hour factor, PHF	0.88	0.88	0.92	0.92
Adj. Flow (vph)	148	85	33	33
RTOR Reduction (vph)	0	65	0	0
Lane Group Flow (vph)	148	20	33	33
Turn Type	NA	Perm	Prot	Prot
Protected Phases	2		4	4
Permitted Phases		2		
Actuated Green, G (s)	26.2	26.2	5.8	5.8
Effective Green, g (s)	26.2	26.2	5.8	5.8
Actuated g/C Ratio	0.24	0.24	0.05	0.05
Clearance Time (s)	5.5	5.5	5.1	5.1
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	788	352	87	78
v/s Ratio Prot	0.05		0.02	c0.02
v/s Ratio Perm		0.01		
v/c Ratio	0.19	0.06	0.38	0.42
Uniform Delay, d1	33.0	31.9	49.9	50.0
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0	1.3
Delay (s)	33.2	32.1	50.9	51.4
Level of Service	C	C	D	D
Approach Delay (s)	37.3		51.1	
Approach LOS	D		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	15	365	115	25	205	5
Future Vol, veh/h	5	0	5	0	0	0	15	365	115	25	205	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	62	62	62	44	44	44	81	81	81	88	88	88
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	0	8	0	0	0	19	451	142	28	233	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	852	923	236	239	0	0	593	0	0
Stage 1	292	292	-	-	-	-	-	-	-
Stage 2	560	631	-	-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	320	262	784	1282	-	-	945	-	-
Stage 1	740	657	-	-	-	-	-	-	-
Stage 2	556	462	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	306	0	784	1282	-	-	945	-	-
Mov Cap-2 Maneuver	306	0	-	-	-	-	-	-	-
Stage 1	707	0	-	-	-	-	-	-	-
Stage 2	556	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1282	-	-	440	945	-	-
HCM Lane V/C Ratio	0.014	-	-	0.037	0.03	-	-
HCM Control Delay (s)	7.8	-	-	13.5	8.9	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	275	10	170	40	355	0	0	205	15
Future Vol, veh/h	5	0	5	275	10	170	40	355	0	0	205	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	92	92	92	92	92	92	85	85	85
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	20	0	20	299	11	185	43	386	0	0	241	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	820	722	250	732	731	386	259	0	-	-	-	0
Stage 1	250	250	-	472	472	-	-	-	-	-	-	-
Stage 2	570	472	-	260	259	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	285	343	770	327	339	645	1260	-	0	0	-	-
Stage 1	737	685	-	558	546	-	-	-	0	0	-	-
Stage 2	493	546	-	727	679	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	194	331	770	310	327	645	1260	-	-	-	-	-
Mov Cap-2 Maneuver	277	417	-	410	409	-	-	-	-	-	-	-
Stage 1	712	685	-	539	527	-	-	-	-	-	-	-
Stage 2	333	527	-	708	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	25.9	0.8	0
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1260	-	407	410	625	-	-
HCM Lane V/C Ratio	0.035	-	0.098	0.729	0.313	-	-
HCM Control Delay (s)	8	-	14.8	34	13.4	-	-
HCM Lane LOS	A	-	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	5.7	1.3	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Future Vol, veh/h	0	0	0	30	410	0	0	0	0	0	30	45
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.67	0.67	0.67	0.81	0.81	0.81
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	37	506	0	0	0	0	0	37	56
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10.9	8.6
HCM LOS	B	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	0%	0%
Vol Thru, %	82%	100%	40%
Vol Right, %	0%	0%	60%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	167	273	75
LT Vol	30	0	0
Through Vol	137	273	30
RT Vol	0	0	45
Lane Flow Rate	206	337	93
Geometry Grp	7	7	2
Degree of Util (X)	0.281	0.453	0.126
Departure Headway (Hd)	4.922	4.832	4.886
Convergence, Y/N	Yes	Yes	Yes
Cap	722	736	738
Service Time	2.71	2.619	2.886
HCM Lane V/C Ratio	0.285	0.458	0.126
HCM Control Delay	9.7	11.6	8.6
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	2.4	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	35	45	50	210	50	150	100	50	80	120	140
Future Volume (veh/h)	25	35	45	50	210	50	150	100	50	80	120	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	35	49	62	55	231	55	190	127	62	114	171	191
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	215	217	264	197	470	111	475	497	242	622	338	377
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	328	1025	1251	315	2222	525	942	1097	536	1103	746	834
Grp Volume(v), veh/h	79	0	67	186	0	155	190	0	189	114	0	362
Grp Sat Flow(s),veh/h/ln	1253	0	1351	1583	0	1479	942	0	1633	1103	0	1580
Q Serve(g_s), s	0.1	0.0	1.5	1.3	0.0	3.3	6.4	0.0	2.6	2.5	0.0	5.8
Cycle Q Clear(g_c), s	3.4	0.0	1.5	3.6	0.0	3.3	12.2	0.0	2.6	5.1	0.0	5.8
Prop In Lane	0.44		0.93	0.30		0.36	1.00		0.33	1.00		0.53
Lane Grp Cap(c), veh/h	410	0	286	465	0	313	475	0	739	622	0	715
V/C Ratio(X)	0.19	0.00	0.23	0.40	0.00	0.50	0.40	0.00	0.26	0.18	0.00	0.51
Avail Cap(c_a), veh/h	1089	0	984	1251	0	1077	893	0	1464	1111	0	1416
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.7	0.0	11.7	12.5	0.0	12.4	11.3	0.0	6.0	7.6	0.0	6.9
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.6	0.0	1.2	0.5	0.0	0.2	0.1	0.0	0.6
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	0.7	0.0	0.6	1.7	0.0	1.4	1.7	0.0	1.2	0.8	0.0	2.6
LnGrp Delay(d),s/veh	11.9	0.0	12.1	13.0	0.0	13.6	11.8	0.0	6.2	7.8	0.0	7.5
LnGrp LOS	B		B	B		B	B		A	A		A
Approach Vol, veh/h		146			341			379			476	
Approach Delay, s/veh		12.0			13.3			9.0			7.6	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.2		13.5		22.2		13.5
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		14.2		5.4		7.8		5.6
Green Ext Time (p_c), s		1.9		0.8		2.8		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	11.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	50	40	0	0	0	140	365	115	110	85	250
Future Vol, veh/h	30	50	40	0	0	0	140	365	115	110	85	250
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	25	25	25	93	93	93	82	82	82
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	43	71	57	0	0	0	151	392	124	134	104	305

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1281	1343	257			409	0	0	516	0	0
Stage 1	525	525	-			-	-	-	-	-	-
Stage 2	756	818	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	176	146	763			1108	-	-	1010	-	-
Stage 1	578	516	-			-	-	-	-	-	-
Stage 2	450	379	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	132	0	763			1108	-	-	1010	-	-
Mov Cap-2 Maneuver	132	0	-			-	-	-	-	-	-
Stage 1	433	0	-			-	-	-	-	-	-
Stage 2	450	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	76.4	2	2.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	132	763	1010	-	-
HCM Lane V/C Ratio	0.136	-	-	0.866	0.075	0.133	-	-
HCM Control Delay (s)	8.8	-	-	109.5	10.1	9.1	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	5.5	0.2	0.5	-	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	180	55	0	0	0	0	0	0	30	20	0
Future Vol, veh/h	0	180	55	0	0	0	0	0	0	30	20	0
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.58	0.58	0.58	0.72	0.72	0.72
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	222	68	0	0	0	0	0	0	42	28	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	8.5	8.4
HCM LOS	A	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	60%
Vol Thru, %	100%	52%	40%
Vol Right, %	0%	48%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	120	115	50
LT Vol	0	0	30
Through Vol	120	60	20
RT Vol	0	55	0
Lane Flow Rate	148	142	69
Geometry Grp	7	7	2
Degree of Util (X)	0.197	0.176	0.094
Departure Headway (Hd)	4.793	4.458	4.848
Convergence, Y/N	Yes	Yes	Yes
Cap	744	798	744
Service Time	2.556	2.221	2.848
HCM Lane V/C Ratio	0.199	0.178	0.093
HCM Control Delay	8.7	8.2	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.6	0.3

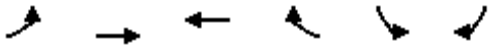
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	15	30	0	10	45	510	0	0	170	15
Future Vol, veh/h	10	5	15	30	0	10	45	510	0	0	170	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	81	81	81	80	80	80	67	67	67
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	40	20	60	37	0	12	56	638	0	0	254	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1021	1015	265	1055	1026	638	276	0	-	-	-	0
Stage 1	265	265	-	750	750	-	-	-	-	-	-	-
Stage 2	756	750	-	305	276	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	207	231	755	197	227	463	1242	-	0	0	-	-
Stage 1	723	675	-	391	407	-	-	-	0	0	-	-
Stage 2	388	407	-	688	667	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	195	221	755	167	217	463	1242	-	-	-	-	-
Mov Cap-2 Maneuver	292	314	-	276	308	-	-	-	-	-	-	-
Stage 1	690	675	-	373	389	-	-	-	-	-	-	-
Stage 2	361	389	-	615	667	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	19	0.7	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1242	-	428	307	-	-
HCM Lane V/C Ratio	0.045	-	0.28	0.161	-	-
HCM Control Delay (s)	8	-	16.7	19	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	0.6	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	350	525	420	120	155
Future Volume (veh/h)	90	350	525	420	120	155
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	114	443	633	488	152	191
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	151	977	512	394	301	269
Arrive On Green	0.57	0.57	0.57	0.57	0.18	0.18
Sat Flow, veh/h	464	1727	905	697	1645	1468
Grp Volume(v), veh/h	114	443	0	1121	152	191
Grp Sat Flow(s),veh/h/ln	464	1727	0	1602	1645	1468
Q Serve(g_s), s	0.0	7.2	0.0	27.0	4.0	5.8
Cycle Q Clear(g_c), s	27.0	7.2	0.0	27.0	4.0	5.8
Prop In Lane	1.00			0.44	1.00	1.00
Lane Grp Cap(c), veh/h	151	977	0	906	301	269
V/C Ratio(X)	0.76	0.45	0.00	1.24	0.50	0.71
Avail Cap(c_a), veh/h	151	977	0	906	896	800
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	6.1	0.0	10.4	17.6	18.3
Incr Delay (d2), s/veh	19.4	0.3	0.0	116.2	1.3	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.4	0.0	40.8	1.9	2.6
LnGrp Delay(d),s/veh	43.2	6.4	0.0	126.6	18.9	21.8
LnGrp LOS	D	A		F	B	C
Approach Vol, veh/h		557	1121		343	
Approach Delay, s/veh		13.9	126.6		20.5	
Approach LOS		B	F		C	

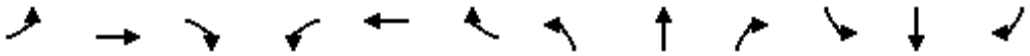
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		33.0				33.0		14.7
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		29.0				29.0		7.8
Green Ext Time (p_c), s		0.0				0.0		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	77.5
HCM 2010 LOS	E



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	295	140	255	525	70	270
Future Volume (vph)	295	140	255	525	70	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.96		1.00	1.00	0.89	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1652		1641	1727	1646	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	1652		1641	1727	1646	
Peak-hour factor, PHF	0.78	0.78	0.86	0.86	0.70	0.70
Adj. Flow (vph)	378	179	297	610	100	386
RTOR Reduction (vph)	16	0	0	0	0	0
Lane Group Flow (vph)	541	0	297	610	486	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	26.9		19.1	50.0	29.6	
Effective Green, g (s)	26.9		19.1	50.0	29.6	
Actuated g/C Ratio	0.30		0.22	0.56	0.33	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	500		352	972	548	
v/s Ratio Prot	c0.33		c0.18	0.35	c0.30	
v/s Ratio Perm						
v/c Ratio	1.08		0.84	0.63	0.89	
Uniform Delay, d1	30.9		33.4	13.1	28.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	64.2		16.0	1.3	15.5	
Delay (s)	95.1		49.4	14.4	43.5	
Level of Service	F		D	B	D	
Approach Delay (s)	95.1			25.9	43.5	
Approach LOS	F			C	D	

Intersection Summary			
HCM 2000 Control Delay	50.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	17.7
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	405	50	50	725	560	5	10	20	335	5	55
Future Volume (vph)	110	405	50	50	725	560	5	10	20	335	5	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	0.93		1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1641	3227		1641	3067		1641	1553		1559	1519	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (perm)	1641	3227		1641	3067		1641	1553		1559	1519	
Peak-hour factor, PHF	0.99	0.99	0.99	0.93	0.93	0.93	0.69	0.69	0.69	0.70	0.70	0.70
Adj. Flow (vph)	111	409	51	54	780	602	7	14	29	479	7	79
RTOR Reduction (vph)	0	6	0	0	90	0	0	28	0	0	10	0
Lane Group Flow (vph)	111	454	0	54	1292	0	7	15	0	287	268	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.6	60.1		5.5	60.0		5.5	5.5		27.2	27.2	
Effective Green, g (s)	5.6	60.1		5.5	60.0		5.5	5.5		27.2	27.2	
Actuated g/C Ratio	0.05	0.52		0.05	0.52		0.05	0.05		0.24	0.24	
Clearance Time (s)	4.2	4.6		4.2	4.6		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	79	1679		78	1593		78	73		367	357	
v/s Ratio Prot	c0.07	0.14		0.03	c0.42		0.00	c0.01		c0.18	0.18	
v/s Ratio Perm												
v/c Ratio	1.41	0.27		0.69	0.81		0.09	0.21		0.78	0.75	
Uniform Delay, d1	55.0	15.5		54.2	23.0		52.6	52.9		41.4	41.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	241.8	0.1		19.2	3.3		0.5	1.4		10.4	8.6	
Delay (s)	296.8	15.6		73.4	26.4		53.1	54.4		51.7	49.6	
Level of Service	F	B		E	C		D	D		D	D	
Approach Delay (s)		70.2			28.1			54.2			50.7	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	17.2
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	480	275	345	830	0	0	0	0	450	10	505
Future Volume (veh/h)	0	480	275	345	830	0	0	0	0	450	10	505
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	571	0	397	954	0				514	0	491
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	2039	912	495	2740	0				823	0	367
Arrive On Green	0.00	0.62	0.00	0.05	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	571	0	397	954	0				514	0	491
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	6.4	0.0	9.8	18.6	0.0				11.1	0.0	20.0
Cycle Q Clear(g_c), s	0.0	6.4	0.0	9.8	18.6	0.0				11.1	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2039	912	495	2740	0				823	0	367
V/C Ratio(X)	0.00	0.28	0.00	0.80	0.35	0.00				0.62	0.00	1.34
Avail Cap(c_a), veh/h	0	2039	912	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.9	0.0	36.7	11.5	0.0				26.7	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.1	0.0	0.0				1.1	0.0	169.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.9	0.0	4.4	8.5	0.0				5.1	0.0	25.3
LnGrp Delay(d),s/veh	0.0	7.3	0.0	36.8	11.6	0.0				27.8	0.0	199.4
LnGrp LOS		A		D	B					C		F
Approach Vol, veh/h		571			1351						1005	
Approach Delay, s/veh		7.3			19.0						111.6	
Approach LOS		A			B						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.1	55.3		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	11.8	8.4		22.0		20.6		
Green Ext Time (p_c), s	0.6	6.0		0.0		14.2		

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	545	0	0	595	500	580	270	600	0	0	0
Future Volume (veh/h)	390	545	0	0	595	500	580	270	600	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	443	619	0	0	676	526	518	566	466			
Adj No. of Lanes	2	2	0	0	2	0	1	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	518	2063	0	0	719	556	411	432	367			
Arrive On Green	0.32	1.00	0.00	0.00	0.41	0.41	0.25	0.25	0.25			
Sat Flow, veh/h	3191	3368	0	0	1851	1363	1645	1727	1468			
Grp Volume(v), veh/h	443	619	0	0	628	574	518	566	466			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1487	1645	1727	1468			
Q Serve(g_s), s	10.4	0.0	0.0	0.0	29.4	29.8	20.0	20.0	20.0			
Cycle Q Clear(g_c), s	10.4	0.0	0.0	0.0	29.4	29.8	20.0	20.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.92	1.00		1.00			
Lane Grp Cap(c), veh/h	518	2063	0	0	669	606	411	432	367			
V/C Ratio(X)	0.85	0.30	0.00	0.00	0.94	0.95	1.26	1.31	1.27			
Avail Cap(c_a), veh/h	798	2063	0	0	669	606	411	432	367			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.84	0.84	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	26.1	0.0	0.0	0.0	22.7	22.9	30.0	30.0	30.0			
Incr Delay (d2), s/veh	3.0	0.3	0.0	0.0	22.8	25.6	135.2	155.6	141.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.8	0.1	0.0	0.0	17.5	16.4	24.5	28.1	22.4			
LnGrp Delay(d),s/veh	29.1	0.3	0.0	0.0	45.5	48.4	165.2	185.6	171.2			
LnGrp LOS	C	A			D	D	F	F	F			
Approach Vol, veh/h		1062			1202			1550				
Approach Delay, s/veh		12.3			46.9			174.4				
Approach LOS		B			D			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		55.4			17.7	37.7		24.6
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		48.3			* 20	25.6		20.0
Max Q Clear Time (g_c+I1), s		2.0			12.4	31.8		22.0
Green Ext Time (p_c), s		9.8			0.6	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	89.1
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	8.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	200	100	385	100	10	155
Future Vol, veh/h	200	100	385	100	10	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	69	69	78	78
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	339	169	558	145	13	199

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	508	0	1685	424
Stage 1	-	-	-	-	424	-
Stage 2	-	-	-	-	1261	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1017	-	99	613
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	257	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1017	-	40	613
Mov Cap-2 Maneuver	-	-	-	-	40	-
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	257	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.1	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	40	613	-	-	1017	-
HCM Lane V/C Ratio	0.321	0.324	-	-	0.549	-
HCM Control Delay (s)	132.8	13.7	-	-	12.8	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	1.1	1.4	-	-	3.4	-



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	85	0	180	90	115	50	20	50	150	100	250	1155
Future Volume (vph)	85	0	180	90	115	50	20	50	150	100	250	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Lane Util. Factor		1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95
Frt		1.00	0.95		1.00	0.96		1.00	0.94		1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1641	3117		1641	1652		1641	3084		1641	3282
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1641	3117		1641	1652		1641	3084		1641	3282
Peak-hour factor, PHF	0.86	0.92	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	99	0	209	105	164	71	29	57	170	114	284	1312
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	99	273	0	164	100	0	57	284	0	284	1313
Turn Type	Split	Split	NA		Split	NA		Prot	NA		Prot	NA
Protected Phases	3	3	3		7	7		1	6		5	2
Permitted Phases												
Actuated Green, G (s)		13.3	13.3		14.5	14.5		6.7	22.7		15.8	31.8
Effective Green, g (s)		13.3	13.3		14.5	14.5		6.7	22.7		15.8	31.8
Actuated g/C Ratio		0.14	0.14		0.15	0.15		0.07	0.23		0.16	0.33
Clearance Time (s)		5.1	5.1		5.1	5.1		4.7	5.5		4.7	5.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0		2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		224	425		244	245		112	718		266	1071
v/s Ratio Prot		0.06	c0.09		c0.10	0.06		0.03	0.09		c0.17	c0.40
v/s Ratio Perm												
v/c Ratio		0.44	0.64		0.67	0.41		0.51	0.40		1.07	1.23
Uniform Delay, d1		38.6	39.8		39.2	37.6		43.8	31.6		40.8	32.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	2.5		5.6	0.4		1.3	0.8		74.2	110.1
Delay (s)		39.1	42.3		44.8	38.0		45.1	32.3		115.0	142.9
Level of Service		D	D		D	D		D	C		F	F
Approach Delay (s)			41.5			42.2			34.4			116.4
Approach LOS			D			D			C			F

Intersection Summary			
HCM 2000 Control Delay	89.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	25.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR	SWL	SWR
Lane Configurations			
Traffic Volume (vph)	355	30	30
Future Volume (vph)	355	30	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00
Frt	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00
Satd. Flow (prot)	1468	1641	1468
Flt Permitted	1.00	0.95	1.00
Satd. Flow (perm)	1468	1641	1468
Peak-hour factor, PHF	0.88	0.92	0.92
Adj. Flow (vph)	403	33	33
RTOR Reduction (vph)	106	0	0
Lane Group Flow (vph)	297	33	33
Turn Type	Perm	Prot	Prot
Protected Phases		4	4
Permitted Phases	2		
Actuated Green, G (s)	31.8	5.6	5.6
Effective Green, g (s)	31.8	5.6	5.6
Actuated g/C Ratio	0.33	0.06	0.06
Clearance Time (s)	5.5	5.1	5.1
Vehicle Extension (s)	5.0	2.0	2.0
Lane Grp Cap (vph)	479	94	84
v/s Ratio Prot		0.02	c0.02
v/s Ratio Perm	0.20		
v/c Ratio	0.62	0.35	0.39
Uniform Delay, d1	27.7	44.2	44.3
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.8	1.1
Delay (s)	31.2	45.0	45.4
Level of Service	C	D	D
Approach Delay (s)		45.2	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	5	0	0	0	0	135	105	25	405	10
Future Vol, veh/h	5	0	5	0	0	0	0	135	105	25	405	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	75	75	75	74	74	74	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	13	0	13	0	0	0	0	182	142	27	445	11

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	758	829	451			456	0	0	324	0	0
Stage 1	505	505	-			-	-	-	-	-	-
Stage 2	253	324	-			-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3			4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-			-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39			2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	364	297	592			1064	-	-	1192	-	-
Stage 1	590	527	-			-	-	-	-	-	-
Stage 2	771	636	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	356	0	592			1064	-	-	1192	-	-
Mov Cap-2 Maneuver	356	0	-			-	-	-	-	-	-
Stage 1	576	0	-			-	-	-	-	-	-
Stage 2	771	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1064	-	-	445	1192	-	-
HCM Lane V/C Ratio	-	-	-	0.059	0.023	-	-
HCM Control Delay (s)	0	-	-	13.6	8.1	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	10	210	10	130	10	135	0	0	385	20
Future Vol, veh/h	5	0	10	210	10	130	10	135	0	0	385	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	31	31	31	89	89	89	85	85	74	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	16	0	32	236	11	146	12	159	0	0	414	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	687	608	425	624	619	159	436	0	-	-	-	0
Stage 1	425	425	-	183	183	-	-	-	-	-	-	-
Stage 2	262	183	-	441	436	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	351	400	612	387	394	866	1082	-	0	0	-	-
Stage 1	592	573	-	800	733	-	-	-	0	0	-	-
Stage 2	726	733	-	580	566	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	284	396	612	363	390	866	1082	-	-	-	-	-
Mov Cap-2 Maneuver	397	467	-	444	457	-	-	-	-	-	-	-
Stage 1	585	573	-	791	725	-	-	-	-	-	-	-
Stage 2	588	725	-	549	566	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	17.3	0.6	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1082	-	518	444	814	-	-
HCM Lane V/C Ratio	0.011	-	0.093	0.531	0.193	-	-
HCM Control Delay (s)	8.4	-	12.7	21.9	10.5	-	-
HCM Lane LOS	A	-	B	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	3	0.7	-	-

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	310	0	0	0	0	0	40	55
Future Vol, veh/h	0	0	0	40	310	0	0	0	0	0	40	55
Peak Hour Factor	0.25	0.25	0.25	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	0	52	403	0	0	0	0	0	53	73
Number of Lanes	0	0	0	0	2	0	0	0	0	0	1	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	1	0
HCM Control Delay	10.2	8.7
HCM LOS	B	A

Lane	WBLn1	WBLn2	SBLn1
Vol Left, %	28%	0%	0%
Vol Thru, %	72%	100%	42%
Vol Right, %	0%	0%	58%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	143	207	95
LT Vol	40	0	0
Through Vol	103	207	40
RT Vol	0	0	55
Lane Flow Rate	186	268	127
Geometry Grp	7	7	2
Degree of Util (X)	0.266	0.373	0.167
Departure Headway (Hd)	5.14	5.001	4.75
Convergence, Y/N	Yes	Yes	Yes
Cap	704	725	756
Service Time	2.84	2.701	2.769
HCM Lane V/C Ratio	0.264	0.37	0.168
HCM Control Delay	9.7	10.6	8.7
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.1	1.7	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	110	40	20	30	20	50	100	100	50	70	40
Future Volume (veh/h)	80	110	40	20	30	20	50	100	100	50	70	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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
Adj Sat Flow, veh/h/ln	1900	1727	1900	1900	1727	1900	1727	1727	1900	1727	1727	1900
Adj Flow Rate, veh/h	111	153	53	22	33	22	63	127	126	71	100	57
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	1	1	0
Peak Hour Factor	0.72	0.72	0.72	0.91	0.91	0.91	0.79	0.79	0.79	0.70	0.70	0.70
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	372	386	139	298	329	219	561	274	272	479	355	203
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	718	1619	582	459	1379	921	1136	797	791	1040	1034	589
Grp Volume(v), veh/h	183	0	134	43	0	34	63	0	253	71	0	157
Grp Sat Flow(s),veh/h/ln	1450	0	1469	1349	0	1409	1136	0	1588	1040	0	1623
Q Serve(g_s), s	2.0	0.0	2.2	0.0	0.0	0.5	1.2	0.0	3.6	1.6	0.0	2.0
Cycle Q Clear(g_c), s	3.0	0.0	2.2	2.2	0.0	0.5	3.2	0.0	3.6	5.2	0.0	2.0
Prop In Lane	0.61		0.40	0.51		0.65	1.00		0.50	1.00		0.36
Lane Grp Cap(c), veh/h	547	0	350	511	0	336	561	0	546	479	0	558
V/C Ratio(X)	0.34	0.00	0.38	0.08	0.00	0.10	0.11	0.00	0.46	0.15	0.00	0.28
Avail Cap(c_a), veh/h	1481	0	1330	1397	0	1276	1437	0	1770	1281	0	1809
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.2	8.5	0.0	8.5	8.0	0.0	7.4	9.4	0.0	6.8
Incr Delay (d2), s/veh	0.4	0.0	0.7	0.1	0.0	0.1	0.1	0.0	0.6	0.1	0.0	0.3
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	1.3	0.0	0.9	0.3	0.0	0.2	0.4	0.0	1.6	0.5	0.0	0.9
LnGrp Delay(d),s/veh	9.8	0.0	9.8	8.6	0.0	8.7	8.1	0.0	8.0	9.5	0.0	7.1
LnGrp LOS	A		A	A		A	A		A	A		A
Approach Vol, veh/h		317			77			316			228	
Approach Delay, s/veh		9.8			8.6			8.0			7.9	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.9		12.8		15.9		12.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		32.0		26.0		32.0		26.0
Max Q Clear Time (g_c+I1), s		5.6		5.0		7.2		4.2
Green Ext Time (p_c), s		1.8		1.8		1.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	200	110	0	0	0	25	120	85	210	315	200
Future Vol, veh/h	55	200	110	0	0	0	25	120	85	210	315	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	95	95	95	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	60	217	120	0	0	0	26	126	89	228	342	217

Major/Minor	Minor2				Major1			Major2		
Conflicting Flow All	1130	1174	451		559	0	0	215	0	0
Stage 1	907	907	-		-	-	-	-	-	-
Stage 2	223	267	-		-	-	-	-	-	-
Critical Hdwy	5.5	6.6	6.3		4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	5.5	5.6	-		-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-		-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39		2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	297	~ 185	592		973	-	-	1309	-	-
Stage 1	381	344	-		-	-	-	-	-	-
Stage 2	796	674	-		-	-	-	-	-	-
Platoon blocked, %						-	-		-	-
Mov Cap-1 Maneuver	239	0	592		973	-	-	1309	-	-
Mov Cap-2 Maneuver	239	0	-		-	-	-	-	-	-
Stage 1	306	0	-		-	-	-	-	-	-
Stage 2	796	0	-		-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	109.8	1	2.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	973	-	-	239	592	1309	-	-
HCM Lane V/C Ratio	0.027	-	-	1.16	0.202	0.174	-	-
HCM Control Delay (s)	8.8	-	-	151.7	12.6	8.3	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	12.9	0.8	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	375	35	0	0	0	0	0	0	40	20	0
Future Vol, veh/h	0	375	35	0	0	0	0	0	0	40	20	0
Peak Hour Factor	0.77	0.77	0.77	0.25	0.25	0.25	0.53	0.53	0.53	0.70	0.70	0.70
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	487	45	0	0	0	0	0	0	57	29	0
Number of Lanes	0	2	0	0	0	0	0	0	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	2
HCM Control Delay	10.6	9.1
HCM LOS	B	A

