



134 E. 13th Ave. Suite 2
Eugene, Oregon 97401

Phone & Fax

541-485-3215

info@accesseng.com

Palmberg Property Zone Change Goal 12 Traffic Impact Analysis

**McCormick Gardens Road
Gearhart, Oregon**

Transportation Engineering

Traffic Design

Trip Generation

Access Management

Traffic Counts

Street Lighting

March 22, 2018

Palmberg Property Zone Change Goal 12 Traffic Impact Analysis

**McCormick Gardens Road
Gearhart, Oregon**



March 22, 2018

Table of Contents

I. Executive Summary	1
II. Background	2
1. Introduction	2
2. Location and Vicinity Map	2
3. Land Uses and Intensity	2
4. Study Area	2
5. Existing Traffic Conditions	3
6. Seasonal Factor	3
7. Crash History	4
8. Intersection Operations - Mobility Standards	4
III. Transportation Planning Rule Analysis	5
1. Existing 2018 Intersection Operational Analysis	5
2. Trip Generation	5
3. Trip Distribution and Assignment	6
4. Year of Completion Traffic Volumes and Analysis	7
5. Horizon Year, 2040, TSP Projects	8
6. Horizon Year, 2040, Traffic Volumes and Analysis	8
7. Conformance to City Standards	9
IV. Conclusions and Recommendations	10

Tables

Table 1: R-A and R-2 Zone Comparison	2
Table 2: Existing Study Area Street Characteristics	3
Table 3: Study Area Crashes	4
Table 4: 2018 Existing Design Hour Operational Analysis	5
Table 5: Maximum R-2 Zone Site Trips	6
Table 6: Net New Trips	6
Table 7: Year of Completion, 2020, Design Hour Operational Analysis	7
Table 8: Year of Completion, 2020, Queuing Analysis	7
Table 9: TSP Horizon Year, 2040 Design Hour Operational Analysis	8
Table 10: TSP Horizon Year, 2040, Queuing Analysis	9

Appendices

Appendix A:	Figures
Appendix B:	Traffic & Crash Data
Appendix C:	Synchro & SimTraffic Reports
Appendix D:	Gearhart Zoning & TSP References

Palmberg Property Zone Change Traffic Impact Analysis

I. Executive Summary

This study evaluates the long-term traffic impacts associated with the proposal for a plan amendment and zone change on 27.13 acres of land on the west side of McCormick Gardens Road along the eastern boundary of the City of Gearhart Urban Growth Boundary (UGB). The proposal would change the zoning from the existing R-A (rural agriculture) to R-2 (medium density residential). The study addresses the requirements of the Transportation Planning Rule (TPR) for changes to plan designations and zoning as set out in OAR 660-12-0060. The study compares the worst-case development for the proposed R-2 zone to the worst-case development of the existing R-A zone.

Extensive wetlands on the site limit the buildable area to approximately 7 acres. The worst-case development in the R-A zone is 7 single-family dwellings. The worst-case development in the R-2 zone consists of 20 duplex units and 3 fourplex units. The R-A zone would generate 7 peak hour trips compared to the 70 peak hour trips generated by the R-2 zone. As a worst-case condition, all new trips were assigned to reach the US 101 at Pacific Way intersection. Intersection operations and queuing analyses were assessed for existing conditions, an assumed completion date of 2020, and for the TSP horizon, 2040. Trips from the worst-case R-2 development found no operational or queuing problems in the study area through 2040. As a result, we conclude that:

The transportation facility is **not** significantly affected if trips from the proposal:

- (a) Change the functional classification of an existing or planned transportation facility; **No**
- (b) Change standards implementing a functional classification system; **No**
- (c) As measured by the end of the planning period identified in the adopted transportation system plan:
 - (A) Allow land uses or levels of development that would result in types or levels of travels that are inconsistent with the functional classification of an existing or planned transportation facility; **No**
 - (B) Reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; **No**
 - (C) Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan. **No**

A five-year crash study found no crashes on McCormick Gardens Road or on Pacific Way east of US 101. Of the nine crashes on US 101 near Pacific Way, five occurred south of the intersection including two sideswipe collisions.

The extensive wetlands on site limit the location of the site access to the surrounding street system. The access location shown on McCormick Gardens Road meets all of Gearhart's access management standards. Only one local street can be developed on site due to the extensive wetlands. The cul-de-sac street would be 800 feet in length but will provide cul-de-sacs along its length. The cul-de-sac at the end of the street will provide a connection to a shared-path that will connect west to 5th Street at US 101. This path will be constructed to emergency vehicle access standards.

Based on these conclusions, we recommend approval of the plan amendment and zone change to medium density residential with no off-site mitigation measures necessary.

II. Background

1. Introduction

The purpose of this report is to provide a Traffic Impact Analysis for the proposed plan amendment and zone change on tax lots totaling 27.13 acres in the City of Gearhart, Oregon in order to comply with the Statewide Planning Goal 12, the Transportation Planning Rule. This report will compare the traffic impacts of a reasonable worst-case development allowed under the proposed R-2 zone to the traffic impacts of a reasonable worst-case development allowed under the existing R-A zone to determine if the change will significantly impact the area’s transportation system. A mitigation plan will be prepared for any study area facility that is significantly impacted.