Lane	EBLn1	EBLn2	SBLn1
Vol Left, %	0%	0%	67%
Vol Thru, %	100%	78%	33%
Vol Right, %	0%	22%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	250	160	60
LT Vol	0	0	40
Through Vol	250	125	20
RT Vol	0	35	0
Lane Flow Rate	325	208	86
Geometry Grp	7	7	2
Degree of Util (X)	0.444	0.275	0.127
Departure Headway (Hd)	4.921	4.768	5.345
Convergence, Y/N	Yes	Yes	Yes
Cap	737	758	672
Service Time	2.621	2.468	3.364
HCM Lane V/C Ratio	0.441	0.274	0.128
HCM Control Delay	11.5	9.3	9.1
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.3	1.1	0.4

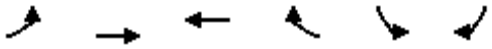
Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	30	45	5	10	20	195	0	0	425	35
Future Vol, veh/h	5	0	30	45	5	10	20	195	0	0	425	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	67	67	67	74	74	74	86	86	83
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	6	0	34	67	7	15	27	264	0	0	494	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	844	833	515	850	854	264	536	0	-	-	-	0
Stage 1	515	515	-	318	318	-	-	-	-	-	-	-
Stage 2	329	318	-	532	536	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	-	-	-
Pot Cap-1 Maneuver	274	296	544	272	287	756	993	-	0	0	-	-
Stage 1	528	522	-	677	639	-	-	-	0	0	-	-
Stage 2	667	639	-	517	511	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	259	288	544	250	279	756	993	-	-	-	-	-
Mov Cap-2 Maneuver	374	389	-	354	372	-	-	-	-	-	-	-
Stage 1	514	522	-	659	622	-	-	-	-	-	-	-
Stage 2	628	622	-	485	511	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	17	0.8	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	993	-	511	390	-	-
HCM Lane V/C Ratio	0.027	-	0.078	0.23	-	-
HCM Control Delay (s)	8.7	-	12.6	17	-	-
HCM Lane LOS	A	-	B	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.9	-	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	340	125	95	165	90
Future Volume (veh/h)	150	340	125	95	165	90
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1727	1727	1727	1900	1727	1727
Adj Flow Rate, veh/h	190	430	151	112	209	114
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.79	0.79	0.83	0.83	0.79	0.79
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	548	742	396	294	334	298
Arrive On Green	0.43	0.43	0.43	0.43	0.20	0.20
Sat Flow, veh/h	1031	1727	922	684	1645	1468
Grp Volume(v), veh/h	190	430	0	263	209	114
Grp Sat Flow(s),veh/h/ln	1031	1727	0	1607	1645	1468
Q Serve(g_s), s	5.0	6.2	0.0	3.6	3.8	2.2
Cycle Q Clear(g_c), s	8.7	6.2	0.0	3.6	3.8	2.2
Prop In Lane	1.00			0.43	1.00	1.00
Lane Grp Cap(c), veh/h	548	742	0	690	334	298
V/C Ratio(X)	0.35	0.58	0.00	0.38	0.63	0.38
Avail Cap(c_a), veh/h	958	1428	0	1328	1310	1169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	7.1	0.0	6.4	11.9	11.2
Incr Delay (d2), s/veh	0.4	0.7	0.0	0.3	1.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	3.0	0.0	1.7	1.9	1.0
LnGrp Delay(d),s/veh	9.7	7.8	0.0	6.7	13.8	12.1
LnGrp LOS	A	A		A	B	B
Approach Vol, veh/h		620	263		323	
Approach Delay, s/veh		8.4	6.7		13.2	
Approach LOS		A	A		B	

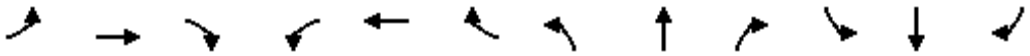
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		20.0				20.0		12.6
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		27.0				27.0		26.0
Max Q Clear Time (g_c+I1), s		10.7				5.6		5.8
Green Ext Time (p_c), s		3.4				1.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	555	65	430	175	35	220
Future Volume (vph)	555	65	430	175	35	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.0	4.6	4.6	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1703		1641	1727	1650	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	1703		1641	1727	1650	
Peak-hour factor, PHF	0.78	0.78	0.92	0.92	0.54	1.00
Adj. Flow (vph)	712	83	467	190	65	220
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	792	0	467	190	285	0
Heavy Vehicles (%)	10%	10%	10%	10%	2%	2%
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	50.4		30.0	84.4	23.4	
Effective Green, g (s)	50.4		30.0	84.4	23.4	
Actuated g/C Ratio	0.43		0.26	0.72	0.20	
Clearance Time (s)	4.6		4.0	4.6	4.6	
Vehicle Extension (s)	3.0		2.0	3.0	1.5	
Lane Grp Cap (vph)	733		420	1245	330	
v/s Ratio Prot	c0.47		c0.28	0.11	c0.17	
v/s Ratio Perm						
v/c Ratio	1.08		1.11	0.15	0.86	
Uniform Delay, d1	33.3		43.5	5.1	45.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	57.2		77.9	0.1	19.6	
Delay (s)	90.5		121.4	5.2	64.8	
Level of Service	F		F	A	E	
Approach Delay (s)	90.5			87.8	64.8	
Approach LOS	F			F	E	

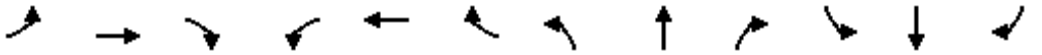
Intersection Summary			
HCM 2000 Control Delay	85.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	117.0	Sum of lost time (s)	17.7
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	690	20	100	545	360	0	5	40	630	25	60
Future Volume (vph)	65	690	20	100	545	360	0	5	40	630	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.94			0.87		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (prot)	1641	3268		1641	3086			1495		1559	1541	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	0.96	
Satd. Flow (perm)	1641	3268		1641	3086			1495		1559	1541	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.77	0.77	0.77	0.85	0.85	0.85
Adj. Flow (vph)	79	841	24	111	606	400	0	6	52	741	29	71
RTOR Reduction (vph)	0	2	0	0	97	0	0	49	0	0	7	0
Lane Group Flow (vph)	79	863	0	111	909	0	0	9	0	422	412	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	5.9	28.2		8.1	30.4			5.3		28.8	28.8	
Effective Green, g (s)	5.9	28.2		8.1	30.4			5.3		28.8	28.8	
Actuated g/C Ratio	0.07	0.32		0.09	0.35			0.06		0.33	0.33	
Clearance Time (s)	4.2	4.6		4.2	4.6			4.2		4.2	4.2	
Vehicle Extension (s)	2.0	3.5		2.0	3.5			3.0		3.0	3.0	
Lane Grp Cap (vph)	110	1052		151	1070			90		512	506	
v/s Ratio Prot	0.05	0.26		c0.07	c0.29			c0.01		c0.27	0.27	
v/s Ratio Perm												
v/c Ratio	0.72	0.82		0.74	0.85			0.10		0.82	0.81	
Uniform Delay, d1	40.0	27.4		38.7	26.5			38.9		27.1	27.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	16.9	5.4		14.7	6.6			0.5		10.4	9.8	
Delay (s)	57.0	32.7		53.4	33.1			39.4		37.4	36.7	
Level of Service	E	C		D	C			D		D	D	
Approach Delay (s)		34.8			35.1			39.4			37.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	730	625	600	430	0	0	0	0	555	5	575
Future Volume (veh/h)	0	730	625	600	430	0	0	0	0	555	5	575
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1727	1727	1727	0				1727	1727	1727
Adj Flow Rate, veh/h	0	869	0	690	494	0				628	0	561
Adj No. of Lanes	0	2	1	2	2	0				2	0	1
Peak Hour Factor	0.84	0.84	0.84	0.87	0.87	0.87				0.89	0.89	0.89
Percent Heavy Veh, %	0	10	10	10	10	0				10	10	10
Cap, veh/h	0	1754	785	771	2740	0				823	0	367
Arrive On Green	0.00	0.53	0.00	0.08	0.28	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	3368	1468	3191	3368	0				3290	0	1468
Grp Volume(v), veh/h	0	869	0	690	494	0				628	0	561
Grp Sat Flow(s),veh/h/ln	0	1641	1468	1596	1641	0				1645	0	1468
Q Serve(g_s), s	0.0	13.4	0.0	17.1	9.2	0.0				14.2	0.0	20.0
Cycle Q Clear(g_c), s	0.0	13.4	0.0	17.1	9.2	0.0				14.2	0.0	20.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1754	785	771	2740	0				823	0	367
V/C Ratio(X)	0.00	0.50	0.00	0.89	0.18	0.00				0.76	0.00	1.53
Avail Cap(c_a), veh/h	0	1754	785	798	2740	0				823	0	367
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.47	0.00	0.09	0.09	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.8	0.0	35.8	8.1	0.0				27.8	0.0	30.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.3	0.0	0.0				3.9	0.0	251.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.2	0.0	7.7	4.2	0.0				6.8	0.0	33.7
LnGrp Delay(d),s/veh	0.0	12.3	0.0	37.1	8.1	0.0				31.7	0.0	281.2
LnGrp LOS		B		D	A					C		F
Approach Vol, veh/h		869			1184						1189	
Approach Delay, s/veh		12.3			25.0						149.4	
Approach LOS		B			C						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	24.0	48.4		25.1		72.4		
Change Period (Y+Rc), s	* 4.7	5.1		5.1		* 5.1		
Max Green Setting (Gmax), s	* 20	25.1		20.0		* 50		
Max Q Clear Time (g_c+I1), s	19.1	15.4		22.0		11.2		
Green Ext Time (p_c), s	0.2	6.0		0.0		7.2		

Intersection Summary	
HCM 2010 Ctrl Delay	67.2
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	465	825	0	0	760	705	270	5	550	0	0	0
Future Volume (veh/h)	465	825	0	0	760	705	270	5	550	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1727	1727	0	0	1727	1900	1727	1727	1727			
Adj Flow Rate, veh/h	528	938	0	0	864	744	204	0	627			
Adj No. of Lanes	2	2	0	0	2	0	1	0	2			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89			
Percent Heavy Veh, %	10	10	0	0	10	10	10	10	10			
Cap, veh/h	585	2252	0	0	766	621	317	0	565			
Arrive On Green	0.37	1.00	0.00	0.00	0.44	0.44	0.19	0.00	0.19			
Sat Flow, veh/h	3191	3368	0	0	1810	1398	1645	0	2936			
Grp Volume(v), veh/h	528	938	0	0	820	788	204	0	627			
Grp Sat Flow(s),veh/h/ln	1596	1641	0	0	1641	1481	1645	0	1468			
Q Serve(g_s), s	12.5	0.0	0.0	0.0	35.5	35.5	9.1	0.0	15.4			
Cycle Q Clear(g_c), s	12.5	0.0	0.0	0.0	35.5	35.5	9.1	0.0	15.4			
Prop In Lane	1.00		0.00	0.00		0.94	1.00		1.00			
Lane Grp Cap(c), veh/h	585	2252	0	0	729	658	317	0	565			
V/C Ratio(X)	0.90	0.42	0.00	0.00	1.12	1.20	0.64	0.00	1.11			
Avail Cap(c_a), veh/h	610	2252	0	0	729	658	317	0	565			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.47	0.47	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.7	0.0	0.0	0.0	22.2	22.2	29.8	0.0	32.3			
Incr Delay (d2), s/veh	8.5	0.3	0.0	0.0	73.3	103.3	3.5	0.0	71.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.1	0.1	0.0	0.0	30.8	33.3	4.4	0.0	11.8			
LnGrp Delay(d),s/veh	33.2	0.3	0.0	0.0	95.5	125.5	33.3	0.0	103.7			
LnGrp LOS	C	A			F	F	C		F			
Approach Vol, veh/h		1466			1608			831				
Approach Delay, s/veh		12.1			110.2			86.4				
Approach LOS		B			F			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		60.0			19.4	40.6		20.0
Change Period (Y+Rc), s		5.1			* 4.7	5.1		4.6
Max Green Setting (Gmax), s		54.9			* 15	34.9		15.4
Max Q Clear Time (g_c+I1), s		2.0			14.5	37.5		17.4
Green Ext Time (p_c), s		17.7			0.1	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	68.3
HCM 2010 LOS	E

Notes

Appendix L
City of National City Municipal Code

18.24.080 - Parking requirements.

A. Purpose. This section establishes parking standards that apply to the mixed-use zones.

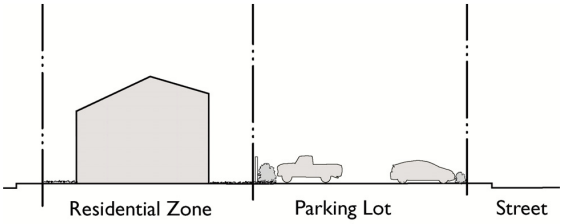
B. Required On-Site Parking. Off-street parking shall be provided pursuant to Chapter 18.45.

C. Parking Structures. All multi-story parking structures shall be lined with commercial, retail or residential uses on the ground floor at street frontages, except for the pedestrian and vehicular entries into the parking structure.

D. Parking Buffers.

1. Surface parking lots abutting a public sidewalk or street shall provide a landscaped buffer a minimum of two feet in width and three feet in height along the perimeter of the parking lot abutting the sidewalk or street.
2. A landscaped buffer at least three feet in width and six feet in height shall be provided for any surface parking lot abutting a residential zone.

Landscaped Parking Buffer Standards



E. Parking Costs.

1. The payment of parking costs shall be separate from rent payments or purchase prices for all uses located within the mixed-use zones.
2. All places of employment within the mixed-use zone shall offer a parking cash-out program that allows employees to receive either owner-subsidized free parking or a cash payment equal to the value of the parking subsidy.

F. Alley Access. For new development on property adjacent to a rear alley, vehicle and service access to the property shall be provided only through the rear alley.

G. Driveways.

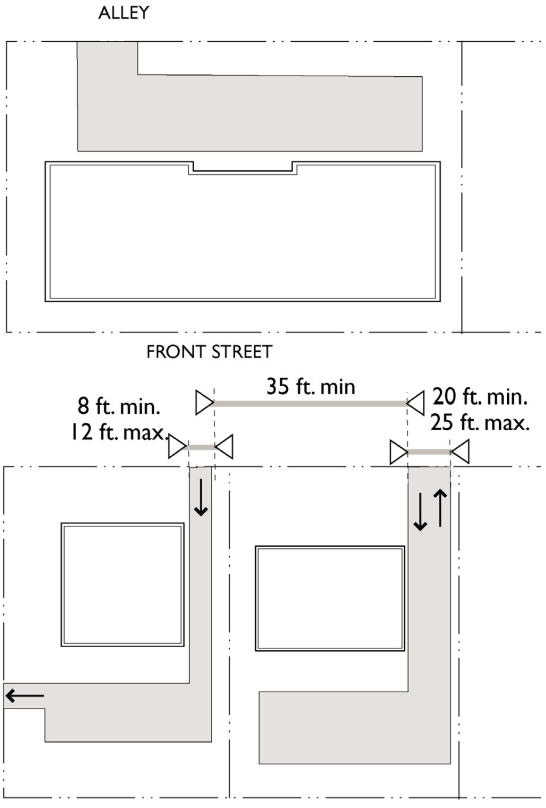
1. New driveways comply with the following standards.
    a. Dimensions. Driveways shall comply with the dimension standards shown in Table 18.24.080B (Driveway Dimension Standards).
    b. Number. No more than one driveway approach shall be provided for every fifty feet of street frontage.
    c. Proximity. A new curb cut providing access to a driveway from a public street shall be separated a minimum distance of thirty-five feet from any other curb cut.
    d. Parking. Parking spaces shall not be located along the sides of a driveway.

TABLE 18.24.080B

Driveway Dimension Standards

Driveway Type	Driveway Width	
	Minimum	Maximum
1-way	8'	12'
2-way	20'	25'

2. The Community Development Director may approve exceptions to the driveway requirements in subsection (1) above in the case of shared or joint use of driveways and parking lots.



Vehicle Access Standards

(Ord. No. 2012-2372, Exh. B-1, 2-7-2012)

~~CHAPTER~~ DIVISION 4

GENERAL DESIGN AND DEVELOPMENT REGULATIONS

~~SECTION~~CHAPTER 18-40 – GENERAL STANDARDS

18.40.010 Purpose
18.40.020 Applicability
18.40.030 Performance Standards for All Development and Land Uses

~~SECTION~~CHAPTER 18-41 – SITE PLANNING STANDARDS

18.41.010 Purpose
18.41.020 Non-Residential Site Planning Standards
18.41.030 Multi-Unit Residential Site Planning Standards
18.41.040 Common Usable Open Space Requirements

~~SECTION~~CHAPTER 18-42 – BUILDING DESIGN STANDARDS

18.42.010 Purpose
18.42.020 Projections into Setbacks and Courts
18.42.030 Accessory Structures
18.42.040 Screening Mechanical Equipment and Elevator Housing
18.42.050 Commercial and Institutional Building Design Standards
18.42.060 Industrial Building Design Standards
18.42.070 Residential Building Design Standards

~~SECTION~~CHAPTER 18-43 – FENCES AND WALLS

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18.43.020 Screening Requirements
18.43.030 Parking Lots
18.43.040 Materials, Construction, and Maintenance
18.43.050 Maximum Height
18.43.060 Prohibited Fences
18.43.070 Entry Arbors
18.43.080 Openings in View-Obscuring Fences
18.43.090 Special Fences
18.43.100 Traffic Visibility Triangles

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18.44.020 Applicability
18.44.030 Definitions
18.44.040 Landscape Plan
18.44.050 Requirements
18.44.060 Plant Materials
18.44.070 Turf Lawn
18.44.080 Soils and Mulching
18.44.090 Minimum Percentage of Net Lot Area to be Landscaped
18.44.100 Statuary Structures and Other Lawn Art
18.44.110 Landscape Location Requirements
18.44.120 Tree Preservation

18.44.130 Landscaping Work Included in Building Permit Inspections
18.44.140 Traffic Visibility Triangles
18.44.150 Maintenance Required
18.44.160 Certain Trees a Public Nuisance
18.44.170 Nonconforming Landscaping
18.44.180 Public Utilities
18.44.190 Water Efficient Landscape Regulations

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18.45.010 Purpose and Intent
18.45.020 Requirements, General
18.45.030 Offsite Facilities
18.45.040 Site Plan Review Required
18.45.050 Off-Street Parking Requirement by Land Use
18.45.060 Westside Specific Plan Parking Requirements
18.45.070 Parking for Commercial Vehicles
18.45.080 Opportunities for Reduced Parking
18.45.090 Parking for Disabled Persons
18.45.100 Parking Lot Design Standards
18.45.110 Loading Requirements
18.45.120 Bicycle Parking

~~SECTION~~CHAPTER 18-46 – OUTDOOR LIGHTING

18.46.010 Purpose
18.46.020 Applicability
18.46.030 General Standards
18.46.040 Lighting Plan Requirements
18.46.050 Security Lighting
18.46.060 Accent Lighting
18.46.070 Lighting Standards for Uses with 50 Feet of Residential Zones
18.46.080 Parking Lot Lighting
18.46.090 Lighting of Outdoor Performance Sport and Recreational Facilities
18.46.100 Lighting for Multi Unit Attached Residential Projects
18.46.110 Standards for Single Family Residential Uses

~~SECTION~~CHAPTER 18-47 – SIGNS AND OUTDOOR ADVERTISING DISPLAYS

18.47.010 Purpose
18.47.020 Site Plan Review and/or Sign Permit Required
18.47.030 Unlawful Display of Signs or Banners Prohibited
18.47.040 Definitions
18.47.050 Design and Maintenance
18.47.060 Permanent Signs Permitted in all Zones
18.47.070 Large Permanent Signs in Commercial, Industrial, Mixed-Use, and Institutional Zones
18.47.080 Large Permanent Signs in Shopping Centers
18.47.090 Small Permanent Signs in Commercial, Industrial, Institutional, Mixed-Use, and Multi-Family Zones
18.47.100 Pole-Mounted or Freestanding Signs in Commercial, Industrial, Mixed-Use, and Institutional Zones
18.47.110 Roof-Mounted Signs
18.47.120 Revolving Signs in Commercial and Industrial Zones
18.47.130 Temporary Signs Permitted in All Zones
18.47.140 Projecting Signs in Commercial, Industrial, Mixed-Use, and Institutional Zones

18.47.150 Vehicle Signs
18.47.160 Public Assembly Use Signs
18.47.170 Mural Type Signs in Commercial and Mixed-Use Zones
18.47.180 Digital Advertising Display (DAD) Signs
18.47.190 Flags, Banners, and Pennants
18.47.200 Signs Prohibited in All Zones
18.47.210 Master Sign Program
18.47.220 Removal from Abandoned Site or Building
18.47.230 Nonconforming Signs
18.47.240 Constitutional Severability
18.47.250 Non-Commercial Speech
18.47.260 Sign Regulations by Zone and Type
18.47.270 Signs for Special Uses

~~SECTION~~CHAPTER 18-48 – DENSITY BONUS AND AFFORDABLE HOUSING INCENTIVES

18.48.010 Purpose
18.48.020 Definitions
18.48.030 Density Bonus
18.48.040 Concessions, Incentives, and Development Standards
18.48.050 Application Requirements and Review
18.48.060 Density Bonus Housing Agreement

~~SECTION~~CHAPTER 18-40 GENERAL STANDARDS

18.40.010 Purpose
18.40.020 Applicability
18.40.030 Performance Standards for All Development and Land Uses

18.40.010 PURPOSE

This chapter expands upon the standards of Chapter 2 by addressing details of site planning, building design, landscaping, parking and loading, outdoor lighting, and signs and outdoor advertising displays. These standards are intended to ensure that all development produces an environment of stable and desirable character, is compatible with existing and future development, and protects the use and enjoyment of neighboring properties, consistent with the General Plan.

18.40.020 APPLICABILITY

The requirements of this chapter shall apply to existing and new development and land uses and shall be considered in combination with the standards for the applicable zone in Chapter 2 and Specific Use Regulations in Chapter 3. If there is conflict, the standards in Chapter 3 shall control.

18.40.030 PERFORMANCE STANDARDS FOR ALL DEVELOPMENT AND LAND USES

A. Purpose

This section provides performance standards that are designed to minimize various potential operational impacts of land uses and development within the city, and promote compatibility with adjoining areas and land uses.

B. Applicability

The provisions of this section apply to all new and existing land uses, in all zones, unless an exemption is specifically provided.

C. Noise

No use shall be established nor any activity conducted which violates the standards of the Noise Control Ordinance--Title 12 of the Municipal Code.

D. Air emissions

Other than as permitted by the County of San Diego Air Pollution Control District, no visible dust, gasses, or smoke shall be emitted.

E. Combustibles and explosives

The use, handling, storage, and transportation of combustibles and explosives shall comply with the Uniform Fire Code and California Code of Regulations Title 19.

F. Dust

1. Activities that may generate dust emissions (e.g., construction, grading, commercial gardening, and similar operations) shall be conducted to limit the emissions beyond the site boundary to the maximum extent feasible. Appropriate methods of dust management shall include the following, subject to approval by the Building Division.
   a. Standards for all construction activities. The Building Official may require the following control measures for construction activities when necessary:
      i. Water all active construction areas twice per day and use erosion control measures to

prevent water runoff containing silt and debris from entering the streets and storm drain system;

ii. Cover trucks hauling soil, sand, and other loose material;

iii. Pave, water, or apply non-toxic soil stabilizers on unpaved access roads and parkina areas;

iv. Sweep and collect (i.e., vacuum) paved access roads and parking areas daily; and

v. Sweep and collect (i.e., vacuum) streets daily if visible material is carried onto adjacent public streets.

b. Additional standards for large construction sites. When construction is proposed on a site of four acres or larger, the following measures will be required in addition to those above when determined by the Building Official to be necessary:

i. Hydroseed or apply non-toxic soil stabilizers to inactive construction areas;

ii. Enclose, cover, water, or apply non-toxic soil binders to open materials stockpiles;

iii. Limit traffic speeds to 15 mph on unpaved access roads:

iv. Install erosion control measures to prevent silt runoff onto public roadways;

v. Replant vegetation in disturbed areas within ten days after project completion;

vi. Install wheel washers for exiting trucks, or wash all equipment leaving site;

vii. Install wind breaks, or plant trees/vegetation at windward sides of construction areas, or avoid removing existing vegetation which acts as a windbreak;

viii. Suspend excavation and grading activity when winds exceed 25 mph; and,

ix. Limit area subject to excavation, grading, and other construction activities at any one time.

G. Ground vibration

No ground vibration shall be generated that is perceptible without instruments by a reasonable person at the property lines of the site, except for vibrations from temporary construction or demolition activities, and motor vehicle operations.

H. Light and glare

1. Outdoor lighting shall comply with the requirements of ~~Section~~ Chapter 18-46 (Outdoor Lighting).
2. Any operation or activity producing glare shall be conducted or shielded so as not to cause illumination in residential zones in excess of five-tenths footcandles. Flickering or intrinsically bright sources of illumination shall be controlled so as not to be a nuisance in residential zones.
3. Illumination levels shall be measured with a photoelectric photometer having a spectral response similar to that of the human eye, following the standard spectral luminous efficiency curve adopted by the Illuminating Engineering Society of North America (IESNA).

I. Liquid waste

No liquid shall be discharged into a public or private body of water, sewage system, watercourse, or into the ground, except in compliance with applicable regulations of the Regional Water Quality Control Board.

J. Odor

1. No obnoxious odor or fumes shall be emitted that are perceptible without instruments by a reasonable person at the property line of the site. For mixed-use buildings, commercial uses that emit odors, such as restaurants and nail salons, shall be properly ventilated to as not to impact adjoining residential uses.
2. No use shall be established nor any activity conducted which violates the standards of the Odor Control Ordinance--Title 7.08—Environmental Conditions of the Municipal Code.

K. Radioactivity, electrical disturbance or electromagnetic interference

None of the following shall be emitted:
1. Radioactivity, in a manner that does not comply with all applicable State and Federal regulations; or
2. Electrical disturbance or electromagnetic interference that interferes with normal radio or television

reception or with the function of other electronic equipment beyond the property line of the site; or that does not comply with all applicable Federal Communications Commission (FCC) and other applicable State and Federal regulations.

~~SECTION~~CHAPTER 18-41 – SITE PLANNING STANDARDS

18.41.010 Purpose
18.41.020 Non-Residential Site Planning Standards
18.41.030 Multi-Unit Residential Site Planning Standards
18.41.040 Common Usable Open Space Requirements

18.41.010 PURPOSE

The purpose of this Chapter ~~section~~ is to provide guidance and standards for site planning for nonresidential and multi-unit residential development in order to enhance safety, convenience and attractiveness for walking, transit use and bicycling; provide safe access to businesses and minimize pedestrian conflicts; and foster an attractive, quality environment to foster community pride and attract desired development and uses.

18.41.020 NON-RESIDENTIAL SITE PLANNING STANDARDS

These standards apply to those areas in the city that will be developed as commercial use without a residential component (mixed-use) or areas where only a commercial use is permitted. This section considers two basic types of development: freestanding buildings and multi-tenant strip developments including mini-malls.

A. Shopping Center Development

1. When shopping centers are set back from the street with parking in front, 30% of the street frontage shall be lined with buildings.
2. Parking lots for shopping centers should provide vehicular connections to adjacent commercial projects.
3. Pedestrian walkways for shopping centers should provide pedestrian connections to adjacent uses.
4. Access drives for commercial centers should be located at least 200 feet apart and at least 100 feet from any major intersection. Access drives should be located a minimum of ten feet from property lines unless a shared drive is provided.
5. For neighborhood-serving and convenience retail centers and office and institutional developments, the first row of parking which is perpendicular to an access drive from a street shall be set back at least 40 feet from the sidewalk to provide adequate queuing distance from the street and for pedestrian safety. Larger community or regional retail centers may require significantly more setback area as determined by the Engineering Division.