2. Location and Vicinity Map

The site is located between McCormick Gardens Road and Railroad Avenue north of Pacific Way in Gearhart, Oregon. The 27.13 acre site consists of nine tax lots; tax lots 1100 and 1201 on Map 6.10.10AB and tax lots 700, 800, 900, 1000, 1100, 1200, and 1300 on Map 6.10.3DC. Figure 1 in Appendix A shows the location of the site along the eastern city limits of Gearhart. The site contains a large pond and extensive wetlands as depicted on Figure 2 in Appendix A. The location of the pond and wetlands on the figure were provided by Pacific Habitat. Only about 7 acres of the site are not in the pond or wetlands.

3. Land Uses and Intensity

The existing site is currently vacant. A possible development plan within the build able area with an access to McCormick Gardens Road is shown on Figure 2. The TPR analysis will compare the traffic impacts of a reasonable worst-case development under the proposed R-2 zoning to the impacts of a reasonable worst-case development under the existing R-A zoning. Table 1 provides the land uses and standards for the existing and proposed zones.

Table 1: R-A and R-2 Zone Comparison

Zone	Outright Uses	Lot Size (sf)
R-A	Single-family dwelling, Manufactured home, Home occupation, Day-care Center*	1 acre
R-2	Single-family dwelling, Manufactured home, Home occupation	7,500
	Duplexes	10,000
	Triplexes	12,500
	Fourplexes	15,000

* - not a reasonable expected use in this area.

4. Study Area

- a. Limits of Traffic Study. The initial study area includes the following intersections:
 - Site Access @ McCormick Gardens Road
 - McCormick Gardens Road @ Pacific Way (two legs are driveways)
 - US 101 @ Pacific Way (Nearest US 101 intersection to site)

- b. Existing Zoning and Land Uses. All parcels between Railroad Avenue on the west and McCormick Gardens Road on the east from Pacific Way north for ~2800 feet are zoned R-A. North and east of that area is under the jurisdiction of Clatsop County. Immediately east of the site is a large area zoned County LW. To the north and east the zoning is County RA-1.
- c. Existing Transportation Facilities. Table 2 shows the characteristics of the existing streets in the initial study area.

Table 2: Existing Study Area Street Characteristics

Street Segment	Jurisdiction / Classification	Road Width (ft)- curbs - shoulders	Posted Speed	Travel Lanes	Bike Lanes	Sidewalks	On-street Parking
US 101	ODOT / Major Arterial	60'-some non-std. curbs	40	4*	None marked	None	None
Pacific Way East of US 101 West of US 101	City - Collector City - Collector	18' - no shoulders 26 to 28' - curbs south	25 25	2 2	None None	None None	None None
McCormick Gardens Rd	City - Collector	20' - no shoulders	25**	2	None	None	None
Site Access	Private - Local	24' - curbs	25**	2	None	Both Sides	None

* - Number of through lanes only. ** - Basic Rule

The intersection of US 101 at Pacific Way is controlled by a traffic signal with protected/permissive left turns with flashing yellow indications for US 101.

The intersection of Pacific Way at McCormick Gardens Road is an uncontrolled 90-degree corner with driveways connecting from the east and south.

The intersection of McCormick Gardens Road at the site access will be controlled by a Stop sign for the site access.

5. Existing Traffic Conditions

Vehicle classification turning movement counts were taken at the US 101 at Pacific Way intersection from 6:00 to 9:00 AM and 3:00 to 6:00 PM on July 27, 2017. The peak hours were 7:45 to 8:45 AM and 3:30 to 4:30 PM. Summary sheets for the traffic counts can be found in Appendix B.

6. Seasonal Factor

For analysis of state highway intersections, ODOT guidelines call for the use of design hour volumes (DHV). Design hour volumes are the 30th highest hour volume for a given year. ODOT's Analysis Procedures Manual (APM) provides three methods for evaluating the seasonal factor. The first method is to consult an existing Automatic Traffic Recorders (ATR) in the nearby area. The Gearhart ATR (No. 04-001) is located on US 101 at MP 15.90, less than three miles south of the site. Comparing the average daily traffic on US 101 counted on July 27th and August 1st, to the average daily traffic during the peak month, August, the seasonal factors were computed to be 1.031 for the AM peak hour counts and 1.018 for the PM peak hour counts. The seasonal factor calculations and traffic count showing the 2017 design hour volumes increased by seasonal factor are found in Appendix B.

7. Crash History

Crash records for McCormick Gardens Road, Pacific Way, and US 101 at Pacific Way for the five-year period 2012 through 2016 were obtained from the ODOT Crash Analysis and Reporting Unit. No crashes were reported on McCormick Gardens Road or Pacific Way east of US 101. Table 2 lists the crashes that occurred on US 101, 500 feet north to 500 feet south of Pacific Way. The detail crash reports are in Appendix B. A total of nine crashes were reported. Table 3 describes the crashes.

Table 3: Study Area Crashes

Street	Location	Date	Type of Collision-Severity*	Comments
US 101	316' N/o Pacific Way	04/09/12	Rear End's - An Injury C	Following driver followed too close & failed to avoid collision
US 101	@ Pacific Way	06/15/12	Angle's - PDO	Westbound vehicles ran signal and struck northbound motor home
US 101	160' S/o Pacific Way	07/04/12	Turning - Injury B & C	Passenger car turning left from a driveway struck a southbound passenger car
US 101	@ Pacific Way	10/21/13	Turn's - a PDO	Eastbound right turn from Pacific Way struck a southbound passenger car
US 101	@ Pacific Way	10/19/14	Angle's - PDO	Westbound vehicles ran a signal and struck northbound passenger car
US 101	105' S/o Pacific Way	12/11/14	Fixed-Object-Injury A	Northbound drivers became ill ran off road hit pole & overturned
US 101	475' S/o Pacific Way	04/01/15	Rear End's - An Injury C	Northbound driver failed to avoid collision with stopped passenger car
US 101	105' S/o Pacific Way	08/02/16	Sideswipe-Overtaking - PDO	Northbound driver improperly changed lanes
US 101	264' S/o Pacific Way	09/27/16	Sideswipe-Overtaking - PDO	Southbound driver failed to yield and sideswiped passenger car

* - Severity: PDO = property damage only; Injury C = least serious injury (Fatal, A, B, C)

8. Intersection Operations - Mobility Standards

For state highway intersections, ODOT uses a mobility standard based on the ratio of the volume of traffic using an intersection or an approach compared to the capacity of the intersection or approach, v/c. As the volume of traffic nears capacity, the ratio approaches 1.0. Table 6 in the Updated 1999 Oregon Highway Plan lists the maximum allowable v/c for various Oregon classifications, locations, and speeds.

- For US 101, a statewide highway inside an urban growth boundary in a non-MPO with a posted speed between 35 and 45 MPH, the maximum allowed v/c is 0.85

A second method to determine the mobility standard is Level of Service (LOS) which is based on the average delay per vehicle at an intersection. LOS measures the quality of traffic flow at an intersection, approach, or movement by estimating the average delay encountered. It is described by a letter scale from "A" to "F" (see below).

Level of Service	Traffic Signal	Stop sign	Level of Service	Traffic Signal	Stop sign
A	≤10 sec	≤10 sec	D	35-55 sec	25-35 sec
B	10-20 sec	10-15 sec	E	55-80 sec	35-50 sec
C	20-35 sec	15-25 sec	F	>80 sec	>50 sec

The mobility standards for the City of Gearhart are provided in the 2017 TSP, volume 2, page 46. Stop and Yield controlled intersections must operate at LOS D or better.

III. Transportation Planning Rule Analysis

1. Existing 2018 Intersection Operational Analysis

Since the traffic count at US 101 at Pacific Way was taken in July of 2017, the traffic volumes must be updated to the current year. Traffic projections for US 101 traffic have been compiled by ODOT in their 2036 Future Volume Tables. The future year 2036 traffic volumes are based on 2015 traffic counts. An annual growth rate can be obtained by averaging the annual rates at five locations on OR 99 near the study area including the Gearhart ATR. The annual growth rate for the study area was found to be 1.18% per year. The calculations are in Appendix B. The design hour volumes from the 2017 traffic count were increased by the annual growth rate and are displayed on Figure 3 in Appendix A.

A capacity analysis was performed on the study area intersection for weekday AM and PM Design Hour Volumes for the existing conditions in 2018. The Synchro program is used to evaluate the operation of the intersections in the study area. The saturation flow rate was set to 1750 vehicles per hour and the existing Peak Hour Factors (PHF's), pedestrian volumes, and heavy vehicle percentages from the traffic counts were used. The Synchro reports are in Appendix C. Table 4 displays the results of the intersection operational analyses for existing conditions. All movements operate well within the appropriate mobility standard.

Table 4: 2018 Existing Design Hour Operational Analysis

Intersection Movement	Mobility Standard	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
US 101 @ Pacific Way	0.85	0.36	6.4	A	0.49	8.3	A

2. Trip Generation

The first step in the analysis of a zone change is to determine the PM peak hour trip generation of a reasonable worst-case development in the existing Rural Agricultural (RA) zone compared to a reasonable worst-case development in the proposed Medium Density Residential (R-2) zone. The worst-case development in the R-A zone allows single-family dwellings at the density of one dwelling per acre per the Gearhart Zoning Code. The area on Figure 2 not shown as wetland, pond, or narrow uplands, amounts to approximately 7.5 acres. Thus the maximum number of dwellings in the R-A zone is 7.