B. Freestanding or “Pad” Buildings

1. Except for drive-through/drive-in establishments, parking for freestanding retail or “pad” buildings fronting a public street shall be located a maximum of 20 feet from the property line. Freestanding buildings adjacent to a public street are discouraged from being separated from the sidewalk with parking.
2. The building entry shall be accentuated with architectural details and landscaping.
3. Freestanding restaurants may provide outdoor seating at the building entry.

C. Drive-Through Businesses

1. Minimum vehicular queuing distance shall be established through the conditional use permit process.
2. Drive through business aisles shall have a minimum interior turning radius of 25 feet for any curves.
3. A drive-through window or lane shall not be placed between the right-of-way or internal drive and the associated building unless a ten foot wide landscape strip extending the entire length of the drive-through queuing is installed and maintained with a minimum three foot height continuous hedge and ornamental trees spaced a minimum of 20 feet on center.

D. Industrial Site Planning Standards

Planning standards for industrial buildings and business parks include the following:

1. Services areas shall be located at the sides or rear of buildings. Service areas located at the exterior side of buildings shall be screened from view by a combination of screen walls, landscaping, and/or portions of the building.
2. Loading areas must be designed so that trucks will not need to back in from the public street onto the site.
3. Parking for visitors shall be convenient to the main entrance.
4. Emphasis shall be placed on the building entry.
5. Buildings should be oriented so as to provide space for plazas and courtyards.
6. Outdoor storage and equipment shall be screened from public right-of-ways.

E. Pedestrian Walkways

1. A pedestrian walkway within a retail center, office, industrial or institutional development shall be a minimum of five feet wide. Pedestrian walkways immediately adjacent to and perpendicular to parking stalls shall be a minimum of six feet wide.
2. Materials for pedestrian walkways may include concrete, concrete pavers, brick, stone or combination thereof or materials as approved by the Planning Division.
3. A pedestrian walkway shall provide direct pedestrian access from peripheral sidewalks to the sidewalks that front on-site buildings and building entrances.

18.41.030 MULTI-UNIT RESIDENTIAL SITE PLANNING STANDARDS

A. Pedestrian Access

1. Unit entries adjacent to a street. Multi-unit projects should be designed with each unit adjacent to a street having its primary pedestrian entrance from the street sidewalk, or as forecourt projects with at at least the primary building entrance having access to the street sidewalk. Where individual units have access to the street sidewalk, private “front yard” outdoor space may be differentiated from the public right-of-way by a porch, or small yard (i.e., patio) enclosed by a low wall or fence not to exceed 42 inches in height.
2. Pedestrian walkways shall be provided to every unit entry.
3. Notwithstanding the provisions of Section 4450, et seq., of Chapter 7 of Title 1 of the Municipal Code, containing requirements for facilities necessary to assure access and usability for the physically handicapped, in all multi-unit residential projects the following provisions shall apply:
   a. Safe, convenient, well-drained pedestrian access to dwelling units, parking lots, and service areas, by provision of walks, steps or stepped ramps, so constructed as to assure reasonable durability and economy of maintenance, shall be required.
   b. Pedestrian walkways shall be a minimum of 36 inches in width.
   c. Pedestrian walkways shall be graded or ramped to no steeper than a one-to-twelve slope.

18.41.040 COMMON USABLE OPEN SPACE REQUIREMENTS

A. Purpose

The purpose of this section is to prescribe standards for the development of open space areas provided for the exclusive use of the occupants of a multi-unit residential building.

B. Definitions

1. “Private usable open space” refers to any areas with a minimum area of 60 square feet and devoted to the following private uses: patio, porch, balcony, or private deck.

2. "Common usable open space" refers to active or passive recreational open space for use of the residents and their guests of a multi-unit residential development. Common usable open space may include gardens, playgrounds, courtyards, swimming pools, sitting areas, court games (indoor or outdoor), recreation rooms, exercise rooms or gyms, spas, community rooms, lawn/turf used for open play, ponds, fountains, atriums, picnic areas, rooftop gardens or green roofs, or similar passive or active recreational/leisure uses or facilities that are not used for enclosed dwelling unit floor area or commercial use space.

C. Standards

1. For projects of three units or more, common usable open space shall be required in a minimum amount of 300 square feet per dwelling unit.
2. Private usable open space may be substituted for such common usable open space but may not exceed 100 square feet per unit. Each square foot of private usable open space shall be considered equivalent to two square feet of required common usable open space, and may be so substituted, subject to the minimum requirements for actual common usable open space. All units shall be provided with at least 60 square feet of private usable open space.
3. Both common and private usable open space provided at ground level may be provided in the interior side yard and rear yard setback areas, within courts, and within exterior side yard setback areas to within five feet of the property line.
4. Private usable open space provided above the first floor may be located in the front setback area to within 12 feet of the front property line.
5. Up to a maximum of 40 percent of the required common usable open space may be provided indoors.
6. Common usable open space areas shall be provided with minimum length and width dimensions of 20 feet.
7. See the Westside Specific Plan for other open space requirements related to the MCR-1 and MCR-2 zones.

~~SECTION~~CHAPTER 18-42 – BUILDING DESIGN STANDARDS

18.42.010 Purpose
18.42.020 Projections into Setbacks and Courts
18.42.030 Accessory Structures
18.42.040 Screening Mechanical Equipment and Elevator Housing
18.42.050 Commercial and Institutional Building Design Standards
18.42.060 Industrial Building Design Standards
18.42.070 Residential Building Design Standards

18.42.010 PURPOSE

The purpose of standards for building design and materials is to focus efforts on good design in order to create a quality image for the city, making new buildings and building additions compatible with their surroundings, encourage reinvestment, and improve the city's economic vitality. These standards apply to those areas in the city that will be developed as a commercial or institutional use without a residential component (mixed-use) or areas where only a commercial or institutional use is permitted.

18.42.020 PROJECTIONS INTO SETBACKS AND COURTS

A. Requirements -- General

Every required front, side, and rear setback shall be open and unobstructed from the ground to the sky, unless otherwise provided. In addition to permitted accessory buildings and structures, the following structures may be erected or projected into any required setback:

1. Fences and walls may be erected or projected into any required setback as provided in this section.
2. Cornices, belt courses, sills, eaves, or other similar architectural features (other than bay windows or vertical projections) may project into a required interior side setback not more than two inches for each one foot of width of such side setback, and may project into any other required setback, passageway or other open space not more than 30 inches, provided the width of an exterior side setback is not reduced to less than three feet.
3. Eaves may project into a required interior side setback not more than four inches for each one foot of width of such side setback, provided the width of such side setback is not reduced to less than two and one-half feet. Eaves may also project into any other required setback, passageway or other open space not more than 30 inches, provided the width of an exterior side setback is not reduced to less than two and one-half feet.
4. Chimneys may project into a required setback, passageway or other required open space not more than two feet, provided the width of any required side setback is not reduced to less than three feet.
5. Fire escapes may project into any setback not more than four feet.
6. Open unenclosed stairways or balconies, not covered by a roof or canopy, may project into a required rear setback not more than four feet, and into a required front setback, exterior side setback side or other required open space not more than 30 inches, provided the width of an exterior side setback is not reduced to less than two and one-half feet.
7. Open, unenclosed porches, platforms or landing places, including access stairways, not covered by a roof or canopy, which do not extend above the level of the first floor of the building, may project into any required setback passageway or other open space not more than four feet, provided that in no event shall any such porch, platform or landing place be more than four feet above the adjacent natural ground level.
8. A one-story unenclosed breezeway, not over five feet in width, extending from a main residential building to an accessory parking or other accessory structure, may project into a required rear or exterior side yard setback a distance not to exceed the required setback of the accessory structure.
9. Awnings or canopies without enclosing walls or screening may be attached to the exterior walls of a residential structure provided that:
   a. Such awnings or canopies do not extend more than four feet into a required front setback and have no vertical support within the setback or space;

b. Such awnings or canopies do not extend more than 30 inches into a required side setback, rear setback, or other required open space, but in no event nearer than 30 inches to an interior lot line;
c. Where such awnings or canopies project into a required front or side setback or other required open space, they may extend only over the windows or doors to be protected and for 12 inches on each side thereof.

10. Entry arbors, either freestanding or as part of a fence as provided for in this section.

18.42.030 ACCESSORY STRUCTURES

A. Conditions

Accessory structures and uses may be developed as permitted in this title, provided they are located on the same lot or parcel of land, and are incidental to and do not substantially alter the character of the principal permitted use.

B. Alteration

No accessory structure shall be structurally altered, converted, enlarged or maintained for the purpose of providing a second dwelling units unless such accessory structures are made to conform to all regulations of this title for new structures.

C. Westside Specific Plan

Accessory structures in the RS-4 Zone shall maintain a three foot setback from the side lot line and the rear lot line and a minimum of six feet between structures, but shall not be located in the front yard setback required except as provided by this title.

18.42.040 SCREENING MECHANICAL EQUIPMENT AND ELEVATOR HOUSING

A. Standards Applicable to All Zones

1. All mechanical equipment located at ground level shall be enclosed within a permanent noncombustible enclosure subject to the approval of the building official, and subject to all yard and setback regulations.
2. All elevator housing and mechanical equipment located on the roof of any building shall be screened from adjacent views and contained within a completely enclosed penthouse or portion of the same building having walls and roofs with construction and appearance similar to the building served by the equipment and other appurtenances.

18.42.050 COMMERCIAL AND INSTITUTIONAL BUILDING DESIGN STANDARDS

A. Applicability

This section provides standards for commercial buildings including retail, service, office, and institutional buildings in any zone where they are permitted.

B. Commercial Retail Buildings

1. Large format retail or anchor stores.
   a. Ground floor facades that face public streets shall have arcades, pergolas or galleries; display windows, accentuated entries or entry pavilions; awnings; raised planters; or special corner treatments such as towers, turrets, angled corners with parapets, or similar architectural treatments on at least 60 percent of the total façade length.
   b. Facades greater than 120 feet in length measured horizontally shall incorporate wall plane projections or recesses having a depth of at least two percent of the length of the façade and extending at least 25 percent of the length of the façade.

c. A minimum of 25 percent transparency (clear vision glass) is required on the ground floor of a large format retail or anchor store.

2. Freestanding or "pad" buildings.
   a. Freestanding retail buildings fronting a sidewalk shall be provided with sufficient display windows meeting the transparency requirements identified in Subsection E below.
   b. Freestanding retail or "pad" buildings within centers (multi-tenant strip developments) that do not front on a public street shall exhibit a minimum of a 50 percent window to 50 percent wall on at least three building facades.

3. Retail shops/multi-tenant development.
   a. Buildings facades within a multi-tenant development must provide a repeating pattern that shall include at least one of the following elements at horizontal intervals of no more than 30 feet:
      i. Color change;
      ii. Texture change;
      iii. Material change; or
      iv. Structural bay expression through a change in plane no less than 12 inches in width such as an offset, reveal, or project rib.
   b. Retail storefronts set back from a street with parking in front shall provide a minimum 60 percent transparency through the use of clear vision windows and doors when located along a sidewalk, building arcade or gallery.
   c. Doors and windows mounted flush with the wall surface shall not be used unless in conjunction with an arcade or covered walkway. Doors and windows shall be set back in their wall openings to reveal the thickness of the wall when an arcade or covered walkway is not provided.

C. Building Aesthetics and Materials

1. Articulation is required to reduce the mass and scale of large monolithic commercial buildings. Articulation is required on at least three sides of a building's façade by use of color, changes in materials, arrangement of façade elements (such as insets, offsets or varying setbacks, canopies, window recesses, arches, arcades or colonnades, varied roof planes, vertical projections, and fenestration). The service side of a building's façade shall not require the same articulation unless it is visible from an adjacent street, park or open space or residential/residentially-zoned area.
2. Any side of an office, commercial and institutional building visible from or adjacent to residential areas or residentially zoned lands shall be treated in the same manner as the street facing façade.
3. For buildings that front on a public right-of-way, internal private street or private drive intended to function as a street, the following minimum standards for transparency or clear vision glass are required:
   a. Ground floor retail: 60 percent.
   b. Upper story retail: 40 percent.
   c. Ground floor office or institutional: 50 percent.
   d. Second floor office or institutional: 35 percent.
4. Rooflines.
   a. Both single and multi-tenant buildings shall have variations in the rooflines and roof features that are consistent with the buildings mass and scale. Roofs shall meet at least two of the following requirements:
      i. Decorative parapets that are a minimum of three feet in height.
      ii. A three-dimensional cornice treatment a minimum of 12 inches in height.
      iii. Overhanging eaves that extend at least two feet beyond the building façade.
      iv. Three or more roof planes.
      v. Any other treatment that in the opinion of the Planning Division, meets the intent of this section.
5. Exterior facades of new buildings should be constructed of materials which will withstand the abuses of weathering and possible defacing due to vandalism. These materials should be easily maintained and attractive from any distance. In the commercial and mixed-use zones, the exteriors of all buildings or accessory structures shall be constructed of stucco, masonry, architectural concrete

masonry units, pre-cast concrete, rock, and/or wood or wood simulated siding; provided, however, that all buildings or structures shall have an integrated color or painted exterior.

a. Metal for use as a primary exterior building material is not permitted. The use of metal is permitted only as an accent material and may not exceed ten percent of each building façade face.
b. Building fronts shall incorporate and present either a finished parapet or overhang to the street.
c. All roof edges shall be finished with facia and/or combination fascia gutter.
d. Finished soffits are required.
e. The use of decorative materials to enhance the aesthetic appearance of the building or structure shall be required on any portion of the building or structure abutting upon a public street.

6. The exterior walls of all buildings or structures constructed within the commercial and mixed-use zones shall be of new material; provided, however, that quality used materials such as rock, red brick, or decorative masonry may be permissible. Other forms of architectural treatment of used materials may be approved by the Planning Division.
7. Color.
   a. The use of colors on the exterior of a building shall be limited to an appropriate and complementary palette.
   b. Large areas of intense white color shall be avoided except on rooftops.
   c. The color palette chosen for a building should be compatible with the colors of adjacent buildings except where existing buildings strongly diverge from these standards.
   d. Fluorescent or neon colors shall be avoided.
8. Accessory structures shall have compatible architectural details, design elements, and roof designs as the primary structure.
9. Trash and recycling enclosures.
   a. Standards for trash enclosures are found in Title 7, Section 7.10.080 (Enclosures required).
   b. Trash enclosures shall be provided with receptacles for both rubbish and recyclable materials.

D. Prohibited Exterior Wall Materials

The following materials are prohibited as a primary exterior wall material:

1. Unfinished concrete and concrete block, except split-face concrete block or slump block.
2. Corrugated metal, standing seam metal, or other metal wall materials.
3. Reflective mirror-type glass.
4. Plywood, including T-11 or similar wood products.
5. Imitation “rock work” veneer.
6. Corrugated fiberglass.
7. Asphalt shingles.
8. Plastic or plastic laminates.

E. Prohibited Roofing Materials

The following materials are prohibited for use as a roofing material:
1. Corrugated metal.
2. High contrast or brightly colored glazed tile, except where desirable for accent purposes.
3. Highly reflective surfaces.
4. Aluminum sheet metal.

18.42.060 INDUSTRIAL BUILDING DESIGN STANDARDS

A. Building Aesthetics and Materials

1. Long unbroken building facades shall be avoided. Facades with varied front setbacks shall be required.

2. Warehouses shall avoid blank front and exterior side wall elevations on street frontages through the use of building indentations and architectural details.
3. Building entrances to industrial use buildings shall be enhanced with architectural elements and landscaping for emphasis.
4. Materials.
   a. All buildings and structures shall be constructed of stucco, masonry, architectural concrete masonry units, pre-cast concrete, rock, and/or wood or wood simulated siding, and shall have an integrated color or painted exterior.
   b. 30 percent, including doors, of the gross area, to a 12 foot height, of any building or structure abutting on the front or exterior side yard of a lot shall be constructed of, or surfaced with, glass, stone, wood, brick, and/or decorative masonry as architectural treatment to increase the aesthetic appearance of the building. On a corner lot, if the treatment required on the exterior side yard is concentrated on the corner of the building or structure and is located nearest the corner of the intersecting streets, the percentage of required area for decorative purposes may be reduced on the exterior side yard to ten percent.
   c. Where the end use of any building or structure prohibits the use of decorative materials in either the front or exterior side of any building or structure or it is not economically feasible to use decorative materials, a color combination of the exterior surface of integrated or painted finish may be permitted, subject to site plan review.
   d. The exterior walls of all buildings or structures in the industrial zones shall be of new material; provided, however, that quality used materials such as rock, red brick, or decorative masonry may be permissible. Other forms of architectural treatment of used materials may be approved by the Planning Division.
   e. Metal for use as a primary exterior building material is not permitted. The use of metal is permitted only as an accent material and may not exceed 10% of each building façade face.
5. Trash and Recycling Enclosures
   a. Standards for trash enclosures are found in Title 7, Section 7.10.080 (Enclosures required).
   b. Trash enclosures shall be provided with receptacles for both rubbish and recyclable materials.

18.42.070 RESIDENTIAL BUILDING DESIGN STANDARDS

A. Multi-Unit Residential Building Design Standards

1. The exterior design, height, and bulk of multi-unit projects should not negatively impact adjacent lower density residential areas.
2. Façade and roof articulation. A structure with three or more attached units should incorporate wall and roof articulation to reduce apparent scale. Changes in wall planes and roof heights, and elements such as balconies, porches, arcades, dormers, and cross gables can avoid a barracks-like quality. Long flat walls and roofs shall be avoided. Secondary hipped or gabled roofs covering the entire mass of a building are preferred.
3. Scale. Because multi-unit projects are usually taller than one story, their bulk can be imposing on surrounding uses. Structures with greater height may require additional setbacks at the ground floor level and/or upper levels.
4. Balconies porches or patios as part of multi-unit structures are required. These elements shall be used to break up large wall masses, offset floor setbacks, and add human scale to structures, and increase neighborhood safety by providing opportunities for “eyes on the street”. Individual unit entrances within a multi-unit project shall have individual covered porches.
5. Trash and recycling enclosures.
   a. Standards for trash enclosures are found in Title 7, Section 7.10.080 (Enclosures required).
   b. Trash enclosures shall be provided with receptacles for both rubbish and recyclable materials.
6. Laundry facilities.
   For multi-unit residential projects containing nine units or more that do not provide a washer and dryer for each unit, the following laundry facilities shall be provided: one washer and one dryer for each 20 dwelling units. The minimum requirement shall be one washer plus one dryer for multi-unit residential projects containing nine to 20 dwelling units.

7. Storage space.
   In all multi-unit residential projects, a storage space of not less than 150 cubic feet for each unit plus 50 cubic feet for each additional bedroom more than one. The cubic feet utilized by mechanical equipment (e.g., water heater, furnace, etc.) may not be included in the cubic footage requirement. A bedroom closet shall not be included in the cubic footage requirement.

B. Mobile Homes / Factory-Built Housing

1. Definition. Factory-built housing includes modular housing and residential structures certified under the National Mobile Home Construction and Safety Standards Act of 1974 and as defined in 798.3 of the Civil Code. All factory-built housing and the lot on which it is placed shall comply with all applicable provisions of Title 18 of the National City Municipal Code and the Design Guidelines.
2. Eligibility. A mobile home shall not be located on a permanent foundation, on a private lot, unless it:
   a. Was constructed after September 15, 1971, and was issued an insignia of approval by the California Department of Housing and Community Development or was constructed after July 1, 1976, and was issued an insignia of approval by the U.S. Department of Housing and Urban Development; and,
   b. Has not been altered in violation of applicable codes.
3. Criteria. Mobile homes placed on a permanent foundation system, on a private lot, shall:
   a. Be occupied only as a residential use type;
   b. Meet all requirements for the zone in which located;
   c. Be attached to a foundation system in compliance with all applicable building regulations and Section 18551 of the Health and Safety Code;
   d. Have a minimum width of 20 feet;
   e. Be covered with an exterior material customarily used on conventional dwellings and approved by the planning division pursuant to site plan review. The exterior covering material shall extend to the ground, except that when a solid concrete or masonry perimeter foundation is used, the exterior covering material need not extend below the top of the foundation;
   f. Have a roof consisting of shingles or other material customarily used on conventional dwellings;
   g. A mobile home may be required to have a porch, eaves or roof with eaves when it is determined, pursuant to site plan review, it is necessary to have it compatible with the dwellings in the area.
4. Foundation system. The most recently adopted California Building Code specifies regulations for the mobile home foundation system. These regulations provide:
   a. Foundation system definition. A "foundation system" is an assembly of material constructed below, or partly below grade, not intended to be removed from its installation site, which is designed to support the structure and engineered to resist the imposition of external natural forces;
   b. That mobile home foundation systems be designed in accordance with the provisions of the most recently adopted California Building Code, and local soil conditions. Design conditions for roof, wind, and seismic loads applicable to permanent building foundations shall be applicable to the mobile home foundation system;
   c. The mobile home shall be installed in accordance with installation instructions provided by:
   d. The manufacturer of the mobile home, or,
   e. A California-licensed architect or engineer for an individual mobile home where manufacturer's installation instructions are not available;
   f. That both the foundation system and connection of the mobile home to the foundation system shall be capable of withstanding the design loads and concentrated loads identified in the installation instructions;
   g. A foundation system plan shall be provided in addition to the installation instructions. The foundation system plan may be:
      i. Provided by the mobile home manufacturer either as a part of, or separate from, the installation instructions,
      ii. Provided by the installation contractor,
      iii. Required to be signed by a California-licensed architect or engineer;
      iv. A foundation system plan approved by the California Department of Housing and Community Development will be accepted.

5. Utility connections. The mobile home electrical, gas, water and drain connections shall be made permanent in a manner applicable to permanent buildings. Gas shut-off valves, meters and regulators shall not be located beneath the mobile homes.
6. Surrender of registration. Prior to occupancy, the owner shall request a certification from the Planning Division that a certificate of occupancy be issued pursuant to Section 18551 (b) (2) of the California Health and Safety Code. Thereafter, for an existing mobile home, any vehicle license plate, certificate of ownership and certificate of registration issued by a state agency is to be surrendered to the appropriate state agencies.
7. Park and school fees. Mobile homes placed on a permanent foundation shall be subject to local park and school fees in the same manner as conventional single-family dwellings.
8. Modification of criteria. Modification of the criteria set forth in this section may be granted by the Planning Division if the site plan review finds that such modification will not be detrimental to the public interest or surrounding residents or properties. No such modification may be granted from Subsections 3a, 3b, and 3c of this section.
9. Additions. Additions to a mobile home placed on a permanent foundation shall be made in accordance with all applicable laws, codes, and ordinances enforced by the City, and installation instructions provided by (site plan review required):
   a. The manufacturer of the mobile home; or,
   b. A California-licensed architect or engineer; or,
   c. A building addition plan approved by the California Department of Housing and Community Development.

C. Single Family Infill Standards

1. Architectural considerations.
   a. New single family projects should incorporate the distinctive architectural characteristics of surrounding development, for example: window and door detailing, decoration, materials, roof style and pitch, finished-floor height, porches, bay windows, dormers, chimneys, balconies, shutters, decorative molding, and similar architectural details.
   b. Rooflines of building additions should be constructed to integrate the addition with the existing building. Contrasting rooflines which emphasize the separate construction of the addition, such as shed roofs extending from the wall of a structure with a hip or gable roof, should be avoided.
   c. Exterior materials, window details, and colors of building additions should match those of existing structures.
   d. Roof pitches in common use in the residential neighborhood are gable and hip. New residential construction and additions should incorporate roofs which are compatible with the existing neighborhood style. Minimize the use of flat roofs unless the surrounding context suggests their use, or the structure being added on to has a flat roof.
   e. Walls should be of either wood or simulated wood clapboard or stucco where the style and context would allow it. Brick or stone is recommended as an accent material. Clay tile is also a very suitable material for roofs and accents, but very shiny glazed roof tile should be avoided.
   f. If concrete block is used for exterior wall construction, it shall receive a finish coat of stucco.
   g. While two-story construction is considered acceptable in single-story neighborhoods, the structure should incorporate both vertical and horizontal variations in the wall planes in order to reduce the overall bulk of the project and develop a smaller scale to be compatible with adjacent single story structures.
   h. The use of any roof mounted equipment is highly discouraged for single family units. If alternatives are not feasible, equipment must be screened from view in a manner which blends with the architectural style of the house, including use of materials and colors.

2. Site design considerations.
   a. New development should continue the functional, on-site relationships of the surrounding neighborhood. For example, in many older neighborhoods, common patterns that should be continued are entries facing the street, front porches, and parking at the rear.
   b. Front setbacks for new single family development in existing neighborhoods should be either:

i. Equal to the average setback of all residences and buildings on both sides of public streets within 100 feet of the property lines of the new project or
ii. Equal to the average of the two immediate adjacent buildings.

c. In cases where averaging between two adjacent existing buildings is chosen, the new building may be averaged in a stepping pattern.
d. Side yard setbacks in the neighborhood create a certain rhythm along the street. New projects or additions should be respectful of the open space pattern created by these setbacks.

~~SECTION~~CHAPTER 18-43 -- FENCES AND WALLS

18.43.010 Purpose
18.43.020 Screening Requirements
18.43.030 Parking Lots
18.43.040 Materials, Construction, and Maintenance
18.43.050 Maximum Height
18.43.060 Prohibited Fences
18.43.070 Entry Arbors
18.43.080 Openings in View-Obscuring Fences
18.43.090 Special Fences
18.43.100 Traffic Visibility Triangles

18.43.010 PURPOSE

The purpose of this Chapter ~~section~~ is to establish regulations for fences and walls. The intent is to enhance the aesthetic appearance of property by providing standards relating to the quality of design materials; to create buffers between different land uses; and to protect the public health, safety, and welfare.

18.43.020 SCREENING REQUIREMENTS

A. Between Land Uses

1. Where the side or rear setback of a commercial or industrial use abuts a residential zone, those side or rear setbacks of the commercial or industrial use shall be screened from the residential zone by an opaque fence or wall with a minimum six feet and a maximum height not to exceed eight feet.
2. Where the side or rear setback of a multi-family residential use abuts a single family residential zone, those side or rear setbacks of the multi-family residential use shall be screened from the single-family residential zone by and opaque fence or wall with a minimum six feet and a maximum height not to exceed eight feet.

18.43.030 PARKING LOTS

A. Screening

1. Parking lots shall be screened from adjacent residential zones and adjacent streets with a five- to six-foot high fence or wall within a five foot wide landscape buffer.
2. The screening requirements for parking lots may be waived when the parking lot serves the structure or use to which the parking is accessory.
3. Required screening shall be continuous, broken only for access driveways and walkways.

18.43.040 MATERIALS, CONSTRUCTION, AND MAINTENANCE

A. Fences and Walls

1. All fences and walls shall be constructed of new or good used material, and all fences and walls shall be kept in good repair and adequately maintained. Any dilapidated, dangerous, or unsightly fences or walls shall be removed, unless otherwise required, or repaired.
2. All masonry walls shall conform to the requirements of the California Building Code. All masonry walls require a building permit.
3. Wood fencing must be constructed using pressure-treated wood posts set in concrete footings.
4. Vinyl fencing is permitted

5. Chain link fences. Chain link fencing of minimum nine-gauge wire and three and one-half inch by five inch mesh with two and one-half inch by five-sixteenths inch redwood slats may be used in screening residential or industrial areas.

18.43.050 MAXIMUM HEIGHT

A. Fences and Walls

1. Fences and walls not exceeding eight feet in height and hedges may be located in setback areas; provided, that if located in any front setback or exterior side setback of any corner lot, they shall not exceed four feet in height, except that a residentially developed property in a residential zone may have a fence, wall or hedge not exceeding six feet in height within the exterior side setback of a corner lot.
2. Fences, walls and hedges over four feet in height shall not be permitted in the rear setback area of a reversed corner lot where such reverse corner lot abuts a front setback of the key lot at the rear.
3. The height of retaining walls contributes to the allowable height of fences and walls; provided, that within interior side setbacks and rear setbacks, the required height of screens or protective fences shall not be inhibited by the height of a retaining wall. The height of such protective fences shall be measured from the top of the retaining wall above or upon which the protective fence is placed.
4. Masonry walls shall not exceed a height of eight feet. Masonry walls that include a retaining wall shall not exceed a maximum height of six feet for the masonry wall and two feet eight inches for the retaining wall.
5. Up to 30 percent of the length of a fence may exceed the height limits specified in this section by up to six inches.