The R-2 zone allows single-family dwellings at 7,500 square foot minimums, duplexes at 10,000 square foot minimums, triplexes at 12,500 square foot minimums, or fourplexes at 15,000 square foot minimums. For trip generation purposes duplexes are normally considered two single-family dwellings and triplexes and fourplexes are considered apartments. Duplexes count as two units at 10,000 square feet or 8.7 units/acre compared to a single-family unit at 7,500 square feet or 5.8 units per acre. Likewise the fourplexes have four units at 15,000 square feet or 11.6 units/acre while triplexes have three units at 12,500 square feet or 10.5 units/acre. The worst-case condition will have either fourplexes or duplexes or a combination of the two uses.

In order to determine which type of dwelling or combination of dwellings will have the maximum number of dwelling units in the R-2 zone, layouts of duplexes and fourplexes were placed on the build able area of the site. Figure 4 in Appendix A shows a duplex layout consisting of 20 duplexes and three fourplex units amounting to 52 dwelling units. Figure 5 in Appendix A shows a layout of 17 fourplex units amounting to 68 total dwelling units. Table 5 computes the trips generated by the two potential developments. The Ninth Edition of the ITE Trip Generation Manual, using the fitted curve equations for each use was used to generate trips for the AM and PM peak hours.

Table 5: Maximum R-2 Zone Site Trips

Dwelling Type	Size	Units	Daily		AM Peak Hour		PM Peak Hour	
			Rate*	Trips	Rate*	Trips	Rate*	Trips
20 Duplexes	40	Dwelling Units	11.30	452	0.94	38	1.15	46
3 Fourplexes	12	Dwelling Units	16.36	196	0.80	10	2.02	24
Duplex/Fourplex Combination	52	Dwelling Units		648		48		70
17 Fourplexes	68	Dwelling Units	7.78	560	0.54	39	0.80	57

* - Rates are computed from the fitted curve equations

Table 5 indicates that the combination of 20 duplexes and 3 fourplexes will generate the most trips. The net trips generated by the proposed zone change is calculated in Table 6. Since the proposed zoning will produce more trips than the existing zoning, and all study area intersections currently operate above the ODOT and County mobility standards, a significant impact will occur when an intersection's mobility standard is exceeded by the new trips from the proposed zoning. The PM Peak Hour has the highest number of new trips and will be used in the Transportation Planning Rule analysis.

Table 6: Net New Trips

Dwelling Type	Size	Units	Daily		AM Peak Hour				PM Peak Hour			
			Rate*	Trips	Rate*	Trips	In	Out	Rate*	Trips	In	Out
R-2 Zone: Duplex/Fourplex	52	Dwelling Units		648		48	11	37		70	44	26
R-A Zone: Single-family	7	Dwelling Units	9.52	-67	0.75	-5	-1	-4	1.00	-7	-4	-3
Net New Trips				581		43	10	33		63	40	23

* - Rates are computed from the fitted curve equations

3. Trip Distribution and Assignment

McCormick Gardens Road is located along the eastern edge of the Gearhart Urban Growth Boundary with only two intersecting roads that connect to the rest of the world; to the south is Pacific Way and to the north is Hillila Road. Both routes connect to US 101. From the site to US 101 via McCormick Gardens and Pacific Way is a distance of 0.43 miles. From the site to US 101 via McCormick Gardens and Hillila Road is a distance of 0.90 miles. The commercial area around Pacific Way is larger than the commercial area near US 101 and Hillila and Pacific Way continues west through Gearhart to the beach. Hillila Road ends at US 101. In addition, the city of Seaside is immediately south on US 101. As a worst-case situation we will assume that all trips will use Pacific Way to reach US 101. Site traffic movements at the US 101 intersection will reflect the existing movements at the intersection. Figure 6 in Appendix A shows the distribution of PM peak hour trips from the site.

4. Year of Completion Traffic Volumes and Analysis

For the Transportation Planning Rule analysis we will analyze the study area in the assumed year of completion of the development, 2020, and in the horizon year of the Gearhart TSP, 2040. The study area has two references to predict traffic future volumes for US 101 and Pacific Way: the Gearhart TSP and the ODOT Future Volume Tables. We will compare the results of both models and use the highest volumes. The ODOT 2036 Future Volume Tables finds a 1.18% annual growth rate for US 101 through 2036 located at the Automatic Traffic Recorder located ~3 miles north of the Pacific Way intersection. The Gearhart TSP finds an annual growth rate of 1.59%. This rate is slightly higher than the rate listed in the TIA Guidelines. The higher Gearhart TSP growth rate will be used. We know of no other planned developments in this area.

The Synchro program is again used to evaluate the operation of the intersections in the study area. No changes were made to the saturation flow rate, the Peak Hour Factors, or pedestrian volumes and heavy vehicle percentages from the traffic counts. The Synchro reports are in Appendix C. Table 7 displays the comparison of the intersection operational analyses from the existing and proposed zones. All movements operate well within the appropriate mobility standard.

Table 7: Year of Completion, 2020, Design Hour Operational Analysis

Intersection Movement	Mobility Standard	Existing R-A Zone			Proposed R-2 Zone		
		V/C	Delay	LOS	V/C	Delay	LOS
US 101 @ Pacific Way	0.85	0.58	10.3	B	0.59	11.2	B
Site Access @ McCormick Gardens Rd	LOS = D	0.01	8.5	A	0.04	8.6	A
Outbound Movements		0.00	7.3	A	0.04	7.3	A
Northbound Movements		---	0.0	A	---	0.0	A
Southbound Movements							

SimTraffic was used to evaluate the queue lengths at the study area intersections following the guidelines in Chapter 8 of ODOT's "Analysis Procedures Manual." Five runs with a random seed were averaged. The 95th percentile queues are reported and are rounded to the next nearest 25-foot increment. Table 8 shows the results of the simulations. The SimTraffic reports are in Appendix C.

Table 8: Year of Completion, 2020, Queuing Analysis

Intersection Movement	Available Storage (ft.)	R-A Zone	R-2 Zone
US 101 @ Pacific Way			
Northbound left turn	125*	100	100
Northbound Through + Right	1000+	225	175
Southbound left turn	125*	50	75
Southbound Through + Right	1000+	225	200
Eastbound Movements	400	125	125
Westbound Movements	350	75	75
Site Access @ McCormick Gardens Rd			
Northbound Movements	750	---	25
Southbound Movements	1000+	---	---
Eastbound Movements	150	25	50

* - turn pocket preceded by center-turn-lane

Both the intersection operational and queuing analyses indicate that the worst-case development will have a negligible effect on the level-of-service or queuing in the study area in 2020.

5. Horizon Year, 2040, TSP Projects

Traffic levels in the study area in the TSP Horizon Year of 2040 are shown in Figure 8 in Appendix A. The existing 2018 traffic volumes for all movements were increased by 1.59% per year and the R-A and R-2 traffic levels from the site were added. The Gearhart TSP lists several projects in or near the study area: (G indicates Gearhart funding; C indicates Clatsop County funding)

- G28: Pacific Way pedestrian & bicycle improvements, US 101 to McCormick Gardens - Package 3
- G29: Shared-use Path - McCormick Gardens to 5th Street - Package 4
- G3: Railroad Avenue extension Pacific Way to Park Lane - Local Street - Package 4
- C5: McCormick Gardens Road pedestrian & bicycle improvements, Pacific Way to UGB - Package 4
- C1: Hilllila Road pedestrian & bicycle improvements, US 101 to Tressel Drive - Package 4

In addition, the TSP identifies projects outside the UGB that are conceptual only:

- C2: Hilllila Road pedestrian & bicycle improvements, Tressel Dr. To McCormick Gardens - Package 4
- C4: McCormick Gardens Road pedestrian & bicycle improvements, UGB to Hilllila Road - Package 4
- G4: Tressel Drive extension from Hilllila Road to Park Lane - Local Street - Package 4

Note: Package 3 relies on a new funding source from eight potential sources listed in the TSP.

Note: Package 4 are aspirational projects that likely would not have City funding by 2024.

The only project above that could be funded by 2040 are the pedestrian & bicycle improvements on Pacific Way which will not affect the operational analyses or queuing at the US 101 at Pacific Way intersection except to provide safer facilities for bikes and pedestrians.

6. Horizon Year, 2040, Traffic Volumes and Analysis

The Synchro program was again used to evaluate the operation of the intersections in the study area. No changes were made to the saturation flow rates, or the heavy vehicle, pedestrian, or bicycle percentages. The peak hour factors were set to the ODOT future year values per the APM. The Synchro reports are in Appendix C. Table 9 shows the results.

Table 9: TSP Horizon Year, 2040 Design Hour Operational Analysis

Intersection Movement	Mobility Standard	Existing R-A Zone			Proposed R-2 Zone		
		V/C	Delay	LOS	V/C	Delay	LOS
US 101 @ Pacific Way	0.85	0.70	13.8	B	0.72	15.0	B
Site Access @ McCormick Gardens Rd	LOS = D						
Outbound Movements		0.01	8.5	A	0.04	8.6	A
Northbound Movements		0.00	7.3	A	0.04	7.3	A
Southbound Movements		---	0.0	A	---	0.0	A

SimTraffic was rerun for 2040 traffic conditions and the results are shown in Table 10. The SimTraffic reports are in Appendix C.

Table 10: TSP Horizon Year, 2040, Queuing Analysis

Intersection Movement	Available Storage (ft.)	R-A Zone	R-2 Zone
US 101 @ Pacific Way			
Northbound left turn	125*	125	125
Northbound Through + Right	1000+	325	275
Southbound left turn	125*	50	125
Southbound Through + Right	1000+	250	325
Eastbound Movements	400	150	175
Westbound Movements	350	75	125
Site Access @ McCormick Gardens Rd			
Northbound Movements	750	---	---
Southbound Movements	1000+	---	---
Eastbound Movements	150	25	50

* - turn pocket preceded by center-turn-lane

Both the intersection operational and queuing analyses indicate that the worst-case development will still have a negligible effect on the level-of-service or queuing in the study area through 2040. All traffic from the development will travel along collector streets through residential zones.