18.43.060 PROHIBITED FENCES

A. Materials

1. The use of barbed wire, electrified fence, concertina or razor wire fence in conjunction with any fence, wall, or hedge, or by itself within any zoning district, is prohibited in residential and commercial zones unless required by law or regulation of the City, the State, or the Federal Government.
2. The use of barbed wire above six feet in height is only allowed in industrial zones except for front and exterior side yards.
3. In the Westside Specific Plan area, the use of chain link, barbed wire and razor wire fencing shall be prohibited.

18.43.070 ENTRY ARBORS

A. Requirements

Arbors may be placed freestanding, or at entrances along fences within required front and exterior side setbacks, subject to the following standards:

1. The height of the arbor shall not exceed ten feet.
2. The width of the arbor shall not exceed six feet between centerlines of the supports.
3. A maximum two-foot overhang is permitted on each side of the center of the supports.
4. The depth of the arbor shall be no more than two feet six inches.
5. A minimum six-foot eight-inch vertical clearance above grade is required.
6. Supports shall not exceed six inches by six inches (horizontal dimensions).
7. The arbor shall not be enclosed on any side other than where attached to a building or by an entry gate that is part of an allowed fence.
8. Arbors may encroach into the entire width of the required front or exterior side setback.

18.43.080 OPENINGS IN VIEW-OBSCURING FENCES

A. When Allowed

1. With the approval of a site plan, the Planning Division may allow view-obscuring fences to have visual openings, for security surveillance. Such openings shall not exceed 24 inches in width and the aggregate of openings shall not exceed 15 percent of the linear length of the fence along any side of an enclosed area.
2. Upon recommendation of the chief of police, the Planning Division or Building Division may require that security openings be provided in view-obscuring fences constructed after the effective date of the ordinance codified in this section.

18.43.090 SPECIAL FENCES

A. Conditions and Restrictions

Special fences are subject to review and approval by the Planning Division. Staff may impose reasonable conditions or restrictions including, but not limited to, neighbor notification, setbacks and landscape screening as staff deems necessary to secure the purpose of this title and to assure compatibility of the special fence with adjoining properties and those in the general vicinity, and may require guarantees and evidence that such conditions are being, or will be, complied with.

B. Types

Special fences include, but are not limited to the following:

1. Recreation area fence. Fences not to exceed 12 feet in height may be located near or around tennis courts, badminton courts, batting cages, golf courses/driving ranges, basketball or volleyball courts and similar play areas, providing that all parts of the fence over six feet are made of open-wire construction or other corrosion-resistant material;
2. Security fences. Fences not to exceed eight feet in height may be located near and around industrial, industrial or research uses where required for security purposes, screening, or containing and protecting hazardous materials;
3. Swimming pool fences. Fences required for swimming pools are governed by Chapter 15.40 of the Municipal Code. Swimming pool fences are subject to Building Official approval.
4. Wood fence posts greater than eight inches in width or depth;
5. Front yard fence posts with more than two attached lights. In no event shall such posts exceed four feet in height plus a two-foot-high light fixture;
6. Chain link fencing in residential areas is permitted in the side and rear yards with vinyl-coating and landscape screening. Chain link fencing shall not exceed six feet in height in these areas. Chain link fencing in front yards in residential areas is not permitted;
7. Gates exceeding four feet in width for pedestrian use or 14 feet in width for driveway use;
8. Other structures which in the opinion of the review authority are of a similar nature.

18.43.100 TRAFFIC VISIBILITY TRIANGLES

A. Sight Requirements

1. Also known as a “Sight Visibility Triangle”, each corner or reversed corner lot in the commercial and industrial zones shall maintain a yard area conforming to the traffic visibility triangle requirements as defined in Table 18.43.100, except that a single supporting column, for a cantilevered roof or second story, having a diameter of eight inches or less may be located in the triangle area.
2. A visibility triangle is the area encompassed by the triangle formed by projecting lines of a specified distance from the point of intersection of the front and side street edges of pavement and a straight line connecting the termini of said projected lines. Within the area comprising the triangle, no tree, fence, wall, shrub, or other physical obstruction higher than three feet above the official grade lot line grade shall be permitted.

3. The following traffic visibility triangles shall be established for the following intersection types as identified in Table 18.43.100 below:

TABLE 18.43.100
Traffic Visibility Triangles

Classification of Intersection Types	Distance Measurements from Point of Intersection of Front and Side Lot Lines
Driveway or Alley with any street	As provided by Caltrans and AASHTO stopping sight distance criteria
Local -- Local	25’
Local -- Collector	25’
Driveway – Collector or Arterial Street	30’
Collector -- Arterial	30’
Arterial -- Arterial	30’

~~SECTION~~CHAPTER 18-44 – LANDSCAPING

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18.44.010 PURPOSE

The purpose of this Chapter ~~section~~ is to provide property owners with standards in landscaping their properties. These standards will be used by the Planning Division, Planning Commission, and City Council when reviewing plans for landscaped areas. These standards are also intended to provide direction for the design, installation, and maintenance of water efficient landscaping as directed by California State law.

18.44.020 APPLICABILITY

These standards shall be used when preparing landscape and irrigation plans for all multi-family residential, commercial, industrial, and institutional projects. Projects with a total landscaped area of 500 square feet or less, private yard areas for single-family dwellings, and registered historic sites shall be exempt from requirements for water efficiency identified in this ~~section~~Chapter. These standards shall not apply to revegetation plans that will be reviewed individually by staff and all appropriate State and Federal agencies.

18.44.030 DEFINITIONS

A. Definitions Used in this Chapter

1. "Landscaping" means the use of architectural and horticultural materials to provide control of erosion, dust, weeds, and accumulation of litter in a manner complementary to the purpose of adding natural environmental quality to the premises. "Landscaping" includes the planting and maintenance of some combination of trees, shrubs, ground cover, vines, flowers, lawns or other planting materials, other than weeds, providing shade, visual screening, aesthetic enhancement, soil conservation, and the removal or reduction of fire hazards, rodent harborages, vermin, and disease-bearing creatures. In addition, the combination or design may include natural features such as rock and stone and structural features such as pools, artwork, screens, walls, fences, and benches. See also "fence," defined in Glossary, and "screening," defined in the Glossary.
2. "Landscaping maintenance" includes sufficient irrigation, fertilization, pruning, trimming and training, and all other reasonable acts necessary to keep plants in a healthy vigorous condition. "Maintenance" also includes removal of weeds, dead materials and accumulated litter, rubble or other foreign

substances; and reseeding, and replacement of dead plants and planting where necessary to restore a landscaped area to the level of coverage required of a new installation.

18.44.040 LANDSCAPE PLAN

A. Requirements

A detailed landscape plan shall be submitted as part of a site plan review. The landscape plan shall include, but not be limited to, the following items:

1. The landscape plan shall be drawn at the same scale as the plot or site plan or at a minimum scale of one inch to 20 feet.
2. The landscape plan shall locate and identify existing and proposed buildings, walls, fences, walks, drives, utilities, etc.
3. Proposed plant location, spacing, size, species (common and botanical name).
4. Existing and proposed contours on-site and 100 feet beyond the site at intervals not to exceed two feet.
5. Height and type of construction of wall or fence, including footings.
6. Provide the types and amounts of soil amendments (additives mixed with the soil) used per 1,000 square feet.
7. Significant site details to resolve specific site conditions, such as tree wells to preserve existing trees or culverts to maintain existing natural drainage patterns.
8. Planting and staking details in drawing form to ensure proper installation and establishment of proposed materials.
9. Identification of existing trees proposed to be saved including individual tree caliper size and species. Clearly reference on the plan the total number of trees proposed to be preserved, caliper of tree saved, and number of trees requested for credit consideration.
10. Identification of tree protection method for trees proposed to be preserved.
11. Identification of existing trees over two-and-one-half inch caliper proposed to be removed.
12. Identification of grass and other groundcover or proposed seed mix and the amount in pounds to be used per 1,000 square feet and method of planting.
13. Prepare calculations for the total number of parking spaces and number of parking lot shade canopy trees required to be placed within the interior of the parking area.
14. Prepare calculations for the square footage of the 20 percent landscape area requirement. The 20 percent required landscape area shall be clearly denoted on the landscape plan.
15. For sites with existing buildings and parking that are proposed for expansion, label the net percent increase and calculated landscape requirement.
16. An irrigation and planting plan shall be submitted that meets the requirements of the Water Efficient Landscape Regulations of this ~~section~~Chapter.
17. Each landscape plan shall be prepared by a California licensed landscape architect, licensed landscape contractor, certified nurseryman, or other professional determined by the City to be qualified.

18.44.050 REQUIREMENTS

A. General

1. Where on-site landscaping is required by this ~~section~~Chapter as part of a project, all landscaping work shall be included in such permit. Such landscaping shall not be considered complete until approved by the Planning Division.
2. Notwithstanding other provisions of this title requiring on-site landscaping, all buildings erected hereafter shall have the surrounding courts, yard areas, open-space areas, and public street parkways, that are otherwise unimproved, landscaped in accordance with Section 18.54.030. This shall include centrally controlled mechanical irrigation systems.
3. New single-family and two-family residences shall be landscaped with a minimum of:
   a. Complete landscaping of all slopes steeper than 3:1;

b. Turf or suitable ground cover on all other ground area lying between the curb, or edge of roadway, within adjoining streets and the rear line of the rearmost main building and the area between the main building and the rear property line on reversed corner lots;
c. This required landscaping shall include irrigation systems meeting the guidelines of this ~~section~~Chapter. All street parkways and slopes more than three feet in height shall have permanent centrally controlled mechanical irrigation systems.

4. All street parkways and slopes more than three feet in height shall have permanent centrally controlled mechanical irrigation systems.
5. Street trees shall be installed within the parkway of public streets at a ratio of one per 30 linear feet of frontage and may not interfere with effective street lighting. Tree selection and tree location shall be approved by the Planning Division.

18.44.060 PLANT MATERIALS

A. Requirements

1. Landscaping shall include a variety of trees, shrubs, and groundcover.
2. Plant materials shall conform to or exceed the plant quality standards of the latest edition of American Standard for Nursery Stock published by the American Association of Nurserymen, or the equivalent.
3. Plant materials shall be sized and spaced to achieve immediate effect and shall not be less than a 15-gallon container for trees, five gallon container for specimen shrubs, and six inch pots for mass planting, unless otherwise approved by the regulating authority.
4. Plant materials shall be selected for low water demand and drought tolerance; use of appropriate native species; adaptability to the National City environment; the geological and topographical conditions of the site; ability to provide shade; and, soil retention capability.
5. Plants having similar water use shall be grouped together in distinct hydrozones.
6. Deciduous trees shall be used to shade buildings and parking lots in summer and allow for passive solar heating of buildings in winter.
7. Street trees shall be planted at a rate of one tree for every 30 linear feet of right-of-way. The review authority may modify this requirement depending on the chosen tree species and its typical spread at maturity.
8. Shrubs. A minimum of two, five gallon shrubs shall be provided for every six feet of distance along street frontages.

18.44.070 TURF LAWN

A. Restrictions

1. Turf lawn is the landscape element which requires the most water and maintenance; therefore, the use of turf must be limited to functional areas such as playgrounds, entertainment areas, picnic areas, employee areas, play areas, etc.
2. Turf shall not exceed 20 percent of the total landscaped area. Decorative cool season turf shall not exceed 15 percent of the landscaped area.
3. Turf shall not be used in parking lot islands or strips.
4. Turf may not be planted in areas with a width of less than six feet.

18.44.080 SOILS AND MULCHING

A. Requirements

1. A minimum of one-foot depth of uncompacted soil shall be provided for water absorption and root growth in each planted area.
2. Soil shall be prepared and/or amended to be suitable for the landscaping to be installed.
3. A minimum of two to three inches of mulch such as ground bark or other composted organic material shall be added in each non-turf area to the soil surface after planting. Any plant type that is intolerant to mulch shall be excluded from this requirement.

4. If a weed control barrier is needed, only porous fabrics shall be used under mulches.
5. Gravel or crushed rock for use as mulching is not permitted.

18.44.090 MINIUMUM PERCENTAGE OF NET LOT AREA TO BE LANDSCAPED

The minimum area of each site to be landscaped with trees, shrubs, groundcover, or turf lawn shall be twenty percent of the net site area, except for a reduction approved by the City Manager or his/her designee due to lot size, sites with existing development, or for lots with zero setback requirements.

18.44.100 STATUARY STRUCTURES AND OTHER LAWN ART

Statuary structures and other lawn art shall be limited to a maximum of three structures and shall not exceed four feet in height and two feet in depth unless otherwise determined by the Planning Division. Staff may impose reasonable conditions or restrictions including, but not limited to, neighbor notification, setbacks and landscape screening as staff deems necessary to secure the purpose of this title and to assure compatibility of the statuary structures and other lawn art with adjoining properties and those in the general vicinity, and may require guarantees and evidence that such conditions are being, or will be, complied with.

18.44.110 LANDSCAPE LOCATION REQUIREMENTS

A. Provisions

Landscaping shall be provided in all areas of a site subject to development with structures, grading, or the removal of natural vegetation, as follows:

1. Setbacks. The setback and open space areas required by this Land Use Code, and easements for utilities and drainage courses shall be landscaped except where:
   a. Occupied by approved structures or paving
   b. A required single family dwelling residential setback is screened from public view; or
   c. They are retained in their natural state, and the review authority determines that landscaping is not necessary to achieve the purposes of this ~~section~~Chapter.
2. Unused areas. Any area of a project site not intended for a specific use, including a commercial pad site intended for future development, shall be landscaped unless retained in the natural state, and the review authority determines that landscaping is not necessary to achieve the purposes of this ~~section~~Chapter.
3. Areas adjacent to side or rear property lines. A parking area for a nonresidential use or multi-unit residential project shall provide a perimeter landscape strip at least eight feet wide where the parking area adjoins a side or rear property line. The requirement for a landscape strip may be satisfied by a setback or buffer area that is otherwise required to be eight feet or greater. Trees shall be provided within the landscape strip at the rate of one for each 30 linear feet of landscaped area.
4. Areas adjacent to buildings. When a parking area is located adjacent to a nonresidential structure, a minimum eight-foot wide landscape strip shall be provided adjacent to the structure, exclusive of any building entries, or areas immediately adjacent to the wall of the structure that serves as pedestrian accessways. Landscape strips shall be planted with a combination of canopy trees, ornamental trees, shrubs, perennials, ornamental grasses, and groundcover.
5. Areas adjacent to residential use. A parking area for a nonresidential use or multi-unit residential project adjoining a residential use in an RS Zone shall provide a landscaped buffer with a minimum ten foot width between the parking area and the common property line bordering the residential use. A solid, continuous decorative masonry wall or fence and landscape buffer shall be provided along the property line, except for approved access points, to address land use compatibility issues (e.g., nuisance noise and light/glare), as determined by the review authority to be necessary. Trees shall be provided at the rate of one for each 30 linear feet of landscaped area.
6. Parking lot landscape requirements.
   a. A minimum of one shade canopy tree shall be required for every seven parking spaces in a parking lot for all zones.

b. All of the required parking lot trees shall be placed within the parking lot envelope, described as the area including the parking lot surface and extending a minimum of eight to ten feet from the edge of the parking lot.
c. Landscape areas within the parking lot island shall be planted with a combination of required canopy trees, ornamental trees, shrubs, perennials, ornamental grasses, and groundcover.
d. A minimum of two thirds of the required trees shall be placed within the interior of the parking area. A maximum of one third may be placed within the ten foot landscape area that surrounds a parking lot.
e. A parking area for a nonresidential use adjacent to a public street shall be designed to provide a minimum ten foot wide landscape planting strip between the street right-of-way and the parking lot.
f. A parking area for a residential use except for dwelling or duplex, shall be designed to provide a landscaped planting strip between the street right-of-way and parking area equal in depth to the setback required by the applicable zoning district.
g. The landscaping shall be designed and maintained to screen vehicles from view from the street to a minimum height of three feet, but shall not exceed any applicable height limit for landscaping within a setback or traffic visibility triangle. Screening materials may include a combination of plant materials, earth berms, solid decorative masonry walls, raised planters, or other screening devices which meet the intent of this requirement.
h. All landscaping including canopy tree placement shall be dispersed throughout the parking lot in order to balance and soften the large areas of pavement and help direct traffic flow within the lot.
i. A permanent underground irrigation system shall be provided for all landscaped areas.

18.44.120 TREE PRESERVATION

A. Site Plan Requirements, Maintenance, and Credits

1. All trees over eight inches caliper shall be identified on the site plan and landscape plan with notations of trees to be preserved and trees to be removed.
2. Trees intended to be preserved shall be noted with a unique symbol on the site plan and be protected during construction through the use of construction fencing at or beyond the drip line of the tree or trees to be preserved.
3. Trees to be preserved shall be considered for credit only if they are located on the developed portion of the site. To obtain credit consideration, the preserved trees shall be of a high quality and at least two-and-one-half inches caliper.
4. The following credits will be considered for high quality trees that are preserved:
   a. 2-1/2" to 7.99 inches: one tree
   b. 8-inches to 11.99 inches: two trees
   c. 12 inches and over: three trees
5. To protect and encourage the continued health and vitality of the preserved trees, the ground within the drip line shall be maintained in the existing natural state. Storage of soils, construction equipment or other materials during or after construction within the tree dripline is prohibited.
6. If preserved trees die within three years after construction, the property owner shall replace with the number of trees that would have been required had the tree preservation credit not been provided. Said trees shall be replaced within 30 days of written notice from the City or within an extended time period as specified in said notice.
7. The minimum number of required trees shall not be reduced by less than 50 percent through the use of approved tree credits, unless the Planning Commission determines that during the site plan review existing vegetation intended to be preserved would provide adequate landscaping, shading, buffering or screening comparable to that required under this ~~section~~Chapter.

18.44.130 LANDSCAPING WORK INCLUDED IN BUILDING PERMIT INSPECTIONS

Where on-site landscaping is required by this title as part of a project for which a building permit is also required, all landscaping work shall be included in such permit. Such landscaping shall not be considered complete until inspected, certified for compliance, and approved by the Planning Division. The City Fire

Department is authorized to annually inspect all properties for adequacy of landscaping maintenance as a part of its annual weed abatement program. Conditions of inadequate landscaping maintenance that cannot be abated pursuant to the weed abatement provisions of the California Health and Safety Code, which nonetheless constitute unsightly or otherwise detrimental conditions, shall be reported to code enforcement for enforcement under this title.

18.44.140 TRAFFIC VISIBILITY TRIANGLE

Refer to Table 18.43.100, Traffic Visibility Triangle, for regulations on landscaping.

18.44.150 MAINTENANCE REQUIRED

A. Property Owner Responsibilities

1. It shall be the responsibility of each property owner to adequately maintain the landscaping of private property and the adjoining public street parkway landscaped, except street trees. All landscaping shall be properly maintained. Trees located within public street parkways will be pruned and trimmed by City forces and not by private property owners.
2. All trees, shrubs, plants, and other landscaping of parking lots, including interior landscaped areas, setbacks, and parkways shall be periodically and systematically watered, weeded, fertilized, and maintained in a healthy, growing condition. Dead growth should be promptly replaced so as to maintain the designed planting scheme.
3. Landscaping--pruning or trimming. All growth in landscaped areas should be controlled by pruning, trimming or otherwise so that:
   a. It will not interfere with the maintenance or repair of any public utility;
   b. It will not restrict pedestrian or vehicular access;
   c. It will not constitute a traffic hazard because of reduced visibility.

18.44.160 CERTAIN TREES A PUBLIC NUISANCE

Any tree or shrub growing or standing on private property in such a manner that any portion thereof interferes with utility poles, lines, wires or electroliers lawfully erected, constructed or maintained along any public street, sidewalk, or intersection or with any person or persons lawfully using the same, or any such tree which has become diseased or weakened in such a manner as to be dangerous to persons lawfully using the streets or sidewalks, or any such tree which has roots that pose a hazard to pedestrians using a sidewalk constitutes a public nuisance. The Public Works Department shall cause notice to be served upon such property owner directing that such public nuisance be abated or removed within seven days after said notice is served. The Public Works Department is authorized to abate or cause to be abated such public nuisance by trimming, pruning, cutting or removing all or such portion of such tree, shrub or plant as may be necessary to eliminate such interference, obstruction or condition. Whenever it is necessary for the Public Works Department to direct the use of City employees to abate, remove, or cause to be abated or removed, public nuisances as contained in this section, he/she shall determine the cost of the work performed by City employees and bill the property owner the cost of the work performed.

18.44.170 NONCONFORMING LANDSCAPING

All properties, now landscaped, which are inadequately maintained shall be brought into compliance with this ~~section~~Chapter upon not less than 90 days' from the date of a written notice from the City. All properties not now landscaped shall be landscaped whenever a building permit for structures valued $10,000 or more is issued for the site. All other properties or portions of properties, not landscaped shall be kept free of rubbish, litter, debris, unused merchandise, unused building materials, machinery or vehicular paraphernalia not essential to the occupancy of the premises.

18.44.180 PUBLIC UTILITIES

No species of trees or large shrubs shall be planted under overhead lines or over underground utilities if its growth might interfere with the installation or maintenance of any public utilities.

18.44.190 WATER EFFICIENT LANDSCAPE REGULATIONS

A. Purpose

The purpose of this section is to provide property owners with standards in landscaping their properties. These standards will be used by the Planning Division, Planning Commission, and Director or Parks and Recreation when reviewing plans for landscaped areas. These standards are also intended to provide direction for the design, installation, and maintenance of water efficient landscaping as directed by California State law.

1. Promote the values and benefits of landscapes while recognizing the need to utilize water and other resources as efficiently as possible.
2. Establish a structure for planning, designing, installing, maintaining, and managing water efficient landscapes.
3. Promote the use, when available, of tertiary treated recycled water, for irrigating landscaping.
4. Use water efficiently without waste by setting a maximum applied water allowance (MAWA) as an upper limit for water use and reduce water use to the lowest practical amount.
5. Encourage water users of existing landscapes to use water efficiently and without waste.

B. Definitions

The following definitions shall apply to this section:

1. "Automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers shall schedule irrigation events using either evapotranspiration (ETo) (weather-based) or moisture sensor data.
2. "Building permit" means a permit to engage in a certain type of construction at a specific location.
3. "Certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization, or other accredited certification program.
4. "Developer" means a person who seeks or receives permits for or who undertakes land development activities who is not a single-family homeowner. Developer includes a developer's partner, associate, employee, consultant, trustee, or agent.
5. "Director" means the development services director or anyone to whom the director has designated or hired to administer or enforce this section.
6. "Discretionary permit" means any permit requiring a decision-making body to exercise judgment prior to its approval, conditional approval, or denial.
7. "Estimated total water use" (ETWU) means the estimated total water use in gallons per year for a landscaped area.
8. "ET adjustment factor" (ETAF) means a factor that when applied to reference ETo, adjusts for plant water requirements and irrigation efficiency, two major influences on the amount of water that is required for a healthy landscape.
9. "Evapotranspiration" (ETo) means the quantity of water evaporated from adjacent soil and other surfaces, and transpired by plants during a specified time period.
10. "Reference evapotranspiration" means a standard measurement of environmental parameters which affect the water use of plants. ETo is given in inches per day, month, or year and is an estimate of the ETo of a large field of four-inches to seven-inch tall, cool season turf that is well watered. Reference ETo is used as the basis of determining the MAWA so that regional differences in climate can be accommodated.
11. "Grading" means any importation, excavation, movement, loosening, or compaction of soil or rock.
12. "Hardscape" means any durable surface material, pervious, or non-pervious.
13. "Homeowner-provided landscaping" means landscaping installed either by a private individual for a single-family residence or installed by a California licensed contractor hired by a homeowner.
14. "Hydrozone" means a portion of the landscape area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

15. "Invasive plant species" means species of plants not historically found in California that spread outside cultivated areas and may damage environmental or economic resources.
16. "Irrigation audit" includes an in depth evaluation of the performance of an irrigation system conducted by a certified landscape irrigation auditor. An irrigation audit may include, but is not limited to, inspection, system tune up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.
17. "Irrigation efficiency" means the measurement of the amount of water beneficially used divided by the water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices.
18. "Landscaped area" means an area with outdoor plants, turf, and other vegetation. A landscaped area may include a water feature either in an area with vegetation or that stands alone. A landscaped area may also include design features adjacent to an area with vegetation. A landscaped area does not include the footprint of a building, decks, patio, sidewalk, driveway, parking lot, or other hardscape. A landscaped area also does not include an area without irrigation designated for non-development such as designated open space or area with existing native vegetation and areas dedicated for food production.
19. "Landscape Manual" means the Water Efficient Landscape Design Manual, approved by the City of National City that establishes specific design criteria and guidance to implement the requirements of this section.
20. "Low head drainage" means a sprinkler head or other irrigation device that continues to emit water after the water to the zone in which the device is located has shut off.
21. "Low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low volume emitters such as drip lines or bubblers.
22. "Maximum applied water allowance" (MAWA) means the maximum allowed annual water use for a specific landscaped area based on the square footage of the area, the ETAF, and the reference ETo.
23. "Mulch" means an organic material such as leaves, bark, straw, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface to reduce evaporation, suppress weeds, moderate soil temperature, or prevent soil erosion.
24. "Overspray" means the water from irrigation that is delivered outside an area targeted for the irrigation and makes contact with a surface not intended to be irrigated.
25. "Pervious" means any surface or material that allows the passage of water through the material and into underlying soil.
26. "Plant factor" means a factor when multiplied by the ETo, estimates the amount of water a plant needs.
27. "Recycled water" means waste water that has been treated at the highest level required by the California Department of Public Health for water not intended for human consumption.
28. "Recreational areas" means areas of active play or recreation, such as parks, playgrounds, sports fields, golf courses, school yards, picnic grounds, or other areas where turf provides a playing surface or serves other recreational purposes.
29. "Runoff" means water that is not absorbed by the soil or landscape to which it is applied and flows from the landscaped area.
30. "Special landscaped area" means an area of the landscape dedicated to edible plants, an area irrigated with recycled water, or an area dedicated as turf area within a park, sports field, or golf course where turf provides a passive or active recreational surface.
31. "Standard Urban Strom Water Mitigation Plan" (SUSMP) means a plan designed to reduce pollutants and runoff flows from new development and significant redevelopment.
32. "SUSMP Manual" means the manual prepared for implementation of SUSMP requirements, and available for reference at the City's Development Services Department and on the City's website.
33. "Storm Water Management and Discharge Control" means regulations contained in Chapter 14.22 of the Municipal Code enacted to reduce the effects of polluted discharge on water of the state, to secure benefits from the use of storm water as a resource, to ensure compliance with the San Diego Regional Water Quality Control Board (RWQCB) and applicable state and federal law.
34. "Subsurface irrigation" means an irrigation device with a delivery line and water emitters installed below the soil surface that slowly and frequently emit small amounts of water into the soil to irrigate plant roots.

35. "Tertiary treated recycled water," means water that has been through three levels of wastewater treatment including filtration and disinfection, but not intended for human consumption.
36. "Transitional area" means a portion of a landscaped area that is adjacent to a natural or undisturbed area and is designated to ensure that the natural area remains unaffected by plantings and irrigation installed on the property.
37. "Turf" means a groundcover surface of mowed grass.
38. "Water feature" means a design element where open water performs an aesthetic or recreational function. A water feature includes a pond, lake, waterfall, fountain, artificial streams, spa, and swimming pool. Constructed wetlands used for onsite wastewater treatment or storm water best management practices are not water features.
39. "WUCOLS III" means Water Use Classification of Landscape Species and refers to the Department of Water Resources 1999 publication or the most current version.