7. Conformance to City Standards

The scarcity and location of developable land on this site does not allow for a standard subdivision development pattern. There is insufficient developable land adjacent to McCormick Gardens Road to allow more than one street connection. As a result a single cul-de-sac street is proposed due to the topographical and environmental constraints. Since the street will be approximately 800 feet in length, the development plan shows cul-de-sacs every 250 to 300 feet and the street terminates in a cul-de-sac that will allow a shared-use path connection per the TSP project G29.

The design of the subdivision street meets the street design cross sections in the Street Design section of the TSP. The intersection of the subdivision street with McCormick Gardens Road meets the Street and Access spacing standards; the closest street, Pacific Way is 750 feet to the south; the closest driveway is 300 feet to the south.

IV. Conclusions and Recommendations

A plan amendment and zone change is proposed on tax lots totaling 27.13 acres along the eastern Urban Growth Boundary in the City of Gearhart, Oregon. The site is currently zoned R-A, rural agriculture, and contains a large pond and wetlands on roughly 20 acres of the site. The development is proposing to change the zone to R-2, medium density residential. The preceding analysis makes the following findings:

- The maximum development in the R-A zone is one dwelling unit per acre or 7 single-family residences.
- The maximum development in the R-2 zone was found to consist of 20 duplex lots and three fourplex lots for a total of 40 single-family residences (20 duplex lots) and 12 apartments (fourplex lots).
- The maximum development in the R-2 zone would generate 70 peak hour trips compared to the R-A zone which would generate 7 peak hour trips.
- An analysis of the worst-case traffic conditions where all trips were assigned to reach US 101 at the signalized intersection with Pacific Way found that the intersection will function well above the ODOT mobility standard and the Gearhart mobility standard through the Gearhart TSP horizon year of 2040.
- An analysis of queuing found no spillover problems in the study area.
- The five-year crash study found no crashes on McCormick Gardens Road or on Pacific Way east of US 101. Of the nine crashes on US 101 near Pacific Way, five occurred south of the intersection including two sideswipe collisions.
- The extensive wetlands on site limit the location of the access to the surrounding street system. The access location shown on McCormick Gardens Road meets all access management standards.
- The extensive wetlands on site limit the buildable area and only one local street can be developed on site. The cul-de-sac street would be 800 feet in length but will provide up to three cul-de-sacs along its length.
- The cul-de-sac at the end of the street will provide a connection to a shared-path that will connect west to 5th Street at US 101. This path will be constructed to emergency vehicle access standards.

Based on these conclusions, we recommend approval of the plan amendment and zone change to medium density residential with no off-site mitigation measures necessary.