C. Applicability

1. All new industrial, commercial, institutional, or multi-family residential development with a total landscaped area less than 2,500 square feet shall provide the following:
   a. Install on-site landscaping and below grade automatic irrigation system in accordance with the landscape manual.
   b. Landscaping shall be installed in all areas not utilized for structures, parking, drainage, and hardscape.
   c. Drought tolerant landscaping and water efficiency in accordance with this section and the landscape manual is encouraged.
   d. Parkways, between the curb and the sidewalk, bordering the development shall be provided with ground cover, shrubs, and at a minimum one 15 gallon street tree every 40 linear feet.
2. All new single-family and two-family residences with a total landscaped area less than 5,000 square feet shall provide the following:
   a. Install on-site landscaping and below grade automatic irrigation systems in accordance with the landscape manual.
   b. Landscaping shall be installed on all areas not used for structures, driveways, drainage, and hardscape.
   c. Drought tolerant landscaping and water efficiency for all new landscaping consistent with this section is encouraged.
   d. Parkways, between the curb and the sidewalk, bordering the development shall be provided with groundcover, shrubs, and at a minimum one 15 gallon street tree every 40 linear feet.
3. For all other projects that exceed the landscape area identified in 18.44.190(C)(1) and (C)(2) of this section shall apply to the following projects when a building permit or a discretionary permit is required:
   a. A project for an industrial, commercial, institutional, or multi-family residential use with a total landscaped area equal to or greater than 2,500 square feet.
   b. Developer installed residential and common area landscapes where the total landscaped area for the development is equal to or greater than two thousand five hundred square feet.
   c. A new single-family residence with homeowner provided landscaping, where the landscaped area is equal to or greater than 5,000 square feet.
   d. A model home that includes a landscaped area.
   e. A public agency project that contains a landscaped area equal to or greater than 2,500 square feet.
   f. A rehabilitated landscape for an existing industrial, commercial, institutional, public agency, or multi-family use where a building permit or discretionary permit is being issued, and the applicant is installing or modifying two thousand five hundred square feet or more of landscaping.
4. This section shall not apply to the following:
   a. A registered local, state, or federal historical site.
   b. An ecological restoration project that does not require a permanent irrigation system.
   c. A mined land reclamation project that does not require a permanent irrigation system.
   d. A botanical garden or arboretum, open to the public.

e. Any single-family residence that is being rebuilt after it was destroyed due to a natural disaster, such as a fire, earthquake, or hurricane.

D. Administration and Enforcement

1. The director shall administer and enforce this section.
2. The director shall provide guidance to applicants on how to comply with the requirements of this section.

E. Landscape Documentation Package

1. Building permit applications for projects shall submit and have approved a landscape documentation package to the development services department prior to issuance of a building permit. A minimum of three percent of the construction cost to install the landscaping and irrigation improvements shall be submitted as a deposit to review the landscape documentation package. The developer shall be billed for actual costs incurred by the City, including actual labor charges and consultant fees, less the amount of the deposit. In addition to the fee, the landscape documentation package shall contain the following.
   a. A soils management report and plan that complies with Subsection F.
   b. Planting and irrigation plans that comply with Subsection G.
   c. A water efficient landscape worksheet that complies with Subsection H.
   d. A grading plan that complies with Subsection I, below, and Chapters 14.22 (Storm Water Management and Discharge Control) and 15.70 (Grading) of the Municipal Code.

F. Soils Management Report

1. The soils management report as required by Section 18.44.190 (E)(1)(a), above shall be prepared by a licensed landscape architect, licensed civil engineer, licensed architect, or other landscape professional appropriately licensed by the state, and shall contain the following information:
   a. An analysis of the soil for the proposed landscaped areas of the project that includes information about the soil texture, soil infiltration rate, pH, total soluble salts, sodium, and percent organic matter.
   b. Recommendations about soil amendments that may be necessary to foster plant growth and plant survival in the landscaped area using efficient irrigation techniques.
   c. Proposed soil amendments and mulch as follows:
      i. The report shall identify the type and amount of mulch for each area where mulch is applied. Mulch shall be used as follows:
         - A minimum two-inch layer of mulch shall be applied on all exposed soil surfaces in each landscaped area except in turf areas, creeping or rooting ground covers or direct seeding applications where mulch is contraindicated.
         - Stabilizing mulch shall be applied on slopes.
         - The mulching portion of seed/mulch slurry in hydro-seeded applications shall comply with Subsection F(1), above.
         - Highly flammable mulch material shall not be used.
         - The report shall identify any soil amendments and their type and quantity.
2. When a project involves mass grading of a site, the soils report shall be submitted with the certificate of completion required by Subsection S.

G. Planting and Irrigation Plan

1. The planting and irrigation plans required shall be prepared by a licensed landscape architect, licensed civil engineer, licensed architect, or other landscape professional appropriately licensed by the state. The plans shall:
   a. Include the MAWA for the plans, including the calculations used to determine the MAWA. The calculations shall be based on the formula in Subsection K.

b. Include the ETWU for the plans, including the calculations used to determine the ETWU. The calculations shall be based on the formula in Subsection L.
c. Include a statement signed under penalty of perjury by the person who prepared the plan that provides, "I am familiar with the requirements for landscape and irrigation plans contained in the City of National City Water Efficient Landscape Regulations (LUC Chapter 4 Section 18.44.190). I have prepared this plan in compliance with those regulations. I certify that the plan implements those regulations to provide efficient use of water."
d. Demonstrate compliance with best management practices identified in Municipal Code Chapter 14.22, including the Storm Water Management, Discharge Control Ordinance and Standard Urban Stormwater Mitigation Plan (SUSMP).
e. Demonstrate compliance with state and City requirements for defensible space around buildings and structures, and avoid the use of fire prone vegetation.

2. The planting plan shall meet the following requirements:
    a. The plan shall include a list of all vegetation by common and botanical plant name, which exists in the proposed landscaped area. The plan shall state what vegetation will be retained and what will be removed.
    b. The plan shall include a list of all vegetation by common and botanical plant name which will be added to each landscaped area. Invasive plant species shall not be added to a landscaped area. The plan shall include the total quantities by container size and species. If the applicant intends to plant seeds, the plan shall describe the seed mixes and applicable purity and germination specifications.
    c. The plan shall include a detailed description of each water feature, including the type and surface area of all water features that will be included in the landscaped area. The water feature shall utilize a recirculating water system.
    d. The plan shall be accompanied by a drawing showing the specific location of all vegetation, retained or planted, the plant spacing and plant size, natural features, water features, and hardscape areas. The drawing shall include a legend listing the common and botanical plant name of each plant shown on the drawing.
    e. All plants shall be grouped in hydrozones, and the irrigation shall be designed to deliver water to hydrozones based on the moisture requirements of the plant grouping. A hydrozone may mix plants of moderate and low water use or mix plants of high water use with plants of moderate water use. No high water use plants shall be allowed in a low water use hydrozone. The plan shall also demonstrate how the plant groupings accomplish the most efficient use of water.
    f. The plan shall identify areas permanently and solely dedicated to edible plants.
    g. The plan shall demonstrate that landscaping when installed and at maturity will be positioned to avoid obstructing motorists' views of pedestrian crossings, driveways, roadways, and other vehicular travel ways. If the landscaping will require maintenance to avoid obstructing motorist's views, the plan shall describe the maintenance and the frequency of the proposed maintenance.
    h. The plan shall avoid the use of landscaping with known surface root problems adjacent to a paved area, unless the plan provides for installation of root control barriers or other appropriate devices to control surface roots.
    i. Plants in a transitional area shall consist of a combination of site adaptive and compatible native and/or non-native species. Invasive species shall not be introduced or tolerated in a transitional area. The irrigation in a transitional area shall be designed so that no overspray or runoff shall enter an adjacent area that is not irrigated.
    j. Where applicable, the plan shall identify passive and active recreational areas.
    k. Parkways, between the curb and the sidewalk, bordering the development shall be provided with ground cover, shrubs, and at a minimum one 15 gallon street tree every 40 linear feet.

3. The irrigation plan shall meet the following requirements:
    a. The plan shall show the location, type, and size of all components of the irrigation system that will provide water to the landscaped area, including the controller, water lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices.

b. The plan shall show the static water pressure at the point of connection to the public water supply and the flow rate in gallons, the application rate in inches per hour, and the design operating pressure in pressure per square inch for each station.
c. The irrigation system shall be designed to prevent runoff, overspray, low-head drainage and other similar conditions where irrigation water flows or sprays onto areas not intended for irrigation. The plan shall also demonstrate how grading and drainage techniques promote healthy plant growth and prevent erosion and runoff.
d. The plan shall identify each area irrigated with recycled water.
e. The plan shall provide that any slope greater than 25 percent will be irrigated with an irrigation system with a precipitation rate of seventy-five hundredths inches per hour or less to prevent runoff and erosion. As used in this section, 25 percent grade means one foot of vertical elevation change for every four feet of horizontal length. An applicant may employ an alternative design if the plan demonstrates that no runoff or erosion will occur.
f. The plan shall provide that all wiring and piping under a paved area that a vehicle may use, such as a parking area, driveway or roadway, will be installed inside a PVC conduit.
g. The plan shall provide that irrigation piping and irrigation devices that deliver water, such as sprinkler heads, shall be installed below grade if they are within 24 inches of a vehicle or pedestrian use area. The director may allow on-grade piping where landform constraints make below grade piping infeasible.
h. The plan shall provide that only low volume irrigation shall be used to irrigate any vegetation within 24 inches of an impermeable surface unless the adjacent impermeable surfaces are designed and constructed to cause water to drain entirely into a landscaped area.
i. The irrigation system shall provide for the installation of a manual shutoff valve as close as possible to the water supply. Additional manual shutoff valves shall be installed between each zone of the irrigation system and the water supply.
j. The irrigation system shall provide that irrigation for any landscaped area will be regulated by an automatic irrigation controller using either evapotranspiration or soil moisture sensor data.
k. The irrigation system shall be designed with a landscape irrigation efficiency necessary to meet the MAWA.
l. The plan shall describe each automatic irrigation controller the system uses to regulate the irrigation schedule, and whether it is a weather-based system or moisture detection system. The plan shall depict the location of electrical service for the automatic irrigation controller or describe the use of batteries or solar power that will power valves or an irrigation controller.
m. Parkways, between the curb and the sidewalk, bordering the development shall be provided below grade irrigation.

H. Water Efficient Landscape Worksheet

The water efficient landscape worksheet required by section 18.44.190(E)(1)(c) shall be prepared by a licensed landscape architect, licensed civil engineer, licensed architect, or other landscape professional appropriately licensed by the state, and shall contain the following:

1. A hydrozone information table that contains a list of each hydrozone in the landscaped area of the project and complies with the following requirements:
   a. For each hydrozone listed, the table shall identify the plant types and water features in the hydrozone, the irrigation methods used, the square footage, and the percentage of the total landscaped area of the project that the hydrozone represents.
   b. The plant types shall be categorized as turf, high water use, moderate water use, or low water use.
2. Water budget calculations, which shall meet the following requirements:
   a. The plant factor used shall be from WUCOLS III. A plan that mixes plants in a hydrozone that requires a different amount of water shall use the plant factor for the highest water using plant in the hydrozone.
   b. Temporarily irrigated areas shall be included in the low water use hydrozone. Temporarily irrigated as used in this section means the period of time when plantings only receive water until they become established.

c. The surface area of a water feature, including swimming pools, shall be included in a high water use hydrozone.
d. The calculations shall use the formula for the MAWA in Subsection K and for the ETWU in Subsection L.
e. Each special landscaped area shall be identified on the worksheet and the area's water use calculated using an ETAF of 1.0.

I. Grading Plan

The required grading plan shall comply with the Municipal Code Chapters 14.22 (Storm Water Management and Discharge Control) and 15.70 (Grading). See the SUSMP Manual for implementation guidelines for Chapter 14.22 to reduce runoff and the discharge of pollutants. The grading plan shall be prepared by a California licensed civil engineer, and shall comply with following requirements:

1. The grading on the project site shall be designed for the efficient use of water by minimizing soil erosion, runoff, and water waste, resulting from precipitation and irrigation.
2. The plan shall show the finished configurations and elevations of each landscaped area including the height of graded slopes, the drainage pattern, pad elevations, finish grade, and any storm water retention improvements.

J. Irrigation Schedule

The irrigation schedule shall be prepared by a licensed landscape architect, licensed civil engineer, licensed architect or other landscape professional appropriately licensed by the State, and shall provide the following information:

1. A description of the automatic irrigation system that will be used for the project.
2. The irrigation schedule shall consider irrigation run times, emission device, flow rate, and current reference evapotranspiration so that applied water meets the estimated total water use. Total annual applied water shall be less than or equal to maximum applied water allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data or soil moisture sensor data.
3. Overhead irrigation will be scheduled between 4:00 p.m. and 9:00 a.m., unless weather conditions prevent it. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
4. The parameters used for setting the irrigation system controller for watering times for:
   a. The plant establishment period.
   b. Different seasons during the year.
   c. Established landscaping and temporarily irrigated areas.
   d. Irrigation uniformity or efficiency setting.
5. The consideration used for each station based on the following factors:
   a. The days between irrigation.
   b. Stations run time in minutes for each irrigation event, designed to avoid runoff.
   c. Number of cycle starts required for each irrigation event, designed to avoid runoff.
   d. Amount of water to be applied on a monthly basis.
   e. The root depth setting.
   f. The plant type setting.
   g. The soil type.
   h. The slope factor.
   i. The shade factor.
   j. Application rate setting.
   k. Irrigation uniformity or efficiency setting.

K. Maximum Applied Water Use

1. A landscape project subject to this section shall not exceed the MAWA. The MAWA for a landscape project shall be determined by the following calculation: MAWA = (ETo)(0.62)[0.7 × LA + 0.3 × SLA].
2. The abbreviations used in the equation have the following meanings:

a. MAWA = Maximum Applied Water Allowance in gallons per year.
b. ETo = Evapotranspiration in inches per year.
c. 0.62 = Conversion factor to gallons per square foot.
d. 0.7 = ET adjustment factor for plant factors and irrigation efficiency.
e. LA = Landscaped area includes special landscaped area in square feet.
f. 0.3 = the additional ET adjustment factor for a special landscaped area (1.0 - 0.7 = 0.3).
g. SLA = Portion of the landscaped area identified as a special landscaped area in square feet.

L. Estimated Total Water Use

1. An applicant for a project subject to Section 18.44.190 shall calculate the ETWU for each landscaped area and the entire project using the following equation: $ETWU = (ETo)(0.62)(PF \times HA/IE + SLA)$.
2. The abbreviations used in the equation have the following meanings:
   a. ETWU = Estimated total water use in gallons per year.
   b. ETo = Evapotranspiration in inches per year.
   c. 0.62 = Conversion factor to gallons per square foot.
   d. PF = Plant factor from WUCOLS.
   e. HA = Hydrozone Area in square feet. Each HA shall be classified based upon the data included in the landscape and irrigation plan as high, medium, or low water use.
   f. IE = Irrigation Efficiency of the irrigation method used in the hydrozone.
   g. SLA = Special landscaped area in square feet.
3. The ETWU for a proposed project shall not exceed the MAWA.

M. Adjustment to Landscaped Area for Non-Vegetated Area

Rock and stone or pervious design features, such as decomposed granite ground cover that are adjacent to a vegetated area may be included in the calculation of the MAWA and ETWU provided the features are integrated into the design of the landscape area and the primary purpose of the feature is decorative.

N. Regulations Applicable to Use of Turf on Landscaped Areas

The following regulations shall apply to the use of turf on a project subject to Section 18.44.190:
1. Only low volume or subsurface irrigation shall be used for turf in a landscaped area when either of the following occurs:
   a. On a slope greater than 25 percent grade where the toe of the slope is adjacent to an impermeable hardscape.
   b. Where any dimension of the landscaped area is less than eight feet wide.
2. On a roadway improvement project, commercial, industrial, institutional, or multi-family project, no turf shall be allowed on a center island median strip or on a parking lot island.
3. A ball field, park, golf course, cemetery, and other similar use shall be designed to limit turf in any portion of a landscaped area not essential for the operation of the facility.
4. No turf shall be allowed in a landscaped area that cannot be efficiently irrigated to avoid runoff or overspray.

O. Projects with Model Homes

A person who obtains a permit to construct a single family residential development that contains a model home or homes shall provide a summary of this section to each adult visitor that visits a model home. If an adult visitor is accompanied by one or more adults during the visit only one set of written materials is required to be provided. Each model home shall provide an educational sign in the front yard of the model home visible and readable from the roadway that the home faces that states in capital black lettering at least two inches high on a white sign, "THIS MODEL HOME USES WATER EFFICIENT LANDSCAPING AND IRRIGATION."

P. Recycled Water

1. A person who obtains a permit for a project that is subject to this section shall use recycled water for irrigation and decorative water features when tertiary treated recycled water is available from the water purveyor who supplies water to the property.
2. A person using recycled water shall install a dual distribution system for water received from the water purveyor. Pipes carrying recycled water shall be purple.
3. A person who uses recycled water under this section shall be entitled to an ETAF of 1.0.
4. This section does not excuse a person using recycled water from complying with all state and local laws and regulations related to recycled water use.

Q. Landscaping and Irrigation Installation

A person issued a landscape approval for a project shall install the approved landscaping and irrigation system before final inspection of the project.

R. Landscaping and Irrigation Maintenance

1. A property owner using water on property subject to a landscape approval shall prepare a maintenance schedule for the landscaping and irrigation system on the project. The schedule shall provide for (1) routine inspection to guard against runoff and erosion and detect plant or irrigation system failure; (2) replacement of dead, dying and diseased vegetation; (3) eradication of invasive species; (4) repairing the irrigation system and its components; (5) replenishing mulch; (6) soil amendment when necessary to support and maintain healthy plant growth; (7) fertilizing, pruning, and weeding and maintaining turf areas; and (8) maintenance to avoid obstruction of motorists' view. The schedule shall also identify who will be responsible for maintenance.
2. After approval of a landscape plan, the owner is required to:
   a. Maintain and operate the landscaping and irrigation system on the property consistent with the MAWA.
   b. Maintain the irrigation system to achieve efficiency that meets or exceeds the MAWA.
   c. Replace broken or malfunctioning irrigation system components with components of the same materials and specifications, their equivalent or better.
   d. Ensure that when vegetation is replaced, replacement plantings are representative of the hydrozone in which the plants were removed, and are typical of the water use requirements of the plants removed, provided that the replaced vegetation does not result in mixing high-water use plants with low-water use plants in the same hydrozone.

S. Certificate of Completion

Each person issued a landscape approval shall submit:
1. A signed certificate of completion, under penalty of perjury, on a form provided by the City of National City within ten days after installation, that includes the following:
   a. A statement verifying that the landscaping and irrigation were installed as allowed in the approved landscape and irrigation plan, all recommended approved soil amendments identified in the soil management report were implemented, the installed irrigation system is functioning as designed and approved, the irrigation control system was properly programmed in accordance with the irrigation schedule, and the person operating the system has received all required maintenance and irrigation plans.
   b. "As-built" plans submitted by the landscape design professional of record showing the changes when there have been significant changes to the landscape plan during the installation of landscaping or irrigation devices or irrigation system components.
   c. Signature by the landscape design professional of record.
2. An irrigation schedule that complies with Subsection J that describes the irrigation times and water usage for the project.
3. A landscaping and irrigation system maintenance schedule that complies with Subsection R.

4. A soil management report that complies with Subsection F if the applicant did not submit the report with the landscape documentation package.

T. Waste Water Prevention

No person shall use water for irrigation that results in runoff, low head drainage, overspray or other similar condition, water flows onto adjacent property, non-irrigated areas, structures, walkways, roadways, or other paved areas.

~~SECTION~~CHAPTER 18-45 – OFF-STREET PARKING AND LOADING

18.45.010 Purpose
18.45.020 Requirements, General
18.454.030 Offsite Facilities
18.45.040 Site Plan Review Required
18.45.050 Off-Street Parking Requirement by Land Use
18.45.060 Westside Specific Plan Parking Requirements
18.45.070 Parking for Commercial Vehicles
18.45.080 Opportunities for Reduced Parking
18.45.090 Parking for Disabled Persons
18.45.100 Parking Lot Design Standards
18.45.110 Loading Requirements
18.45.120 Bicycle Parking

18.45.010 PURPOSE

A. Intent of this ~~Section~~Chapter

1. Provide for the establishment of accessory off-street parking and loading facilities incidental to new uses and to major alterations and enlargements of existing uses, in order to prevent or to progressively alleviate traffic congestion and shortage of curb space;
2. Prescribe minimum off-street parking and loading requirements for the various structures and uses irrespective of the districts in which they occur;
3. Ensure that off-street parking and loading facilities are designed, developed and maintained in a manner that will assure their usefulness, provide for public safety, and, where appropriate, insulate surrounding uses from their impact.

18.45.020 REQUIREMENTS – GENERAL

For any structure or use hereafter constructed, established, substantially altered, increased in intensity of use, or changed in, off-street parking and loading facilities conforming to the requirements of this ~~section~~Chapter shall be provided on the same lot as the main building or structure or on contiguous property.

A. Required for New or Moved Structures

Parking and loading facilities shall be provided for all structures and uses hereafter constructed, established, or moved to new sites.

B. Additional Facilities for Altered Structures – Requirements

1. Additional parking and loading facilities need not be provided where any structure is renovated or repaired, provided said structure is not increased in intensity of use or changed to a use requiring additional facilities.
2. Parking and loading facilities shall be provided in accordance with the requirements for an equivalent new structure where any such structure is in any way structurally altered to the extent of more than twice the latest assessed valuation prior to the alteration. (This provision applies to existing structures which, upon the effective date of the National City Land Use Code, are nonconforming as to parking and loading. The "latest assessed valuation" requirement is identical to the requirement for all nonconforming structures under the nonconforming provisions.)

C. Increase in Intensity of Use

1. For the purpose of this ~~section~~Chapter, an increase in the intensity of use of any structure or premises shall mean the addition of dwelling units, employees, gross floor area, seating capacity, or

any other unit of measurement specified in this title as a basis for determining required parking and loading facilities.

2. When the intensity of use of any structure or premises, excluding single-family detached dwellings, is increased by less than 50 percent, parking and loading facilities shall be provided for the increase but not for any existing deficiency in such facilities.
3. When the intensity of use is increased by more than 50 percent, excluding single-family detached dwellings, parking and loading facilities shall be provided for the entire structure or premises.
4. When consecutive increases in intensity of use amount to a total increase of more than 50 percent, parking and loading facilities shall be provided for the entire structure or premises. Consecutive increases shall be figured from the effective date of the National City Land Use Code or from the time of the initial construction or establishment, whichever is more recent.
5. When a single-family detached dwelling is increased or expanded to more than 2,500 square feet of floor area and/or more than four bedrooms, off-street parking facilities shall be provided for the increase but not for any existing deficiency in such facilities. Parking facilities required as a result of this ~~section~~Chapter may be provided in a garage, carport, or surface space.

D. Change in Use

When the use of any structure or premises is changed to a different use, parking and loading facilities shall be provided for the different use, in compliance with the provisions of this section for increase in intensity of use.

E. Permitted Facilities

Any off-street parking or loading facility which is permitted but not required by this title shall comply with all regulations in this ~~section~~Chapter governing the location, design, improvement, operation and maintenance of such facilities.

F. Reduction of Existing Facilities

Accessory parking and loading facilities in existence on the effective date of the National City Land Use Code, or authorized and subsequently established under a building permit issued prior to said effective date, shall not be reduced below, or if already less than, shall not be further reduced below, the requirements for an equivalent new structure or use. All such facilities shall be continued for as long as the structure or use served is continued, or until equivalent facilities are substituted in conformance with the requirements of this title. In no case, however, shall it be necessary to continue parking or loading facilities in excess of those required by this title for equivalent new structures or uses.

18.45.030 OFFSITE FACILITIES

A. Offsite Facilities – Recorded Agreements

1. Where required parking or loading facilities are provided on a lot other than the lot on which the structure or use served is located, as a prerequisite to the issuance of a building permit or certificate of occupancy, the property owners for which the facilities are required to be provided shall record an agreement, approved by the City Attorney as to form and content, in the Office of the County Recorder as a covenant running with the land for the benefit of the city. The agreement shall provide that said facilities shall be continued so long as the structure or use they intended to serve is continued.
2. Said agreement shall remain in effect until satisfactory evidence has been submitted to the Planning Division either that other parking or loading facilities meeting the requirements of this title have been provided or that the structure or use served has been removed or changed so as to no longer require said facilities. Upon submission of such evidence, the Planning Division shall remove the restriction from the property.

B. Offsite Facilities – Certificate of Occupancy for Building or Structure Being Served

1. Any certificate of occupancy for the structure or use referred to in Section 18.43.030(A) shall be valid only while such parking facilities are continued and shall bear a notation to that effect.
2. Each such certificate shall be continuously displayed in a conspicuous place in the building, or, if there is no building, on the premises. The City Manager or his/her designee shall keep a record of each off-site parking or loading facility and shall periodically inspect such facilities to ensure their continuation.
3. If such facilities are not continued, the certificate of occupancy for the structure or use served by the facilities shall be automatically canceled. The Building Official shall notify the person having custody of said structure or use of the cancellation of the certificate and the reasons therefore. The structure or use shall not thereafter be occupied or used until the required facilities are again provided in accordance with the provisions of this title and a new certificate is issued.

C. Requirements --General

Where there is a combination of structures or uses on a lot, the total number of parking stalls and loading facilities required shall be the sum of the individual requirements of the various structures or uses on the premises.

D. Unspecified Uses – Determination of Parking Requirements

Parking requirements for structures and uses not specified in Section 18.45.050 shall be determined by the Planning Commission based on the requirements for the most comparable structure or use specified.

18.45.040 SITE PLAN REVIEW REQUIRED

All parking facility improvements shall comply with the provisions of Chapter 1 Section 18.12.070 (Site Plan Review). Improvements subject to review include, but are not limited to, driveways, access to streets and alleys, arrangement of parking stalls, aisles and maneuvering areas, signs and traffic-control devices, striping, surfacing, lighting, landscaping, screening, pedestrian walkways, fire access ways, obstructions, traffic flow and protective barriers.

18.45.050 OFF-STREET PARKING REQUIREMENTS BY LAND USE

The off-street parking and loading spaces as required by this section shall be completed and made available for use, including curb break and driveway installed to the established grade of the street, prior to the occupancy of the building served.

A. Off-Street Parking Schedule

The following is the schedule of off-street parking requirements for residential use. Each land use shall be provided the number of parking spaces required as determined in Table 18.45.050. In addition, the following information shall be used to determine off-street parking requirements.

1. Floor area. Where Table 18.45.050 establishes a parking requirement based on the floor area of a use in a specified number of square feet (e.g., 1 space per 250 square feet), the floor area shall be construed to mean gross floor area.
2. Fractions. Where application of the requirements in Table 18.45.050 results in a fractional requirement, a fraction of 0.5 or greater shall be increased to the next higher number and a fraction of less than 0.5 shall be reduced to the next lower number.