Appendix A

Figures

Figure 1
Palmberg Zone Change Traffic Impact Study
Vicinity Map



Figure 2
Palmberg Zone Change Traffic Impact Study
Site Plan

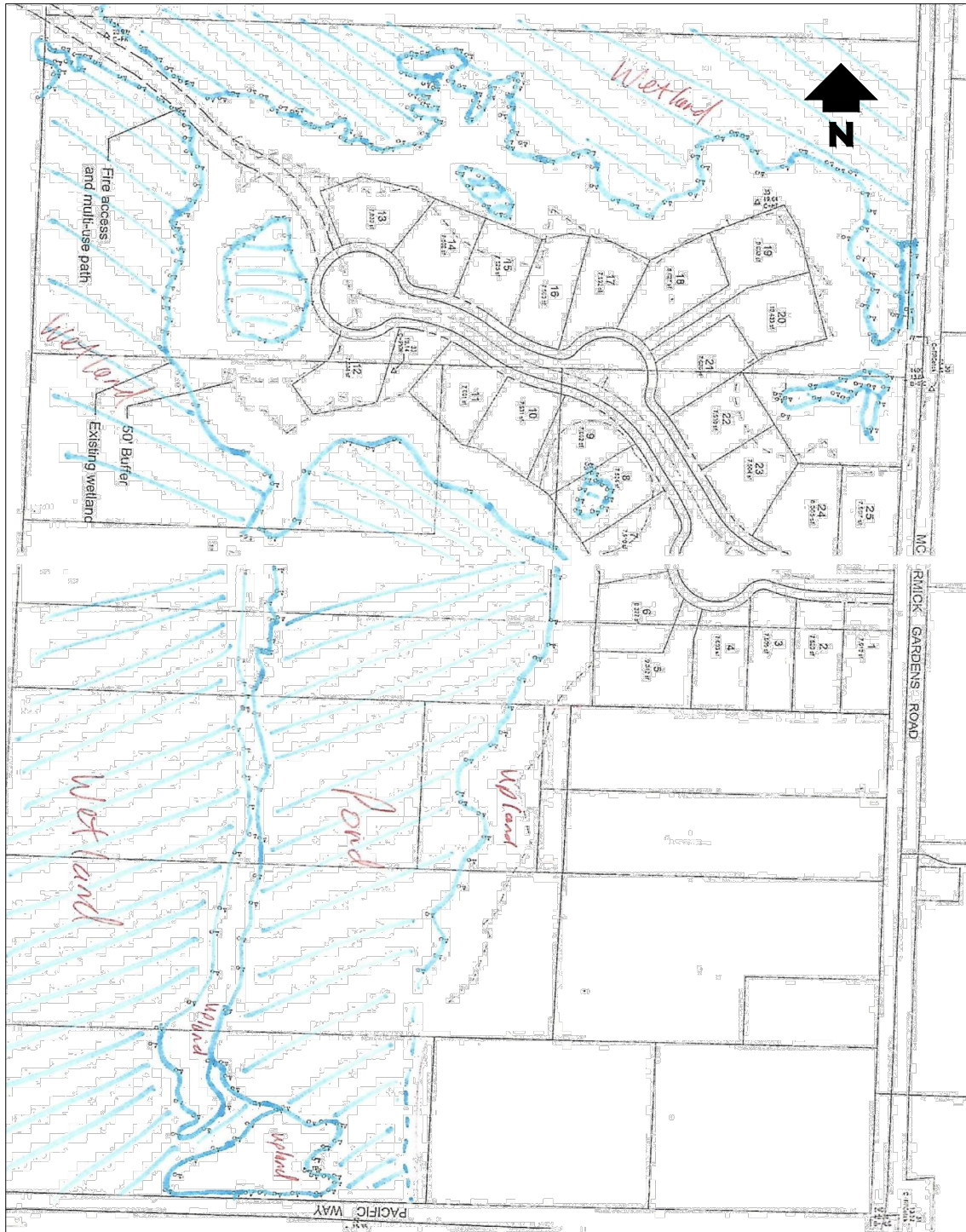


Figure 3

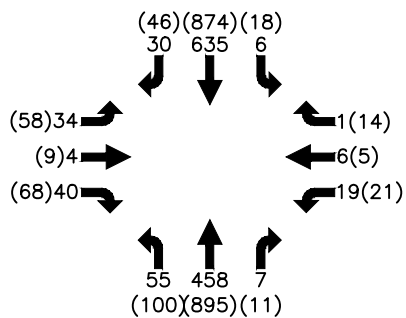
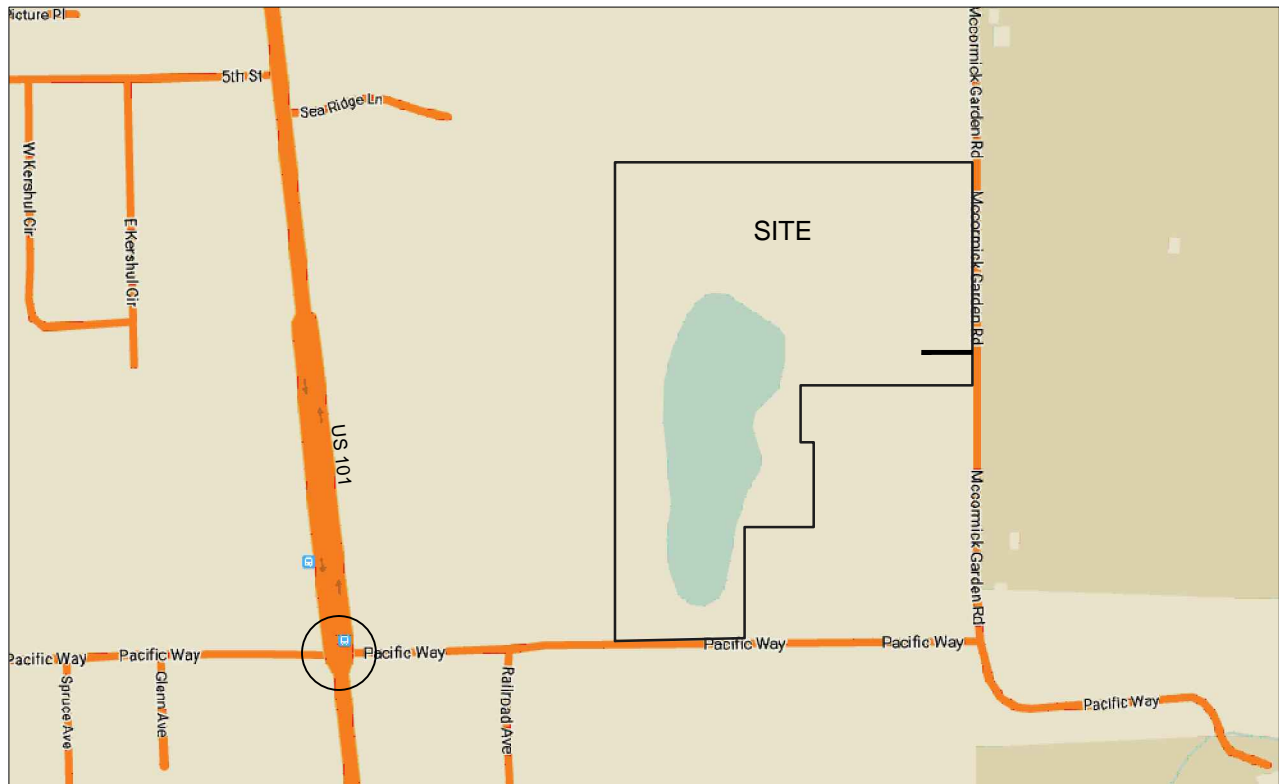
Palmberg Zone Change Traffic Impact Study