TABLE 18.45.050
Schedule of Off-Street Parking Requirements by Land Use

Uses and Structures	Minimum Parking Spaces Required (Unless Otherwise Specified)
Residential Uses	
Dwelling, single detached (RS-1 zone)	2 spaces within a garage or carport for dwellings 2,500 square feet or less. 3 spaces, including 2 spaces within a garage or carport, for dwellings greater than 2,500 square feet.
Dwelling, single detached (all other RS and RM zones, except within the Westside Specific Plan area)	2 spaces, including 1 space in a garage or carport, for dwellings 2,500 square feet or less. 3 spaces, including 2 within a garage or carport, for dwellings greater than 2,500 square feet.
Dwelling, single attached	1.5 spaces per dwelling unit in a garage or carport
Dwelling, multiple	1.3 spaces per 1-bedroom dwelling unit plus 1.5 spaces per 2-bedroom or more unit, and conveniently located guest parking of ½ space per unit for 20 units or less, plus ¼ space for each unit over 20. Half of the required guest parking spaces may include parallel curb parking spaces on dedicated public streets contiguous to the site.
Fraternity, Sorority House, or Dormitory	1.5 spaces for each sleeping room
Mobile Home Parks	2 spaces per unit
Rectory	1 garage space per bedroom
Rooming or boarding house	1 space per guest room
Second dwelling unit	1 space in addition to primary residence parking requirements
Senior Housing	1 space per unit plus 1 guest space for each 10 units
RS-4 (Westside Specific Plan): Units greater than 1,200 square feet	2 spaces per unit
RS-4 (Westside Specific Plan): Units less than 1,200 square feet	1.7 spaces per unit
Commercial and Office Uses	
Banks and financial institutions	3 spaces per 1,000 square feet floor area
Offices, administrative, clerical, and professional • First 5,000 square feet • 5,000 to 10,000 square feet • 10,000 to 30,000 square feet • 30,000 to 100,000 square feet • Over 100,000 square feet	Number of required parking spaces varies depending on the amount of floor area as identified in the column to the left. • 1 space per 200 square feet floor area • 1 space per 250 square feet floor area • 1 space per 300 square feet floor area • 1 space per 350 square feet floor area • 1 space per 400 square feet floor area
Offices, medical/dental office or outpatient clinic, veterinary hospitals and clinics	1 space per 300 square feet floor area
Lodging – Hotel, motel, bed and breakfast inn	1 for each guest bedroom, plus 1 for the manager's unit
Restaurant, bar, nightclub, pool hall, bowling alley, or similar establishment	10 spaces per 1,000 square feet floor area
Gasoline service station	1 space per 1,000 square feet of lot area; less the footprint of any convenience store area, plus 3.3 spaces per 1,000 square feet of convenience store area
Commercial recreation, indoor	2.5 spaces per 1,000 square feet floor area
Retail sales	1 for each 250 square feet of floor area
Personal services	1 space per 300 square feet of floor area
Shopping centers with multiple tenants	1 space per 200 square feet floor area
Vehicle repair or service, including car wash	1 space per 500 square feet floor area
Vehicle sales or rental (new and used)	1 space per 500 square feet floor area plus one per every 2,500 square feet outdoor display area
Theater/auditorium, stadium/sports arena	1 space per 5 seats
Mausoleum/crematory	25 spaces per 1,000 square feet of seating area
CL zone (Westside Specific Plan): Office	2.9 spaces per 1,000 square feet floor area
CL zone (Westside Specific Plan): Retail	3.6 spaces per 1,000 square feet floor area
CL zone (Westside Specific Plan): Industrial	2 spaces per 1,000 square feet floor area

Mixed-Uses	
MXD-1 and MXD-2 (Non-residential uses)	Minimum: 2 spaces per 1,000 square feet floor area; Maximum: 4 spaces per 1,000 square feet floor area
MXC-1 and MXC-2 (Non-residential uses)	Minimum: None; Maximum: 3 spaces per 1,000 square feet floor area
MXD and MXC zones: Residential – studio, 1 bedroom, and 2 bedroom units	Minimum: 1 space per unit; Maximum: None
MXD and MXC zones: Residential – 3 or more bedroom units	Minimum: 1.5 spaces per unit; Maximum: None
MCR-1 and MCR-2 (Westside Specific Plan): Residential units greater than 1200 square feet	1.5 spaces per unit
MCR-1 and MCR-2 (Westside Specific Plan): Residential units less than 1200 square feet	1 space per unit
MCR-1 and MCR-2 (Westside Specific Plan): Office uses	2.9 spaces per 1,000 square feet floor area
MCR-1 and MCR-2 (Westside Specific Plan): Retail uses	3.6 spaces per 1,000 square feet floor area
MCR-1 and MCR-2 (Westside Specific Plan): Industrial uses	2 spaces per 1,000 square feet floor area
Industrial Uses	
Industrial manufacturing and processing uses, waterfront related industry, wholesaling, warehousing, and distribution	1 space for each 1,000 square feet of floor area
Industrial/building supplies and equipment, sales and rentals	1 space per 800 square feet floor area
Research and development	1 space per 400 square feet of floor area
Recycling facilities	2 spaces per 1,000 square feet floor area
Animal boarding/kennel	1 space per 500 square feet floor area
Trucking and transportation terminal	2 spaces per 1,000 square feet floor area plus 1 space for every 2 fleet vehicles
Institutional Uses	
Hospital or other inpatient medical institution	1 space per 3 beds, excluding bassinets
Civic, fraternal, community, and cultural facilities	1 space per every 200 square feet of floor space open to the public plus 1 space per each 300 square feet of administrative office area
Public/religious assembly, fraternal lodge or club, banquet fall/facilities, and similar establishments	1 space for every 35 square feet of seating area
Convention center	1 space per 50 square feet floor area
Child day care center, preschool, or nursery school	2 spaces per 1,000 square feet floor area
Schools, elementary and middle	1.5 spaces per classroom plus area one space for each 300 square feet of office area
Schools, high	1 space per each 150 square feet of classroom area plus one space for each 300 square feet office area
Schools, trade, college/university, business, adult education	1 space per 40 square feet of classroom area plus 1 space per 300 square feet of office area
Open Space/Agriculture	
Neighborhood and community farms	Minimum 2 parking spaces, plus one additional space for every acre of garden site lot area over 2 acres. Each garden site that includes a farm stand shall provide 1 additional space for every 250 feet of floor area and outdoor display space.

18.45.060 WESTSIDE SPECIFIC AREA PLAN PARKING REQUIREMENTS

A. Shared parking for mixed use in MCR-1 and MCR-2 zones

Shared parking may be considered where 50 percent of the parking may be shared between daytime uses (commercial and office) and nighttime uses (residential).

B. Joint parking arrangements

Joint parking arrangements may be developed on-site or within an off-site parking lot or parking structure located within 500 feet of the property line of the development.

C. Tandem parking

1. Two-car tandem garages are permitted within the RS-4 zone. A two-car tandem garage shall measure a minimum of ten feet wide by 38 feet long. A tandem parking space within a parking structure shall be a minimum of 8.5-feet wide by 36-feet long.
2. A maximum of 25 percent of multi-family development may be provided with tandem parking spaces.
3. Tandem parking is permitted when a mechanical lift parking device is used. See subsection 18.45.100.G.

18.45.070 PARKING FOR COMMERCIAL VEHICLES

In addition to the parking spaces required by Table 18.45.050, for owners, occupants, employees, customers, or visitors of structures and uses, one parking space shall be provided for each commercial vehicle used in connection with the operation of any structure or use. Parking spaces for accessory vehicles shall be provided within an open or enclosed parking facility on the same lot as the structure or use to which the vehicles are accessory.

18.45.080 OPPORTUNITIES FOR REDUCED PARKING

A. Transportation Demand Management Program (TDM)

The Planning Commission, appealable to City Council, may approve a reduction in off-street parking spaces otherwise required by the strict application of this section, subject to conditions it deems appropriate, when the applicant has demonstrated to the City's satisfaction that, due to the TDM program, that the spaces proposed to be eliminated for the subject development are unnecessary and that the reduction will not adversely affect the site or the adjacent area. A TDM program shall include, at a minimum, the following components:

1. A projected reduction in parking demand expressed as a percentage of overall parking demand and the basis for such reduction;
2. The TDM program actions to be taken by the applicant to reduce the parking demand;
3. A requirement by the applicant to periodically monitor whether the projected reductions are being achieved; and
4. A commitment and plan whereby the applicant shall provide additional parking spaces in an amount equivalent to the reduction should the TDM program not result in the projected reduction in parking demand.

B. Proximity to Transit

The Planning Commission, appealable to City Council, may approve a reduction in off-street parking spaces otherwise required by the strict application of this section, subject to conditions that it deems appropriate, when the subject development is conveniently accessible to a transit station. The transit station must either exist or is programmed for completion within the same time frame as the completion of the subject development. In addition, the subject development shall be located within a quarter-mile radius (1,320 feet) of the transit station. Such reduction may be approved when the applicant has proven

that the parking spaces proposed to be eliminated are unnecessary based on the projected parking demand resulting from the proximity to the transit station and such reduction in parking spaces will not adversely affect the site or the adjacent area. Parking may be reduced to no more than two parking spaces per 1,000 square feet of commercial floor area and multi-unit residential parking requirements may be reduced to no more than space for studio, one-bedroom, and two-bedroom units and two spaces for three-bedroom units.

C. Shared Parking

The Planning Commission, appealable to City Council, encourages parking lots for different structures or uses, or for mixed-uses, to be shared. At the applicant's request, a reduction in off-street parking spaces otherwise required by the strict application of this section, subject to conditions it deems appropriate, when the applicant has demonstrated to the review authority's satisfaction that, due to the shared parking approach, that the spaces proposed to be eliminated for the subject development are unnecessary and that the reduction will not adversely affect the site or the adjacent area. Uses that are sharing the parking facility shall be a maximum of 500 feet from the closest parking space in a lot providing the shared spaces.

D. Adjacent On-Street Parking

The Planning Commission, appealable to City Council, may approve a reduction in off-street parking spaces otherwise required by the strict application of this section, subject to conditions it deems appropriate, when the applicant has demonstrated to the City's satisfaction that the spaces proposed to be eliminated for the subject development are unnecessary and that the reduction will not adversely affect the site or the adjacent area. A reduction in parking spaces will only be allowed for adjacent on-street parking when said spaces are located along the public street frontage shared with the building's façade. For example, if a building fronting a public street measures 100 linear feet and four parking spaces are located adjacent to the 100 linear feet of frontage, the parking reduction may be four spaces. Fractions of spaces will not be permitted to count towards the reduction allowance.

E. Car-sharing

The Planning Commission, appealable to City Council, may approve a reduction in off-street parking spaces otherwise required by the strict application of this section, subject to conditions it deems appropriate, when the applicant has demonstrated to the City's satisfaction that the spaces proposed to be eliminated for the subject development are unnecessary and that the reduction will not adversely affect the site or the adjacent area. A reduction of one parking space for each car sharing vehicle space leased by a car sharing program may be allowed for every 60 dwelling units in a multi-unit residential development.

F. Motorcycle Parking Spaces

Parking lots with 40 or more spaces may replace regular spaces with motorcycle spaces. One regular space may be replaced for each 40 required spaces. Motorcycle spaces shall be a minimum size of four feet by eight feet. Although more spaces may be provided, a maximum of two-and-one-half percent of the total parking space requirement based on the strict application of this section may be motorcycle parking spaces provided in lieu of automobile parking space. Motorcycle parking spaces shall be located within 100 feet of a building entry.

18.45.090 PARKING FOR DISABLED PERSONS

A. California Vehicle Code

Properly posted and identified off-street parking stalls reserved for disabled persons shall be provided pursuant to California Vehicle Code Section 21107.8 et seq. or the most recently adopted Chapter 11 of

the California Building Code. Such parking stalls shall be included in the minimum number of parking stalls required by this ~~section~~Chapter.

18.45.100 PARKING LOT DESIGN STANDARDS

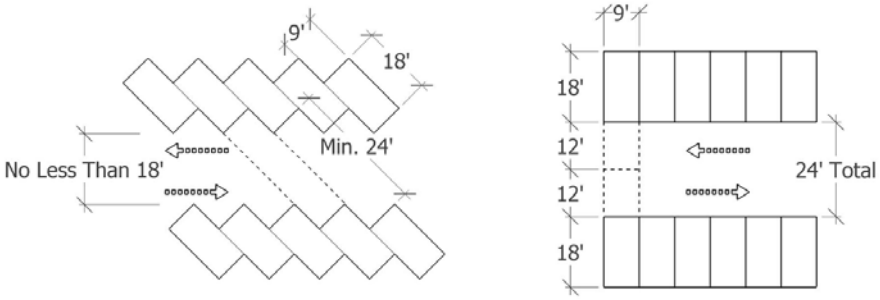
A. Setbacks

1. Parking facilities may occupy any portion of a lot, except and as provided by this section.
2. Parking facilities shall not extend into any required yard that adjoins a street lot line.
3. Where a parking facility is on a lot not in a residential zone but which adjoins a residential zone along the same street, the parking facility shall not be located closer to the street lot line than would be permitted on the adjoining residential zone lot or 20 feet, whichever is less. The street setback provided by this provision shall extend for a distance of at least 50 feet from the adjoining residential zone.
4. All required yards separating off-street parking areas from street lot lines shall be landscaped in accordance with this chapter, except multi-unit residential projects of eight units or less.
5. All parking stalls in an open parking facility shall be setback from any dwelling unit wall on the same lot if the wall contains doors or windows which are on the same or approximately the same level as the parking facility. The setback shall be at least ten feet in width, at least one-half the width of which shall be unpaved.

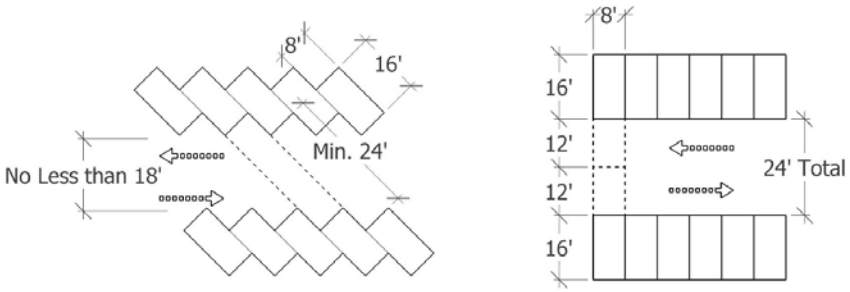
B. Minimum Dimensions: Stalls, Back-Up Areas, and Aisles

All parking stalls for a standard size car shall measure no less than nine feet wide and 18 feet long. All two-way aisles providing access to parking stalls, including compact parking spaces, shall provide a minimum back-up and maneuvering distance of 12 feet for each space. In no instance may a two-way aisle measure less than 18 feet in width. All one-way aisles providing access to parking stalls, including compact parking spaces, shall provide a minimum back-up and maneuvering distance of 12 feet for each space, but in no instance may a one-way aisle measure less than 12 feet width. The following diagrams illustrate the minimum layout of parking stalls, back-up space, and drive aisles. The minimum back-up area for two-way aisles is 24-feet. All aisles shall be adequate to provide safe and efficient access to and from parking spaces, based on minimum standards administered by the City Traffic Engineer. Two feet shall be added to the width of the stall for stalls abutting a building, fence, or other obstruction.

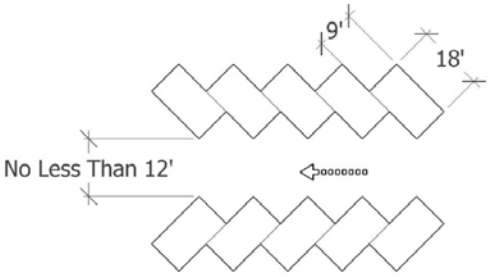
Parking Lot Design Standards Dimensions



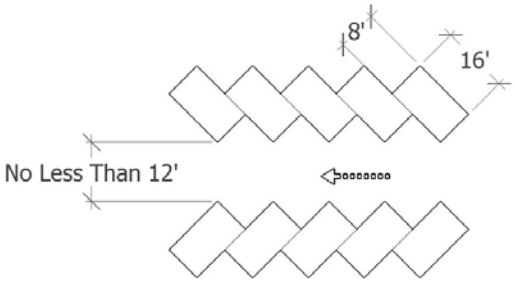
Standard Size Car
Minimum Stall, Back-Up, and Two-Way Aisle Dimensions



Compact Size Car
Minimum Stall, Back-Up, and Two-Way Aisle Dimensions



Standard Size Car
Minimum Stall, Back-Up, and One-Way Aisle Dimensions



Compact Size Car
Minimum Stall, Back-Up, and One-Way Aisle Dimensions

C. Parking Stalls – General Provisions

1. Parking stalls--openings. All parking stalls shall open directly on a maneuvering or turnaround area, an access driveway, or an aisle leading to an access driveway, and shall be individually and continuously accessible.
2. Parking stalls--location. All parking stalls shall be so located and free of obstructions that parking can be accomplished in a continuous forward movement and unparking can be accomplished with not more than one backing movement and one forward movement.
3. Vertical clearance. Each parking space shall have a vertical clearance of at least seven feet.

D. Driveways and Aisles – General Provisions

1. Access to streets or alleys.
   a. Access driveways shall be provided between each parking facility and a public street or alley. Lots should not have access from predominantly residential streets, except when the lot is serving a residential use. Residential driveways shall be permitted only on an arterial street where no other access to the property exists.
   b. One-way driveways and driveways serving a single-family residence shall have a minimum width of 12 feet; except for driveways leading to a single car garage or parking space where the City Manager or his/her designee may authorize a lesser width.
   c. Two-way driveways between a street and private parking facilities shall have a minimum width of 18 feet. Two-way driveways between a street and public parking facilities shall have a minimum width of 24 feet. Two-way driveways within a parking facility connecting separated areas of parking spaces shall have a minimum width of 18 feet, or as otherwise required by this section.
   d. Where access is available from any adjoining or abutting alley to any lot proposed for residential or mixed use development in the commercial zones, access to the required residential parking facility shall be from that alley when appropriate to avoid access to commercial collector or arterial streets.
2. Internal circulation--generally. All parking facilities, except those serving not more than two dwelling units, shall be arranged so that:
   a. Any vehicle entering a public street can do so traveling in a forward motion;
   b. A vehicle entering the parking facility shall not be required to enter a street to move from one location to any other location within the parking facility or premises.
3. Internal circulation--serving not more than two dwelling units. Parking facilities serving not more than two dwelling units shall be arranged so that any vehicle entering a street can do so traveling in a forward motion where:
   a. The parking facility is served by a single access driveway that is less than 20 feet in width and more than 100 feet in length;
   b. The access driveway opens upon an arterial street.
4. Vehicle maneuver restrictions. All parking facilities, except those serving not more than two dwelling units, shall be arranged so that parking maneuvers can be accomplished without driving, maneuvering, or encroaching into or upon any public right-of-way, walkway, or unpaved landscaped area within or adjoining the parking facility.
5. Parking facilities--Driveway vertical clearance. The minimum vertical clearance for driveways shall be 13 feet six inches to allow for the passage of emergency vehicles, or as required by the City Fire Department, whichever is greater.
6. Parking facilities--aisles, approach lanes, and maneuvering areas for two-way traffic. For two-way traffic within parking facilities, all aisles, approach lanes and maneuvering areas shall have a minimum width as specified in this section or as required by the City Fire Department for emergency access, whichever is greater.
7. Parking facilities--one-way aisles--width. One-way aisles shall have a minimum width of 12 feet or as specified in this section, whichever is greater.
8. Parking facilities--one-way aisles--directional markings. One-way aisles shall have directional markings to indicate one-way circulation.

9. Parking facilities--entrances and exits.
   a. The location and design of all street or alley entrances and exits for off-street parking facilities shall be subject to the approval of the City Engineer, to insure traffic safety.
   b. Each exit to a parking lot shall be constructed and maintained so that any vehicle leaving the parking lot shall be clearly visible to a person reaching a point ten feet from the edge of the approach to the driveway nearest to him, when the vehicle is at a point distant ten feet from the property line within the parking lot. Exits from parking lots shall be clearly posted with stop signs. Appropriate bumper guards, entrance and exit signs, and directional signs shall be maintained where needed. Upon a finding that parking facilities cause imminent hazard upon adjoining public streets, the City Engineer may order the placement and maintenance of such guards and signs. Failure to comply with any such order may be grounds for a finding of a public nuisance.
10. Vertical clearance. The minimum vertical clearance for driveways shall be 13 feet six inches to allow for the passage of emergency vehicles, or as required by the City Fire Department, whichever is greater.

E. Compact Car Parking

1. In the industrial, institutional zones, commercial, and mixed-use zones (except retail uses) 25 percent of the parking stalls required by the schedules set out in this section may be allocated to compact car spaces. No compact parking spaces shall be permitted for retail uses and guest and visitor parking.
2. For residential multifamily use, one parking space may be compact in size for every ten parking spaces required.
3. All parking spaces provided in excess of the number required by Table 18.45.050 set out in this section may be allocated to compact car spaces.
4. All parking facilities constructed, installed or modified to incorporate compact car spaces shall comply with the provisions of this section. Design features subject to review shall include, but are not limited to, specific findings of good circulation, adaptability to balance of parking lot, easy identification and adequate signs and pavement markings. The design of such signs and markings shall be subject to approval of the Planning Division.
5. Maintenance of parking facilities pursuant to this section shall also include maintenance of all special compact car signs and pavement markings shown on approved site plans or otherwise required by this section.
6. The dimensions of compact car parking stalls, back-up areas, and drive aisles shall be as indicated in the diagrams in Section 18.45.100(B).

F. Dimensions for Garage or Carport Areas and Openings

1. A one-car garage or carport shall contain an unobstructed interior parking area of a minimum of 11 feet wide by 19 feet deep. A two-car garage or carport shall contain an unobstructed interior parking area of a minimum of twenty feet wide by nineteen feet deep.
2. A garage for more than two cars shall contain a minimum area of nine feet by 18 feet for each additional car.
3. A single-car garage door or opening to a single space carport shall be a minimum of eight feet wide; a two-car garage door or opening to a two-space carport shall be a minimum of 16 feet wide. For larger parking garages or carports serving multifamily residential or nonresidential development, openings shall be increased in width by at least one foot if a column, post, or similar obstruction is located within at least three-and-one-half feet of the opening to the stall.

G. Mechanical Lift Parking

Mechanical lifts for vertical storage of vehicles are permitted in the Downtown and Westside Specific Plan areas. Each vertically stacked space shall count as one space. Mechanical lifts shall be completely enclosed or fully screened from street view and adjacent residential zones. Vertically stacked vehicles are exempt from the seven foot vertical clearance requirement. All mechanical parking equipment must be designed, installed, constructed, and maintained so as to be reasonably safe to life, limb, and adjoining

property and must be reviewed by the City Manager or his/her designee prior to installation or construction.

H. Motorcycle Parking

Each motorcycle parking space shall measure at least four feet wide and 32 square feet in total area. Motorcycle parking spaces shall be located within 100 feet of a building entry.

I. Pedestrian Walkways

1. All parking facilities shall have safe, unobstructed, convenient, well-drained pedestrian access by provision of walks, steps or stepped ramps, so constructed as to assure reasonable durability and economy of maintenance.
2. Pedestrian walkways shall be a minimum of five feet in width. Pedestrian walkways located immediately adjacent to and perpendicular to a parking stall shall be a minimum of six feet.
3. The preferred gradient for pedestrian walkways is no greater than five percent. Pedestrian walkways shall not exceed a gradient of 12 percent. Pedestrian walkways between five percent and 12 percent gradients shall be provided with handrails.

18.45.110 LOADING REQUIREMENTS

A. General Provisions

1. On the same premises with every building, structure or part erected and occupied in the commercial or industrial zones, there shall be provided and maintained, on the lot, adequate space for standing, loading and unloading services, in order to avoid undue interference with public use of the streets or alleys.
2. Such space, unless otherwise adequately provided for, shall include one 12 foot by 50 foot loading space with a 14 foot height clearance for every 20,000 square feet or fraction thereof of building floor area, or for every 20,000 square feet or fraction thereof of land use.
3. All loading facilities shall be improved in accordance with the requirements established for parking facilities by this section.
4. Required loading facilities shall be used exclusively for the loading and unloading of vehicles concerned with the transportation of goods or materials. Loading facilities shall not be used to satisfy the stall requirements for parking facilities, nor shall they be used for the sale, display, rental or repair of motor vehicles.
5. Loading facilities shall be screened as provided in this section except that all loading berths exceeding 25 feet in length which are located within 50 feet of a residential zone shall be enclosed or screened from the residential zone by a solid masonry wall not less than six feet nor more than eight feet in height.
6. No interior landscaping of loading areas shall be required.
7. All loading facilities shall be arranged so that any vehicle utilizing the facility may enter a street traveling in a forward motion.
8. Each loading berth shall open directly upon a maneuvering or turnaround area, an access driveway, an aisle leading to an access driveway, or an alley, and shall be easily accessible.
9. All access driveways serving loading facilities shall conform to the requirements established in this section for parking facility access driveways, but in addition shall be located so that any street entrance or exit to or from the loading facility is at a point at least 50 feet from the nearest point of intersection of any two streets and at least 30 feet from any lot in a residential district.

B. Number of Spaces Required

The following loading and unloading spaces shall be provided and maintained as specified below for the use to which the property is devoted. Fractional requirements are omitted. Encroachment of the loading space on a public right-of-way is not permitted.

1. Retail and wholesale markets, warehouses, hotels, hospitals, laundry and dry cleaning establishments and other places where large amounts of goods are received and shipped, no loading space is required for a building less than 10,000 square feet in gross floor area.
2. For such buildings with 10,000 to 40,000 square feet in gross floor area, one off-street loading space shall be required.
3. For such buildings with greater than 40,000 square feet in gross floor area, one off-street loading space is required for each 40,000 square feet in total gross floor area.

18.45.120 BICYCLE PARKING

A. Number of Spaces Required

The following minimum off-street bicycle parking facilities shall be required for all new or expanded developments. Calculation of bicycle parking facilities shall be based on the off-street vehicle parking spaces required prior to consideration of any vehicle parking reduction measures. Fractional requirements up to one-half shall be omitted. One-half or over shall require one space. Calculation of bicycle parking facilities for mixed use land uses shall be based on the individual use as identified in Table 18.45.120A, below.

TABLE 18.45.120A
Bicycle Parking Requirements by Land Use

Use	Required Number of Bicycle Parking Spaces
Multi-family Residential	1 for every 10 vehicle parking spaces
Senior Housing	1 space for every 20 dwelling units
Health Care Facilities	1 space for every 10 vehicle parking spaces
Retail Commercial, Public and Civic	1 space for every 20 vehicle parking spaces
Public Assembly, Health Clubs, Hotels, Private Clubs and Lodges	1 space for every 10 vehicle parking spaces
Business, professional, and corporate office	1 space for every 10 vehicle parking spaces
Industrial	1 space for every 10 vehicle parking spaces

B. Bicycle Parking Design

1. Bicycle parking facilities shall be installed in a manner which allows adequate spacing for access to the bicycle and the locking device when the facilities are occupied. Space allowances shall be 30 inches wide and six feet long per bicycle and include a five foot maneuvering space behind the bicycle. At least seven feet of vertical clearance is required.
2. The facilities shall be located on a hard dust-free surface, such as asphalt or a concrete slab.
3. Bicycle parking facilities shall be located in view of building entrances or in view of windows and/or security personnel stations. At least 50 percent of required bicycle parking must be located within 50 feet of a customer entrance, and the remainder must be located within 100 feet of any entrance.
4. Bicycle spaces shall be separated from sidewalks, motor vehicle parking spaces or aisles by a fence, wall, or curb, or by at least five feet of open area, marked to prohibit motor vehicle parking.

C. Required Shower Facilities

All news buildings and additions to existing buildings that result in a total floor area as shown in the following table are encouraged to provide employee showers and dressing areas for each gender as shown in the following Table 18.45.120B

TABLE 18.45.120B
Required Number of Showers

Land Use	Number of Showers Required for Specified Building Floor Area	
	1 Shower for Each Gender	1 Additional Shower for Each Gender
Office Use (Business, professional)	50,000 to 149,000 square feet	Each 100,000 square feet over 150,000
Retail trade and services	100,000 to 299,999 square feet	Each 200,000 square feet over 300,000
Industrial/Manufacturing	50,000 square feet or more	N/A

~~SECTION~~CHAPTER 18-46 – OUTDOOR LIGHTING

18.46.010 Purpose
18.46.020 Applicability
18.46.030 General Standards
18.46.040 Lighting Plan Requirements
18.46.050 Security Lighting
18.46.060 Accent Lighting
18.46.070 Lighting Standards for Uses with 50 Feet of Residential Zones
18.46.080 Parking Lot Lighting
18.46.090 Lighting of Outdoor Performance Sport and Recreational Facilities
18.46.100 Lighting for Multi Unit Attached Residential Projects
18.46.110 Standards for Single Family Residential Uses

18.46.010 PURPOSE

A. Intent and Purpose of this ~~Section~~Chapter

1. To provide reasonable restrictions and limitations upon the use of lighting in or near the residential zones of the City so as to prevent lighting from creating a nuisance to residents within said residential zones. It is recognized that lighting is widely used in commercial or industrial zones for the purpose of advertising and security and that such lighting is essential to the conduct of many commercial or industrial enterprises.
2. The City acknowledges that protective security lighting in residential zones constitutes a deterrent to crime and an aid in law enforcement and contributes generally to the safety of those persons residing in such residential zones. It is further accepted that properly controlled lighting in residential areas used for landscaping and highlighting of architectural features of buildings and structures enhances and promotes the aesthetic condition of the property and the general welfare of the area.
3. It is equally recognized that lighting, by virtue of its intensity, brightness, direction, duration and hours of operation, can constitute a nuisance to adjacent residential dwellers. The purpose and intent of this section is to establish outdoor lighting standards that reduce the impacts of glare, light trespass, overlighting, skyglow, and poorly shielded or inappropriately directed lighting fixtures and that promote safety and energy conservation.
4. It is the intent of the City to adopt this section to encourage the continued and appropriate use of lighting for the purposes set forth in this section, but to require that said lighting be regulated and controlled in a manner so as to avoid the creation of a public nuisance in residential areas. All outdoor lighting in National City shall be regulated by this Land Use Code and by the State of California Title 24 Energy Efficiency Standards for outdoor lighting requirements.

18.46.020 APPLICABILITY

A. New Uses, Buildings, and Additions

Unless specifically exempted elsewhere in this ~~section~~Chapter, the provisions of this ~~section~~Chapter shall apply to all outdoor lighting for proposed new land uses, developments, buildings, structures, or building additions that require a permit.

B. Non-Conforming Uses, Structures, or Lots

Whenever a nonconforming use, structure or lot is abandoned for a period of one year and then recommenced or changed to a new use, then any existing outdoor lighting shall be reviewed and brought into compliance with the provisions of this ~~section~~Chapter as necessary for the entire building, structure or premises, to the maximum extent possible as determined by the Planning Division.

18.46.030 GENERAL STANDARDS

A. Outdoor Lighting Fixtures

All outdoor lighting fixtures shall be designed, shielded, aimed, located, and maintained to shield adjacent properties and to not produce glare onto adjacent properties or roadways. Parking lot light fixtures and light fixtures on buildings shall be full cut-off fixtures.

B. Street Lighting

Street lighting shall be provided in accordance with the requirements of the National City Standards Manual.

C. Prohibited Lighting

Flashing, revolving, intermittent exterior lighting or internally illuminated signs are prohibited. High intensity light beams, such as, but not limited to, outdoor searchlights, lasers, or strobe lights shall be prohibited.

D. Lighting for Safety

In all multiple family residential, commercial, or industrial developments, all sites shall be well lit so as to provide safe pedestrian and vehicular access and to eliminate dark areas.

18.46.040 LIGHTING PLAN REQUIREMENTS

A. Exterior Lighting Plan

The applicant shall submit to the Planning Division sufficient information, in the form of an overall exterior lighting plan, to enable the director to determine that the applicable provisions will be satisfied. The exterior lighting plan shall include, at a minimum, the following information:

1. Manufacturer specification sheets, cut sheets or other manufacturer provided information for all proposed lighting fixtures.
2. The proposed location, mounting height, and aiming point of all exterior lighting fixtures.
3. If building elevations are proposed for illumination, drawings shall be provided for all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the luminance levels of the elevations, and the aiming point for any remote light fixture. If only architectural lighting below five foot-candles is proposed, this section or any portion of it may be waived by the director.
4. A brief written narrative which describes the objectives of the lighting.
5. Photometric data, Color Rendering Index (CRI) of all lamps (bulbs), and other descriptive information of the fixtures, and, if applicable or required, designation as Illuminating Engineering Society of North America (IESNA) “cut-off” fixtures.
6. A computer generated photometric grid showing foot-candle readings every ten feet within the property or site, and ten feet beyond the property lines at a scale specified by the director. Iso foot-candle contour line style plans may be substituted for the photometric grid.
7. For exterior lighting installations within 50 feet of upper level living units, horizontal and vertical projection of photometric data is required.
8. If needed to review proposed exterior lighting installations, the director may require additional information following the initial lighting plan submittal, including but not limited to:
   a. Landscaping information that indicates mature tree size;
   b. Shrubbery and other vegetation in order to evaluate the long-term and seasonal effectiveness of lighting or screening of lighting.

18.46.050 SECURITY LIGHTING

A. Defined

For the purposes of this section, security lighting is defined to include the following: lighting intended to reduce the risk (real or perceived) of personal attack and lighting intended to discourage intruders, vandals, or burglars, and to protect property.

B. Shielded and Aimed

All security lighting fixtures shall be shielded and aimed so that illumination is directed only within the owner's property boundaries and not cast on other areas. In no case shall lighting be directed above a horizontal plane through the top of the lighting fixture, and the fixture shall include shields that prevent the light source or lens from being visible from adjacent properties and roadways. The use of general floodlighting fixtures shall be prohibited unless it meets the shielding requirements of this section.

C. Vertical Surfaces

Security lighting may illuminate vertical surfaces (e.g. building facades and walls) up to a level eight feet above grade or eight feet above the bottoms of doorways or entries, whichever is greater.

D. Pole-Mounted

Security lighting fixtures may be mounted on poles located no less than ten feet from the perimeter of the property boundary.

E. Site Perimeters

Security lights intended to illuminate a perimeter (such as a fence line) shall include motion sensors and be designed to be off unless triggered by an intruder located within five feet of the perimeter. The zone of activation sensors must be within the property boundaries of the property wishing to be illuminated.

F. Timers and Photocells

Security lights shall combine timers with dusk-to-dawn photocells to ensure lights are on only when it is dark.

G. Requirements

In addition to the application materials set forth in the general provisions of this sction, applications for security lighting installations shall include a written description of the need for and purposes of the security lighting, a site plan showing the area to be secured and the location of all security lighting fixtures, specifications of all fixtures, the horizontal and vertical angles in which light will be directed, and adequate cross-sections showing how light will be directed only onto the area to be secured.

18.46.060 ACCENT LIGHTING

Architectural features may be illuminated by uplighting, provided that the light is effectively contained by the structure, the lamps are low intensity to produce a subtle lighting effect, and no glare or light trespass is produced. For national flags, statues, public art, or other objects that cannot be illuminated with down lighting, upward lighting may only be used in the form of two narrow-cone spotlights that confine the illumination to the object of interest.

18.46.070 LIGHTING STANDARDS FOR USES WITHIN 50 FEET OF RESIDENTIAL ZONES

A. For Uses within 50 Feet of Residential Zones

1. Lighting poles shall be no taller than 20 feet.
2. Lighting fixtures shall be aimed and shielded in a manner that shall not direct illumination on adjacent residential zones. Fixtures shall be of a type or adequately shielded to prevent glare from normal viewing angles.
3. At the discretion of the review authority and, where feasible, additional landscaping may be used to provide light screening between commercial zones and residential zones to help prevent light trespass. Where landscaping is used for light screening, the director shall take into consideration the applicable landscaping standards, the design standards, the creation of excessive shadows or dark spaces, and views into and out of a site.

18.46.080 PARKING LOT LIGHTING

A. Standards

1. Parking lots shall comply with the standards of this ~~section~~Chapter in addition to the other requirements of this title.
2. Parking lot lighting shall be designed to provide for uniform lighting throughout the facility with no dark patches or pockets.
3. Parking lot lighting shall be designed to provide sufficient lighting to identify parking features and provide pedestrian safety.
4. In order to direct light downward and minimize the amount of light spilled into the dark night sky, all lighting fixtures serving parking lots, shall be full cut-off fixtures as defined by the Illuminating Engineering Society of North America (IESNA).
5. The maximum permissible mounting height of all parking lot lighting shall be 30 feet unless otherwise specified in this ~~section~~Chapter.

18.46.090 LIGHTING OF OUTDOOR PERFORMANCE, SPORT AND RECREATIONAL FACILITIES

A. Events and Special Activities

1. Lighting levels and pole heights for outdoor performance, sports, and recreation facilities shall not exceed by more than five percent of the Illuminating Engineering Society of North America published standards for the proposed activity.
2. Where playing fields or other special activity areas are to be illuminated, lighting fixtures shall be specified, mounted, aimed and shielded so that their beams fall within the primary playing area and immediate surroundings, and so that no direct illumination is directed off the site.
3. The main lighting shall be turned off as soon as possible following the end of the event. The main lighting shall not remain on longer than 30 minutes following the end of the event. Where feasible, a low level lighting system shall be used to facilitate patrons leaving the facility, cleanup, nighttime maintenance and other closing activities. The low level lighting system shall provide a horizontal illumination level at grade of no more than four foot-candles.

18.46.100 LIGHTING FOR MULTI-UNIT ATTACHED RESIDENTIAL PROJECTS

In all multi-unit attached residential developments, light fixtures for walks, steps, parking areas, driveways, onsite streets, and other facilities shall be provided in keeping with the type of development and at locations to assure safe and convenient nighttime use. Fixtures shall be designed in keeping with the project and shall be properly shaded to screen the windows of habitable rooms from the direct rays of light. All outdoor lighting shall be so shielded and adjusted that the light is directed to fall only on the

same premises upon which the light source is located. All outdoor security and safety lighting shall be installed in accordance with the standards in this ~~section~~Chapter.

18.46.110 STANDARDS FOR SINGLE FAMILY RESIDENTIAL USES

A. Standards

1. Protective security lighting, landscape lighting or architectural highlighting, properly directed and shielded, may be operated at all hours of the night.
2. Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot are allowed.
3. Motion sensors with integral photo-control area and high-efficacy dust-to-dawn lighting are encouraged.
4. Permanently installed luminaires in or around swimming pools, water features, or other locations subject to Article 680 of the California Electrical Code need not be high-efficacy luminaires.
5. Lighting for single family residential uses shall be directed to fall only on the same premises upon which the light source is located.
6. Floodlighting is discouraged, and if used, must be shielded to prevent:
   a. Disability glare for drivers or pedestrians;
   b. Light trespass beyond the property line; and
   c. Light above a horizontal plane. 'Wallpack' type fixtures are not permitted.

~~SECTION~~CHAPTER 18-47 – SIGNS AND OUTDOOR ADVERTISING DISPLAYS

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18.47.020 Site Plan Review and/or Sign Permit Required
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18.47.010 PURPOSE

The purposes of this Chapter ~~section~~ are to: aid in the identification of properties, land uses, and enterprises; improve traffic safety by reducing visual distractions and physical obstructions and hazards; enhance the general appearance and aesthetics of the urban environment; and protect the natural beauty of the city's open space.

18.47.020 SITE PLAN REVIEW AND/OR SIGN PERMIT REQUIRED

A. Site Plan Review and/or Sign Permit Approval

Signs allowed by this ~~section~~Chapter may not be installed until a site plan review and/or sign permit is conducted and approved (see Chapter 1 Section 18.12.100) and a finding of compliance is made with the design criteria identified in this ~~section~~Chapter by the Planning Division. Signs that are not consistent with the design criteria outlined in this ~~section~~Chapter may not be installed. This determination may be appealed pursuant to the provisions of Section 18.12.060.

B. Considerations

Site plan review and/or a sign permit shall be limited to considerations of the location, installation or placement, size, public safety and sight distance, view blockage, and comparable matters, and not to the content of the message conveyed by the sign or banner, except when the publication of such message is unlawful.

C. Exempt Signs

Site plan review and sign permits are not required for exempt signs pursuant to Section 18.12.100 (c).

18.47.030 UNLAWFUL DISPLAY OF SIGNS OR BANNERS PROHIBITED

A. Except as provided in this ~~section~~Chapter and in Section 18.12.100, it is unlawful for any person or entity to install, maintain, or allow the installation or maintenance of a sign or banner as defined in this ~~section~~Chapter in any zone.
B. The reference to a specific prohibition in this ~~section~~Chapter shall not affect the validity and effect of the general prohibition set forth in this ~~section~~Chapter or its application regulating the uses of property outlined throughout the remainder of the Land Use Code, nor shall it affect Chapter 10.54 prohibiting the maintenance of graffiti as a public nuisance.
C. This ~~section~~Chapter shall not apply to any governmental agency or to any regulatory sign prescribed or required by federal or State law or local ordinance.
D. Nothing in this ~~section~~Chapter is intended to authorize the installation of a sign or banner without the permission of the owner or occupant of that property.
E. Within this ~~section~~Chapter, all regulations shall refer and apply only to "on-site" displays of signs and banners. When a regulation is made applicable to an "off-site" display, it shall be so designated. Unless so designated, off-site displays are prohibited. Off-site displays include “sign spinners”.

18.47.040 DEFINITIONS

A. As used in this ~~section~~Chapter, and in addition to the definitions in the Glossary, the following definitions or concepts shall be applicable:

1. "Banner" is any flexible material, such as cloth, plastic, vinyl, paper, cardboard or thin metal, with or without a "message", attached outdoors to a building, structure or mounting device, or attached indoors to a building, structure or mounting device so as to be visible from the exterior of a building, or structure. The term "banner" includes a pennant, flag, or bunting.
2. “Billboard” means a sign which directs attention to a business, community service or entertainment not exclusively related to the premises where such sign is located.
3. "Bunting" is a form of banner that is typically presented and displayed in a folded or gathered fashion or combination. It may include a display in combination with a flag or banner. Depending on the format of the display, the term may be synonymous with banner.
4. "Business premises" refers to specific business occupancy within a building or upon a parcel of land, typically having a specific address and discrete entrance(s) and exit(s) so as to maintain a specific business identity and location.
5. "Changeable copy sign" refers to a sign displaying a "message" that is changed by means of moveable letters, slats, lights, light emitting diodes, or moveable background material.
6. "Directional sign" is any individual sign used to provide directions to pedestrians and vehicular traffic. It shall not include a grouping or mosaic of individual signs that are arranged in such a manner as to constitute a larger sign.
7. "Flag" is a form of "banner" that is mounted and displayed outdoors on a pole.
8. "Freestanding sign" means a sign which is permanently supported on the ground by one or more uprights, braces, poles, or other similar structural components that are not attached to any building. This category includes both monument and pole signs.
9. "Frontage" when used as a measurement reference of a building or business premises, shall refer to the distance between the two most distant corners of a building measured in a straight line along the building face bordering the adjoining street. See Glossary pertaining to frontage when made applicable to a parcel of land. It shall also refer to the elevation of a building that abuts or adjoins a private or public right-of-way or parking lot.
10. "Height" means the distance measured vertically from grade to the highest point or portion of the object to be measured or height limited.
11. "Illuminated sign" means a sign whose message is made readable by internal or external lights or light emitting diodes, typically during hours of darkness.

12. "Install" or "installation" includes but is not limited to the act by which a sign is constructed or placed on land or a structure, or the act of attaching, painting, printing, producing, or reproducing, or using any other method or process by which a visual message is presented or placed upon a surface.
13. "Message" means any form of visual communication presented on any type of media. It is not material whether the communication has any logical, practical, literary, or artistic significance or not. It includes any form or combination of letters, graphics, symbols or designs. The term is not intended to include mono-color paint applied to the exterior, trim, fascia, or other architectural elements of a building for protection against the elements.
14. "Monument sign" means a low-profile freestanding sign supported by a structural base or other solid structural features other than support poles and may contain signage on more than one side.
15. "Mural" or "mural-type sign" means a sign painted on the exterior wall of a building consisting of graphics or images, either alone or in combination with letters.
16. "Off-site" or "off-site sign" refers to a sign or banner that promotes or advertises goods, services or activities located or offered on a business premises or parcel that is separate from the parcel where the sign is located, even if the two sites or parcels are contiguous to each other.
17. "On-site" or "on-site sign" refers to a sign or banner that promotes or advertises goods, services, or activity located or offered on the business premises or parcel of property where the sign is located.
18. "Outdoors" means a location on undeveloped property or to the exterior of a building or structure.
19. "Outdoor advertising" refers to the placement of a message on signs or banners located outdoors, or located indoors in a manner such that the message is visible from the exterior of a building or structure.
20. "Parcels" or "property" or similar references or descriptions shall refer to parcels defined or delineated by assessor parcel numbers maintained by the County tax assessor or as defined in the Glossary of this Code.
21. "Pennant" is a banner with three sides.
22. "Permanent sign" means a sign that is solidly attached to a building, structure, or the ground by means of mounting brackets, bolts, welds, or other combination of attachment methods, thereby rendering the sign non-moveable or difficult to reposition without the use of machinery, cutting devices, or mechanical devices. See also "temporary sign."
23. "Pole sign" means a permanently mounted, freestanding sign which is supported above the ground by one or more uprights, braces, poles, or other similar structural components.
24. "Projecting sign" is any sign which projects beyond a building face and uses a wall or vertical element of a building as its main source of support. A projecting sign includes a double-faced sign that is installed more or less perpendicular to the face of a building so as to allow a message to be viewable from either side. A projecting sign does not include signs that are installed along the face of a building and that are completely attached to the face of a building.
25. “Rooftop or roof-mounted sign” means a sign that extends above the ridgeline of the roof of a building or a sign attached to any portion of the roof of a building.
26. "Shopping center" shall mean a group of commercial buildings as defined in the Glossary.
27. "Sign" as used in this ~~section~~Chapter, shall generically refer to any medium through which a message is conveyed which is placed outdoors in any zone or is visible to the exterior of a commercial or industrial building or structure. It shall include a banner and any of the following:
    a. Any advertising display defined in Section 9.32.010.
    b. Any message painted, printed, or otherwise produced or affixed on or to:
    c. The exterior of a building or structure;
    d. A rigid or semi-rigid material or surface, such as wood, metal, or plastic, attached to a building, structure, or pole or which is itself free-standing; or
    e. An inflatable balloon or other three-dimensional object that is tethered or fastened to a building, structure, pole, or the ground.
28. "Temporary sign" means a sign that is easily moveable and which is not attached to a building, structure, or the ground in such a manner as to be rendered a permanent sign.
29. "Visible to the exterior" refers to the placement of a sign or banner within the interior first eight feet of a commercial or industrial building or structure in such a manner so that it or its message is readily visible on an immediately contiguous public right-of-way, parking lot, or parcel. To be visible does not require that the message be understandable or readable.

18.47.050 DESIGN AND MAINTENANCE

A. Uniform Building, Electrical and Mechanical Code compliance--Required

No sign shall be installed that does not comply with the applicable Uniform Building, Mechanical and Electrical Codes adopted by the City. Permits for installation shall be obtained, when required, prior to any installation, from the director of building and safety.

B. Maintenance

All signs and their supporting structures and components shall be maintained in a state of safe condition and good repair. Signs shall be "face washed" at least once a year. Electrically energized components must bear the seal of approval of an approved testing laboratory. Broken faces and burned-out lamps, bulbs, or tubes must be replaced within thirty days from the date of notification from the City.

18.47.060 PERMANENT SIGNS PERMITTED IN ALL ZONES

The following signs shall be permitted in all zones. Site plan review shall not be required.

A. Permanent Signs

1. Size. The display on any parcel of any single sign, flag, or banner that is less than six square feet in area is permitted, except when a home occupation permit has been issued for a residential parcel, this exemption shall not apply, and that property shall be subject to all the requirements of this ~~section~~Chapter.
2. Restrictions. No signs shall be placed in the public right-of-way nor shall they obstruct the free flow of traffic.

B. Directional Signs

Directional signs which do not exceed a total of three square feet in size per sign and total area combined does not exceed nine square feet.

C. Freestanding or Monument Signs.

A maximum of two freestanding or monument signs not to exceed a total of one hundred square feet, are permitted for single-family subdivisions, multi-family developments, or mobile home parks.

D. Official Flags

Up to three official flags of the Unites States, the State of California, or other states of the nation, counties, municipalities, and official flags of sovereign nations. Proposals for more than three flags require a sign permit and site plan review. If flags are to be displayed on vertical flagpoles, these poles shall be permanently installed with appropriate building permits. Flags of nationally or internationally recognized organizations and corporate or business flags are only permitted if displayed in conjunction with the United States flag. The Flag Code of the United States shall be observed at all times.

18.47.070 LARGE PERMANENT SIGNS IN COMMERCIAL, INDUSTRIAL, MIXED-USE AND INSTITUTIONAL ZONES

A. Specifications and Restrictions

Except in shopping centers, large permanent signs (those exceeding 25 square feet in area) may be installed on or along the face of a building in commercial, and commercial uses in a mixed-use zone, industrial or institutional zones, subject to the following specifications and restrictions:

1. Signs shall be limited to one sign per business premise per frontage along a street, freeway, or parking lot.

2. Sign area on the primary frontage shall not exceed 30 percent of the area of the building face or four square feet of sign for each linear foot of building face along that frontage, whichever is greater.

3. Sign area on a secondary frontage shall not exceed 15 percent of the area of the building face or two square feet per linear foot of secondary frontage, whichever is greater.

4. The sign face shall not be located, such as by a cabinet, deep lettering, or architectural feature, more than 18 inches from a building face unless an exception is approved pursuant to site plan review.

18.47.080 LARGE PERMANENT SIGNS IN SHOPPING CENTERS

Large permanent signs for businesses within a shopping center shall be limited to one per business premises per frontage on a common walkway, parking lot, driveway, alleyway, street, or freeway. The size and placement of these signs shall conform with the standards specified by Subsections 18.47.070 as well as standards that may be applied through any required City Council or Planning Commission approval, including but not limited to a conditional use permit, planned development permit, specific plan, or variance.

18.47.090 SMALL PERMANENT SIGNS IN COMMERCIAL, INDUSTRIAL, INSTITUTIONAL, MIXED-USE, AND MULTI-FAMILY ZONES

A. Permanent Signs Less than 25 Square Feet

Any permanent sign measuring less than 25 square feet and not described elsewhere in this ~~section~~Chapter shall be considered a small permanent sign that shall only be permitted in commercial, industrial, and institutional zones and commercial uses in a mixed-use zone as follows:

1. Small permanent signs shall be permitted only in windows or along the face of a building.
2. The total area of all small permanent signs and any allowable small temporary signs combined shall not exceed ten percent of the wall or elevation on which the sign is placed.

18.47.100 POLE MOUNTED OR FREESTANDING SIGNS IN COMMERCIAL, INDUSTRIAL, MIXED-USE, AND INSTITIONAL ZONES

A. Requirements

Pole-mounted or freestanding signs are permitted in the commercial and industrial zones and commercial uses in a mixed-use zone, subject to the following requirements:

1. Pole signs or freestanding signs shall be limited to one sign per frontage on street, freeway, or parking lot, and may include a cluster sign identifying individual businesses on the parcel(s).

2. The total area of any sign installed along the primary frontage shall not exceed four square feet per lineal foot of property on the primary frontage.

3. The total area of any sign installed along each secondary frontage shall not exceed two square feet per lineal foot of property on the secondary frontage.

4. Sign structures shall not be placed within the required setback area, except that projecting signs may protrude into or overhang a maximum distance of one-half of the setback.

18.47.110 ROOF MOUNTED SIGNS.

Roof-mounted signs are not permitted.

18.47.120 REVOLVING SIGNS IN COMMERCIAL AND INDUSTRIAL ZONES

Signs that revolve shall be restricted to those that rotate 360 degrees and no more than eight revolutions per minute. Revolving signs shall be permitted only in commercial and industrial zones.

18.47.130 TEMPORARY SIGNS PERMITTED IN ALL ZONES.

A. Temporary Signs on Construction Sites

Temporary signs on construction sites having the following specifications shall be permitted in all zones:

1. The maximum total area for signs at single-family residential construction projects shall be 20 square feet per street frontage.
2. The maximum area of signage at other construction projects shall be 50 square feet per street frontage.
3. For any request for square-footage exceeding the limits set forth in Subsections A.1. and A.2., a temporary use permit is required, the granting or denial of which shall be based solely on objective criteria such as time, location, and size.
4. All signs must be removed prior to and as a condition of the final inspection and approval of the project.

B. Temporary Signs on For Sale or For Lease Property

A maximum of two temporary signs on currently for sale or for lease property may be installed on developed or undeveloped property in all zones, with the following requirements and specifications for the sign:

1. The maximum area of signage allowed by this section per parcel per street frontage in commercial, industrial, mixed-use, multi-family, or institutional zones shall be 50 square feet.
2. The maximum area of signage allowed by this section per parcel per frontage in single-family residential zones is six square feet.
3. These signs shall not be lighted.
4. Signs shall be removed within ten days following the lease or sale of the premises on which the sign is displayed.

C. Temporary Off-site Signs Prohibited

Temporary off-site signs are prohibited in all zones, unless otherwise provided herein and by State law.

D. Temporary Signs For Events

Additional temporary signs erected due to an event are permitted as follows:

1. Commercial/industrial/multi-family/mixed-use/institutional zones.
   a. One or more temporary signs, each of which is 32 square feet or less in area, shall be permitted per parcel.
   b. Temporary signs, except flags and banners, shall not be fastened directly to the exterior wall or face of any building. Such signs may be displayed in windows or on display boards, provided the combined total area of all signs does not exceed ten percent of the area of the building face upon which the signs are mounted. (See Section 18.47.190 for restrictions on flags and banners.)
   c. Such signage is permitted on a temporary basis as defined hereinafter, in addition to other sign allotment per site.
2. Single-family residential zones.
   a. One or more temporary signs, each of which is six square feet or less in area, shall be permitted per parcel.
   b. A parcel that is a corner lot can also have up to two signs greater than six square feet or less in area, but less than or equal to 16 square feet in area per parcel.
   c. Permission of the property owner or occupant where the sign is placed shall be required.
   d. No temporary signs are permitted in the public right-of-way.

e. Removal. If the signage was erected for an event, such signage shall be removed within ten days after the event.

18.47.140 PROJECTING SIGNS IN COMMERCIAL, INDUSTRIAL, MIXED-USE, AND INSTITUTIONAL ZONES

A. Conditions

A projecting sign may be permitted in all commercial, industrial, mixed-use, and institutional zones, subject to the following conditions:

1. Projecting signs shall not project over any public right-of-way, including streets or alleys, except as provided in Subsection D below.

2. The maximum height of projecting signs shall be 12 feet, and may project above any eave or parapet of less than 12 feet in height, but may not project inward over any such eave or parapet.

3. The maximum area of a projecting sign shall be 32 square feet.

4. Projecting signs may project over street parkways and required setback areas a maximum of one-half of the street parkway or setback width. For the purpose of this section, "street parkway" is defined as that part of the public street right-of-way lying between the front property line and the edge of the roadway.

5. No more than one projecting sign shall be placed on each street frontage per business premises.

6. A projecting sign shall be permitted only in lieu of a freestanding or marquee sign, and may not be utilized in addition to a freestanding or marquee sign.

7. Projecting signs shall be supported so as to appear to be an architectural and integral part of the building. The sign shall be free of any extra bracing, angle iron, guy wires, or cables.

18.47.150 VEHICLE SIGNS

A. Permitted Vehicle Signs

1. Advertising signs on buses and taxis.
2. Signs on automobiles and trucks that are painted on or attached flat against the vehicle to identify or advertise the associated business, provided that the vehicle is primarily used for the business and not parked on public streets.

18.47.160 PUBLIC ASSEMBLY USE SIGNS

On property used for public assembly, one wall mounted sign not to exceed 20 square feet in area per street frontage or parking lot frontage, and one freestanding changeable copy directory sign not to exceed six feet in height and 20 square feet in area per street frontage or parking lot frontage shall be allowed; provided, however, that the signs shall be architecturally related to the structure to which they are appurtenant. No more than two wall-mounted signs plus no more than two freestanding signs shall be permitted.

18.47.170 MURAL TYPE SIGNS IN COMMERCIAL AND MIXED-USE ZONES

Mural-type signs not exceeding 110 square feet in area shall be allowed in commercial zones and for commercial uses in mixed-use zones in lieu of a fixed sign.

18.47.180 DIGITAL ADVERTISING DISPLAY (DAD) SIGNS

A. Purpose

The use of digital advertising display technology (also known as a message center display or electronic reader board) for on-premises advertising signage can be an enhancement to the city as a whole, provided that sufficient standards are established to regulate daytime/nighttime illumination, prohibit movement, flashing, and other animation that may distract motorists, and allow for reasonable height and size requirements that balance the need for visibility with overall city aesthetic concerns, and;

The need for establishing design and operational standards for digital advertising displays for digital advertising signage will ensure that they do not create adverse effects on adjacent uses, for motorists, or conflict with Amber light or other digital emergency response signage, and;

The Federal Highway Administration in a 2007 ruling stated that digital billboards are permissible adjacent to and visible from federal highways.

B. Applicability

Digital advertising display signs are allowed in commercial, mixed-use, and industrial zoned areas along highways and arterial roadways (as defined by the General Plan Circulation Element) with approval of a sign permit provided all the conditions identified below are met.

C. Requirements

1. The maximum height of the sign structure containing the digital advertising display shall be subject to the same height restrictions as contained in Section 18.47.260 of the Land Use Code.
2. For properties that front on arterial roadways, the electronic message display component of the sign structure shall not exceed 80 square feet in area per sign face.
3. For properties that front on highways, the electronic message display component of the sign structure shall not exceed 250 square feet in area per sign face.
4. No more than one digital advertising display sign shall be permitted on a site. The electronic message display may be single-faced or double-faced.
5. The electronic message display shall be an electronic LED (Light Emitting Diode) screen.
6. The pixel pitch of the LED electronic message display shall be no greater than 25mm; 20mm or less is preferred, especially for arterial roadways.
7. Each DAD sign shall be provided with encapsulated LED's for weather protection.
8. The DAD may be programmed to allow changeable messages, provided that any image shall be displayed for a minimum of 8 seconds, and transitions between slides shall not exceed one second. Fading in or out, or scrolling of text shall be permitted as transitions.
9. Each DAD shall include a photometric sensor that will adjust the intensity of the sign for daytime and nighttime viewing. The nighttime intensity shall be limited to 0.3-foot candles (over ambient levels) as measured at a preset distance as established by the Lewin Report as prepared for the Outdoor Advertising Association of America (OAAA). The City may modify or further restrict the intensity of any DAD display should the lighting create a distraction to drivers or an adverse effect on nearby residential property.
10. The electronic message display shall not be operated between the hours of midnight and 6:00 am.
11. The electronic message display shall not result in unacceptable light intensity and glare impacting surrounding property.
12. All new digital advertising display signs not attached to a building shall be mounted on one support column only.

13. Digital advertising display signs are permitted to be located on the wall of a building provided the sign does not obscure any of the building's windows, architectural features, or other architectural details.
14. No digital advertising display sign may be placed within one-mile of another DAD on the same side of a highway. No more than 2 DAD signs are permitted per freeway.
15. Digital advertising display signs are limited to on-premise signs only. No digital display signs may be placed within 1,000 feet of another DAD sign on the same side of an arterial roadway.
16. An existing billboard sign may be refurbished with a digital advertising display sign provided it does not exceed the area of the existing billboard and in all other respects meets the requirements of this ~~section~~Chapter.
17. Cabinetry shall include solid welds and voltage protection.
18. Exterior cabinetry consisting of sheet metal or fabricated metal construction is not permitted.
19. The electronic message display shall be maintained in good operating condition and external appearance at all times.
20. Solar powered DAD signs are encouraged.
21. A DAD shall be subject to all other sign face size restrictions as contained in this ~~section~~Chapter.

18.47.190 FLAGS, BANNERS, AND PENNANTS

A. Regulations

1. Permit required. All banners require the approval of the Planning Division. In order to obtain approval, see application and drawings required at the City Planning Division.
2. Minimum standards. Flags and banners may be displayed on automobile sales lots without time limitation or site plan review provided that:
   a. The displays are properly maintained;
   b. Displays are limited to the perimeter of the lot;
   c. Displays do not exceed a height of 25 feet above the ground;
   d. Displays may not be used in place of a permanent sign.
3. Flags, banners, and pennants may be displayed on other commercial and industrial uses for a cumulative period of 60 days within each calendar year. The time limit commences when a banner permit is issued by the planning director. The 60-day period may be divided into two occasions per calendar year, provided the total display time does not exceed 60 days per calendar year. A banner permit fee and an administrative fee in an amount representing the anticipated City enforcement costs in causing the applicant to remove flags or banners shall be paid to the City Treasurer at the time of application for site plan review. The administrative fee shall be refunded upon the verified removal of the flag or banner by the specified deadline.
4. The following shall apply to all displays of flags, banners, and pennants:
   a. Must be removed by the owner or occupant within 15 days after a determination by the City Manager or his/her designee that the display is improperly maintained or the flag or banner is tattered or worn.
   b. Shall not be larger than 40 square feet.
   c. Shall not be displayed in lieu of a permanent sign.
   d. Shall not be placed on a roof, placed in required yard areas, or landscaped areas.
   e. Must be compatible with the primary building's appearance.
   f. Violation of the time limits shall render the site ineligible for issuance of a permit for display of a banner for a period of one year from the date that the violation is abated.
   g. The restrictions of this section shall also apply to signs and banners located within the first eight feet of the interior of commercial or industrial premises when such sign or banner is visible to the exterior.

18.47.200 SIGNS PROHIBITED IN ALL ZONES

A. Prohibited Signs

Notwithstanding Section 18.47.030 the following signs are strictly prohibited in all zones:

1. Signs that obstruct any window, door, or opening used or required as a means of regular ingress and egress, legal light and ventilation, as a fire escape or other emergency access or escape.
2. Signs placed on public property or within the public street right-of-way.
3. Signs placed on property without permission of the property owner or occupant.
4. Signs on fences.
5. Except as provided in otherwise in this ~~section~~Chapter, signs on vacant or unimproved land.
6. Any sign whose intensity of illumination or size, shape, or location interferes with the safe operation of a vehicle or creates distraction to the operator of a motor vehicle on adjoining public streets.
7. Animated and flashing signs exceeding the following limits or restrictions:
   a. Flashing signs are limited to a maximum illumination equivalent to incandescent bulbs of sixty watts per bulb maximum, and shall not flash more than sixty times per minute. "Chasers" are prohibited.
   b. High intensity neon lights, tubes, or flashing lights exceeding sixty watts are prohibited on animated or flashing signs.
   c. Rotating beacon-type lighting elements on signs are prohibited.
8. Temporary or permanent off-site signs, including billboards, are prohibited except where otherwise provided by State law or in Section 18.47.180.
9. Inflatable signs and displays, unless authorized pursuant to a temporary use permit.
10. Signs mounted on motor vehicles that are in violation of Section 7.20.150 or signs exceeding 25 square feet mounted on motor vehicles parked for more than eight hours in any 24-hour period on private property.
11. Off site temporary signs, mobile billboards on public streets (excepting buses, taxicabs, and business vehicles with an advertisement or display of its owner).
12. Mobile billboard advertising. Mobile billboard advertising includes any vehicle or wheeled conveyance which carries, conveys, pulls, or transports any sign or billboard for the primary purpose of advertising. Mobile billboard advertising upon any street or other public place within the city in which the public has the right of travel is prohibited. Any vehicle which displays an advertisement or business identification of its owner, so long as such vehicle is engaged in the usual business or regular work of the owner and not used merely, mainly, or primarily to display advertisements; buses; and taxicabs are exempt from this prohibition.

18.47.210 MASTER SIGN PROGRAM

A. Purpose and Applicability

The purpose of the Master Sign Program provisions is to provide a coordinated approach to signage for National City's business districts, which include the Harbor District, Downtown, Mile of Cars, and Plaza Bonita. The development of a master sign program is optional, but strongly encouraged for these areas.

B. Approval

A Master Sign Program shall require the approval of the Planning Commission and the City Council.

C. Design Standards

Master Sign Programs shall feature a unified and coordinated approach to the materials, color, size, type, placement and general design of signs proposed for a project or property.

D. Effect of Master Sign Program

All subsequent signs proposed for a development or property subject to an approved Master Sign Program shall comply with the standards and specifications included in the Master Sign Program.

18.47.220 REMOVAL FROM ABANDONED SITE OR BUILDING

When the use of any parcel or building is vacated, terminated, or abandoned for any reason for a period of more than 120 consecutive days, the owner or person in possession of the property shall be responsible for the physical removal of all signs on the property, building or wall(s), and for painting over the surface so as to obliterate any painted or printed signs on the building so that the copy is not visible, within 30 days following notice from the City. Removal, painting out, or obliteration shall be performed in a manner that does not create a blighting influence.

18.47.230 NONCONFORMING SIGNS

Any sign that is made nonconforming by enactment of Ordinance 2001-2192 may continue to be maintained or displayed subject to the provisions of 18.11.090 regarding the continuance and abatement of nonconforming signs.

18.47.240 CONSTITUTIONAL SEVERABILITY

The City Council declares that the judicial invalidity of any subsection or portion of this ~~section~~Chapter shall not affect the validity of any other remaining section or portion; that the City Council would have adopted each of those remaining portions, notwithstanding any later declared invalidity. If any provision determined invalid under the preceding sentence can either be judicially severed or interpreted in a way that could harmonize it with the remaining provisions, then it may be severed or interpreted and applied so as to give full purpose, meaning, and effect to the remaining provisions of this ~~section~~Chapter.

18.47.250 NON-COMMERCIAL SPEECH

Anywhere that commercial signage is allowed, non-commercial signage is allowed subject to the same restrictions as those set forth for commercial signage, but not in addition to such allowance.

18.47.260 SIGN REGULATIONS BY ZONE AND TYPE

The following table summarizes the types of signs that shall be permitted within the zoning designations listed below. Signs are not permitted in public rights-of-way unless otherwise noted in Table 18.47.260 below.

TABLE 18.47.260
Sign Regulations by Zone and Type

Sign Type	Use or Zone	Location	Maximum Size and Height	Other Regulations
Permanent Signs less than 6SF	All (except home occupation)	--	6 square feet	--
Directional Sign	All	--	3 square feet per sign and a combined total of 9 square feet	--
Official Flags (United States, California, other state or nation, county, municipality	All	--	--	Maximum of three flags; must be on permanently installed poles; organizations, corporations and

Sign Type	Use or Zone	Location	Maximum Size and Height	Other Regulations
or sovereign nation)				business flags prohibited
Building Mounted Greater than 25SF	Commercial, Industrial, Mixed-Use	One sign per building premises per frontage on a street, parking lot or freeway.	Primary frontage: 30% of the area of the building face or 4 square feet of sign for each linear foot of building face along the frontage, whichever is greater. Secondary Frontage: 15% of the area of the building face or 2 square feet per linear foot of secondary frontage, whichever is greater.	May not extend more than 18" from building face. Internally illuminated light box or cabinet signs not permitted.
Building Mounted Greater than 25SF	Shopping Centers, MXD-1 and MXD-2 (except residential buildings)	One sign per business premises per frontage along a common walkway, parking lot, driveway, alleyway, street or freeway.	Primary frontage: 30% of the area of the building face or 4 square feet of sign for each linear foot of building face along the frontage, whichever is greater. Secondary Frontage: 15% of the area of the building face or 2 square feet per linear foot of secondary frontage, whichever is greater.	May not extend more than 18" from building face. Internally illuminated light box or cabinet signs not permitted.
Building Mounted Less than 25SF	Commercial, Industrial, Mixed-Use, Institutional, Multi-Family	Windows or along the face of a building.	10% of the wall or elevation on which the sign is placed or 25SF, whichever is less.	May not extend more than 18" from building face. Internally illuminated light box or cabinet signs not permitted.
Freestanding/Pole Mounted	Commercial, Industrial, MXD-1 and MXD-2 (except residential buildings), Institutional	One sign per building premises per frontage on a street, parking lot or freeway. Not permitted in required setbacks	Primary Frontage: 4 square feet per lineal foot Secondary Frontage: 2 square feet per lineal foot	Cluster signs identifying individual businesses on a parcel are permitted.
Roof-Mounted	All zones	Not permitted.	Not permitted.	Not permitted.
Revolving	Commercial, Industrial		Same as Freestanding/Pole Mounted	360 degree rotation only and maximum of 8 revolutions per minute
Projecting Sign	Commercial, Industrial, Mixed-Use, Institutional	One sign per street frontage per business premise. May extend into or overhang no more than one half of the setback or street parkway distance. A sign may not extend beyond the street curb.	Area: 32 square feet Height: 12 feet	Permitted only in lieu of a freestanding or marquee sign. Must be an integral component of building. Decorative brackets permitted.
Public Assembly Signs	All	One wall-mounted sign per street or parking lot frontage plus one	One wall mounted sign not to exceed 20 square feet in area and one freestanding sign not to	No more than 2 wall-mounted signs and no more than 2 freestanding signs shall be permitted.

Sign Type	Use or Zone	Location	Maximum Size and Height	Other Regulations
		freestanding sign per street frontage.	exceed 6 square feet in height and 20 square feet in area.	
Temporary Signs, Construction Sites	All	--	Single Family Residential, MXC-1 and MXC-2: 20 square feet per street frontage Other: 50 square feet per street frontage	Temporary use permit required. Shall be removed in ten days following sale or lease of the premises.
Temporary Signs, Event	All	Window display or display boards permitted only.	Commercial, industrial, mixed-use or multi-family, institutional: One or more each of which is 32 square feet or less in area Single Family Residential: one or more limited to 6 square feet or less in area per parcel except corner lots are permitted up to two signs greater than 6 square feet or less in area per parcel, but less than or equal to 16 square feet in area per parcel.	For commercial, industrial, mixed-use or multi-family, may not be fastened to exterior wall or building face (except flags and banners).
Temporary Off-Site Signs	Prohibited in all zones	Prohibited in all zones	Prohibited in all zones	Prohibited in all zones
Mural Signs	Commercial	--	110SF or 25% of the wall of a building, whichever is less.	Permitted in lieu of a fixed sign. Must be coated with anti-graffiti coating.
Window Signs	Commercial, Industrial, Mixed-Use	--	15% of the area of a window or 12SF, whichever is less.	--
Awning, Canopy or Marquee	Commercial, Industrial, Mixed-Use	--	Awning or canopy: 50% of the total area of the awning or canopy Marquee: 75% of the total area of the marquee	Internally illuminated or backlit awning signs not permitted
Building Arcade Hanging Sign (also known as suspended or blade sign)	Commercial, Mixed-Use	One per tenant. Must be perpendicular to face of building.	Area: 6 square feet; Width: No more than 60% of arcade. Clearance: No less than 8' above finished grade.	Internal illumination not permitted

18.47.270 SIGNS FOR SPECIAL USES

For institutional, educational, regional commercial or other large campus-style uses – including but not limited to hospitals, schools and colleges, or shopping malls – signs may exceed the design guidelines as prescribed in this chapter with the approval of the Planning Commission. Approval may be either through a discretionary development process (PD, CUP, etc) for new construction or through the Approval of Plans process for existing facilities.

CHAPTER 18-48~~-~~ RESIDENTIAL DENSITY BONUS AND AFFORDABLE HOUSING INCENTIVES

18.48.010 Purpose
18.48.020 Definitions
18.48.030 Density Bonus
18.48.040 Concessions, Incentives, and Development Standards
18.48.050 Application Requirements and Review
18.48.060 Density Bonus Housing Agreement

18.48.0.010 PURPOSE

A. Intent and Purposes of Section

The intent and purposes of this ~~section~~Chapter are to:

1. Implement the policies of the General Plan's Housing Element for developing affordable housing for households with very low, low, and moderate incomes.
2. Encourage affordable housing units to be developed citywide and designed to be consistent with the surrounding neighborhood.
3. Implement the provisions of State Government Code Section 65915.

18.48.020 DEFINITIONS

A. Section Definitions

Within this ~~section~~Chapter, the following definitions shall apply:

1. "Additional incentives" means any regulatory concessions or incentives which would result in identifiable cost avoidance or reductions that are offered in addition to a density bonus, as also specified in California Government Code Subsections 65915.
2. "Density bonus" means a density increase of up to thirty-five percent over the otherwise maximum residential density allowable by the applicable zoning designation, pursuant to State Government Code Section 65915, as amended from time to time.
3. "Density bonus units" means those residential units granted pursuant to the provisions of this ~~section~~Chapter that exceed the otherwise allowable maximum residential density for the development site.
4. "Development standard" shall have the meaning given that term by Government Code Section 65915.
5. "Financial Pro Forma" means a financial report for density bonus projects that shall include identifiable, financially sufficient, and actual cost reductions achieved through any requested incentives or concessions, as well as evidence that the cost reduction allows the developer to provide affordable rents or affordable sales prices.
6. "Housing development" for the purpose of this ~~section~~Chapter means construction projects consisting of five (5) or more residential units, including single-family, multi-family, and mobile homes for sale or rent.
7. "Lower income household" means households whose income is no more than 80 percent of the area median income of San Diego County, as established and amended time to time by Section 8 of the United States Housing Act of 1937, pursuant to Section 50079.5 of the California Health and Safety Code.
8. "Maximum residential density" means the maximum number of residential units permitted by the City's General Plan Land Use Element and Land Use Code at the time of application, excluding the provisions of this ~~section~~Chapter. In calculating the required number of dwelling units affordable to moderate, lower, or very low income households, any decimal fraction resulting from the applicable percent of the total units shall be rounded to the next larger whole number.
9. "Moderate income household" means households whose income does not exceed 120 percent of the area median income of San Diego County, as established and amended time to time by Section 8 of the United States Housing Act of 1937, pursuant to Section 50093 of the California Health and Safety Code.

10. "Non-restricted unit" means all units within a housing development as defined in this section, excluding the target units.
11. "Target unit" means a dwelling unit within a housing development that will be reserved for sale to or rent to, and affordable to, very low, or moderate income households, or qualifying residents.
12. "Very low income household" means households whose income is no more than 50% of the area median income of San Diego County, as established and amended time to time by Section 8 of the United States Housing Act of 1937, pursuant to Section 50105 of the California Health and Safety Code.

18.48.030 DENSITY BONUS

A. In applications for projects meeting the minimum threshold of five units or more, the density bonus provisions set forth in Government Code Section 65915, as amended from time to time, shall apply.

B. It is the intent of this ~~section~~Chapter to ensure that all projects applying for the concessions and incentives of this ~~section~~Chapter provide for affordable housing units that are comparable in size, design, and quality to the market units in the same project. The City Manager or his/her designee, unless otherwise specified, shall have the discretion and authority to enforce this provision during the application process.

18.48.040 CONCESSIONS, INCENTIVES, AND DEVELOPMENT STANDARDS

A. Requests for Incentives and Concessions

In applications for projects meeting the minimum threshold of five units or more, concessions and incentives including reductions in site development standards, modifications of zoning code or architectural design requirements, and other incentives or concessions defined in Government Code Section 65915(1) may be requested, consistent with the parameters enumerated below.

B. Financial Pro Forma

The applicant shall provide a financial pro forma demonstrating to the City that the requested concession or incentive results in identifiable, financially sufficient, and actual cost reductions to the project pursuant to California Government Code Section 65915(l)(1).

C. Development Standards

Applicants may seek a waiver or modification of development standards that will have the effect of precluding the construction of a residential development meeting the criteria of Government Code Section 65915 at the densities or with the incentives or concessions permitted by that section.

D. Financial Incentives

Nothing in this section requires the City to provide direct financial incentives for the residential development, including but not limited to the provision of publicly owned land, waiver of fees, off-site improvements, or dedication requirements.

18.48.050 APPLICATION REQUIREMENTS AND REVIEW

A. Application Conference

Prior to submitting an application, an applicant proposing a housing development pursuant to this section shall schedule a pre-application conference with appropriate Planning and/or Housing Division staff. The applicant should provide the following information:

1. A brief description of the proposed development, including at a minimum the total number of units, total number of target units, and total number of density bonus units proposed.

2. The combined general plan/zoning designations and assessor parcel number(s) of the project site.
3. A vicinity map and preliminary site plan, drawn to scale, including building footprints, driveway and parking layout.
4. If an additional incentive(s) is requested, the application should describe why the additional incentive(s) is necessary to ensure affordability of the target units and density bonus units proposed!
5. The developer/applicant should also submit the project pro-forma, outlining revenue sources, expenses, and projected profit.

B. Application/Processing

Requests for a density bonus and/or additional incentive(s) pursuant to this section shall be submitted to the Planning Division and processed pursuant to procedures in Chapter 1 for approval of a conditional use permit and concurrently with any other application(s) required for the development. In addition, applications shall include the following:

1. A description of any requested density bonuses, incentives, concessions, waivers or modifications of development standards, or modified parking standards.
2. Identification of all affordable units qualifying for the project for a density bonus, and level of affordability of all affordable units.
3. For all incentives and concessions, a financial pro forma demonstrating that the requested incentives and concessions result in identifiable, financially sufficient, and actual cost reductions is required.
4. For waivers or modifications of development standards: evidence that the imposition of the development standards for which a waiver is requested will have the effect of precluding the construction of the residential development at the densities or with the incentives or concessions permitted by Government Code Section 65915.
5. Any financial pro forma submitted to comply with this section may not include the lost opportunity cost of any affordable units (i.e., the revenue that would have been generated had the units been rented or sold at market rate) and may include as an additional cost only those additional expenses that are required solely because of the proposed construction of the affordable units. The pro forma shall also include:
   a. The actual cost reduction achieved through the incentive or concession; and
   b. Evidence that the cost reduction allows the developer to provide affordable rents or affordable sales prices.
6. The City may retain a consultant to review the financial report (pro forma). The cost of the consultant shall be borne by the applicant with the following exception: if the applicant is a non profit organization, the cost of the consultant may be paid by the City upon prior approval of the City Council.

C. Findings for Approval

Before any density bonus and/or additional incentive is granted, the approving authority shall make the following findings:

1. The residential development is eligible for a density bonus and any concessions, incentives, waivers, modifications, or reduced parking standards requested.
2. The residential development conforms to all standards for affordability included in this ~~section~~Chapter.
3. Any requested incentive or concession will result in identifiable, financially sufficient, and actual cost reductions based upon appropriate financial analysis and documentation if required by conditional use permit.
4. If a waiver or modification is requested, the applicant has shown that the imposition of the development standards sought to be waived or modified will have the effect of physically precluding the construction of the development at the densities or with the incentives or concessions otherwise permitted by this ~~section~~Chapter.

D. Findings for Denial - Concessions, Incentives, Waivers, Modifications.

1. Concessions or incentives. The City may deny one or more requested concessions or incentives if, based on substantial evidence, the City makes either of the following findings:
   a. The concession or incentive is not required in order to provide for affordable housing costs, as defined in Section 50052.5 of the Health and Safety Code, or for rents for the targeted units to be set as specified in Section65915(c); or
   b. The concession or incentive would have a specific adverse impact, as defined in Government Code Section 65598.5(d)(2), upon public health and safety or the physical environment, or on any real property that is listed in the California Register of Historical Resources, and for which there is no feasible method to satisfactorily mitigate or avoid the specific adverse impact without rending the development unaffordable to very low, low, and moderate income households.
2. Waivers and modifications. The City may deny one or more requested waivers or modifications if the City makes either of the following findings:
   a. The waiver or modification would have a specific adverse impact, as defined in Government Code Section 65598.5(d)(2), upon public health and safety, or the physical environment, and for which there is no feasible method to satisfactorily mitigate or avoid the specific adverse impact; or
   b. The waiver or modification would have a specific adverse impact on any real property that is listed in the California Register of Historical Resources.

E. Deed Covenant

Approval of a density bonus and/or additional incentive(s) pursuant to this section shall require the recordation of a deed covenant recorded against the property to ensure the target unit(s) is maintained for affordability for the time period required prior to Final Map recordation or prior to the issuance of a building permit, if no subdivision of property is involved.

F. Appeal Procedure

The decision of the Planning Commission to approve or deny a request for a density bonus, additional incentive(s), and/or waivers or modifications of development standards pursuant to this section may be appealed to the City Council pursuant to procedures for appeal of other discretionary permit applications that are concurrently considered, or I if no other discretionary permit applications are concurrently considered, the decision of the Planning Commission may be appealed pursuant to procedures specified in Chapter 1 Section 18.12.110 (Conditional Use Permits) of the Land Use Code.

18.48.060 DENSITY BONUS HOUSING AGREEMENT

A. Agreement with the City

Applicants/developers requesting a density bonus shall enter into a Density Bonus Housing Agreement with the City. The terms of the draft agreement shall be approved by the Executive Director of the Community Development Commission of the City of National City or his designee.

B. Recordation

Following execution of the Agreement by all parties, the completed Density Bonus Housing Agreement, or memorandum thereof, shall be recorded with the County of San Diego Recorders Office, and the conditions therefore filed and recorded on the parcel or parcels designated for construction of target units and a copy of the recorded document shall be provided to the City. Recordation of the Agreement shall occur prior to recordation of a Final Map or prior to issuance of building permits, whichever occurs first. The Density Bonus Housing Agreement shall be binding to all future owners and successors in interest during the term of the Agreement, unless rescinded by the City upon completion of terms of the Agreement.

C. Provisions of Agreement

The Density Bonus Housing Agreement shall include at least the following:

1. The total number of units approved for the housing development, including the number of target units.
2. A description of the household income group to be accommodated by the housing development, as outlined in Section 18.47.050 of this chapter, and the standards for determining the corresponding affordable rent or affordable sales price and housing cost.
3. The location, unit sizes (square feet), and number of bedrooms of target units.
4. Tenure of use restrictions for target units of at least ten or 30 years, in accordance with Section 18.47.050 of this chapter.
5. A schedule for completion and occupancy of target units.
6. A description of the density bonus, additional incentive(s) or equivalent financial incentives being provided by the City.
7. A requirement to submit to the Executive Director of the Community Development Commission of the City of National City or his designee for review and approval of an Affirmative Marketing Plan, which details the actions the developer/applicant shall take to provide information and otherwise attract eligible persons to the available housing units without regard to race, sex, sexual orientation, marital status, familial status, color, religion, national origin, ancestry, handicap, age, or any other category which may be defined by law now or in the future.
8. A description of remedies for breach of the Agreement by either party. The City may identify tenants or qualified purchasers as third party beneficiaries under the Agreement.
9. Other provisions to ensure implementation and compliance with this section.
10. Provision allowing payment of fee by applicant to the City to recover their administrative expenses.

D. For-Sale Housing Developments

In the case of for-sale housing developments, the Density Bonus Housing Agreement shall provide for the following conditions governing the initial sale and use of target units during the applicable use restriction period:

1. Target units shall, upon initial sale, be sold to eligible very low, low, or moderate income households at an affordable sales price and housing cost, or to qualified residents (i.e., maintained as senior citizen housing) as defined by this ~~section~~Chapter.
2. Target units shall be initially owner-occupied by eligible very low, low, or moderate households, or by qualified residents in the case of senior citizen housing.
3. Target units, if later rented by the owner, shall be made available to eligible very low, low, or moderate income households at an affordable rent or to qualified residents (i.e., senior citizens) as defined by this ~~section~~Chapter.
4. The initial purchaser of each target unit shall execute an instrument or agreement approved by the City restricting the sale or rental of the target unit in accordance with this Ordinance during the applicable use restriction period. Such instrument or agreement shall be recorded against the parcel containing the target unit and shall contain such provisions as the City may require to ensure continued compliance with this ~~section~~Chapter and the State density bonus law.

E. Rental Housing Developments

In the case of rental housing developments, the Density Bonus Housing Agreement shall provide for the following conditions governing the use of target units during the use restriction period:

1. The rules and procedures for qualifying tenants, establishing affordable rent, filling vacancies, and maintaining target units for qualified tenants;
2. Property owners shall be required to verify tenant incomes on an annual basis and maintain books and records to demonstrate compliance with this ~~section~~Chapter.
3. Property owners shall be required to submit an annual report to the City, which includes the name, address, household size, and income of each household occupying target units, and which identifies the bedroom size and monthly rent or cost of each target unit.

4. Property owners shall be required to allow a City representative to inspect each unit annually at a minimum to ensure that units are being maintained to local Code and the Department of Housing and Urban Development (HUD) Housing Quality Standards.

Appendix M
Parking Occupancy Worksheets

National City Marina 10 Parking Demand

Time	Pier 32 Marina	Pepper Park	W 32nd Street
9 AM	127	34	12
12 PM	131	87	11
3 PM	137	98	22
6 PM	127	80	20

Pepper Park Break Down

	9 AM	12 PM	3 PM	6 PM
Short Spaces	34	73	73	65
Long Spaces		12	16	6
Illegally Parked	0	2	9	9
Total	**34**	**87**	**98**	**80**

Capacity

Short Spaces	73
Long Spaces	17
ADA	3