2018 DHV's

LEGEND

XX - AM Peak Hour

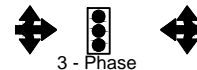
(XX) - PM Peak Hour



T AM = 2%
PM = 1%



PHF AM = .89
PM = .96



T AM = 4%
PM = 1%

Figure 4
Palmberg Zone Change Traffic Impact Study
Duplex Layout

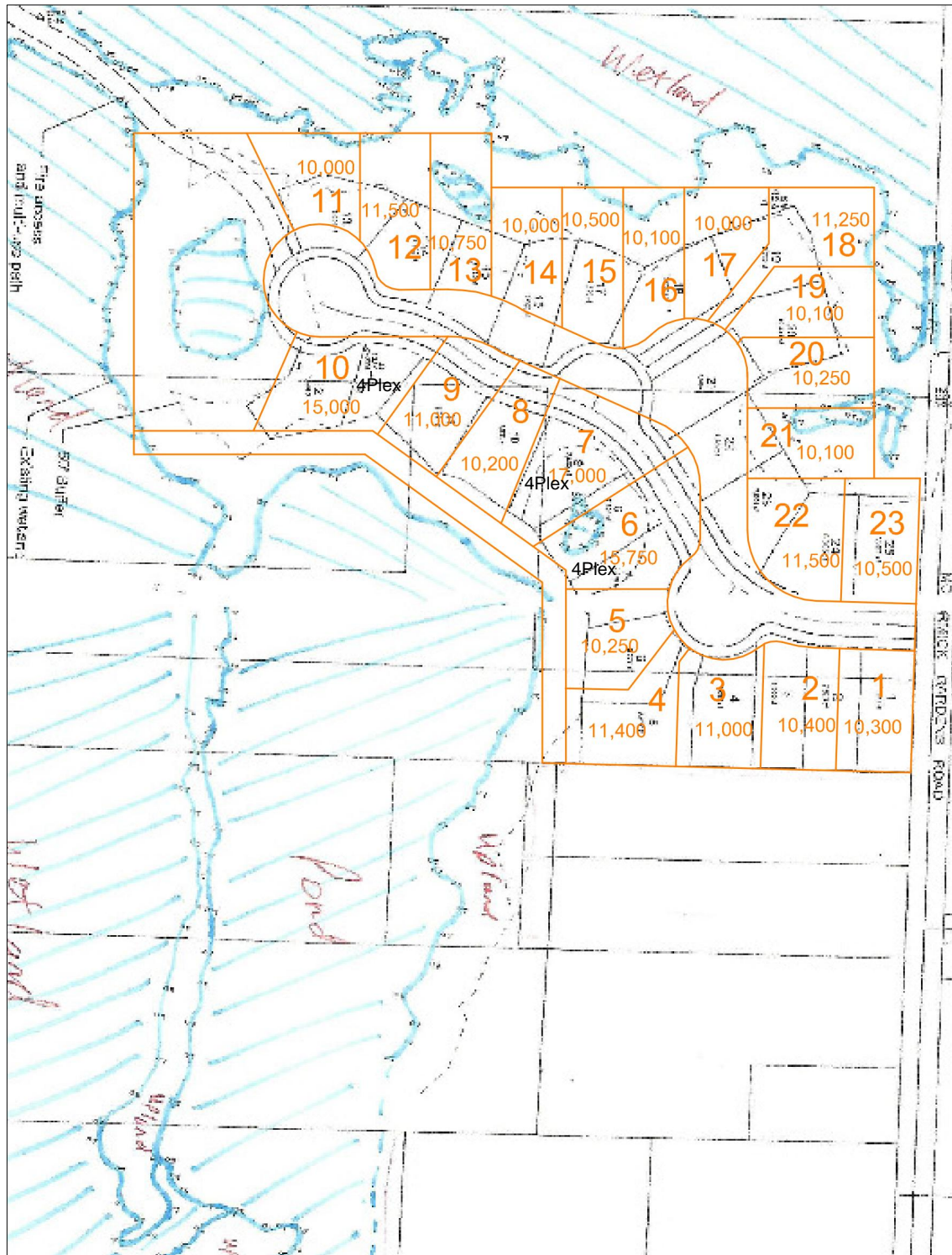


Figure 5
Palmberg Zone Change Traffic Impact Study
Fourplex Layout

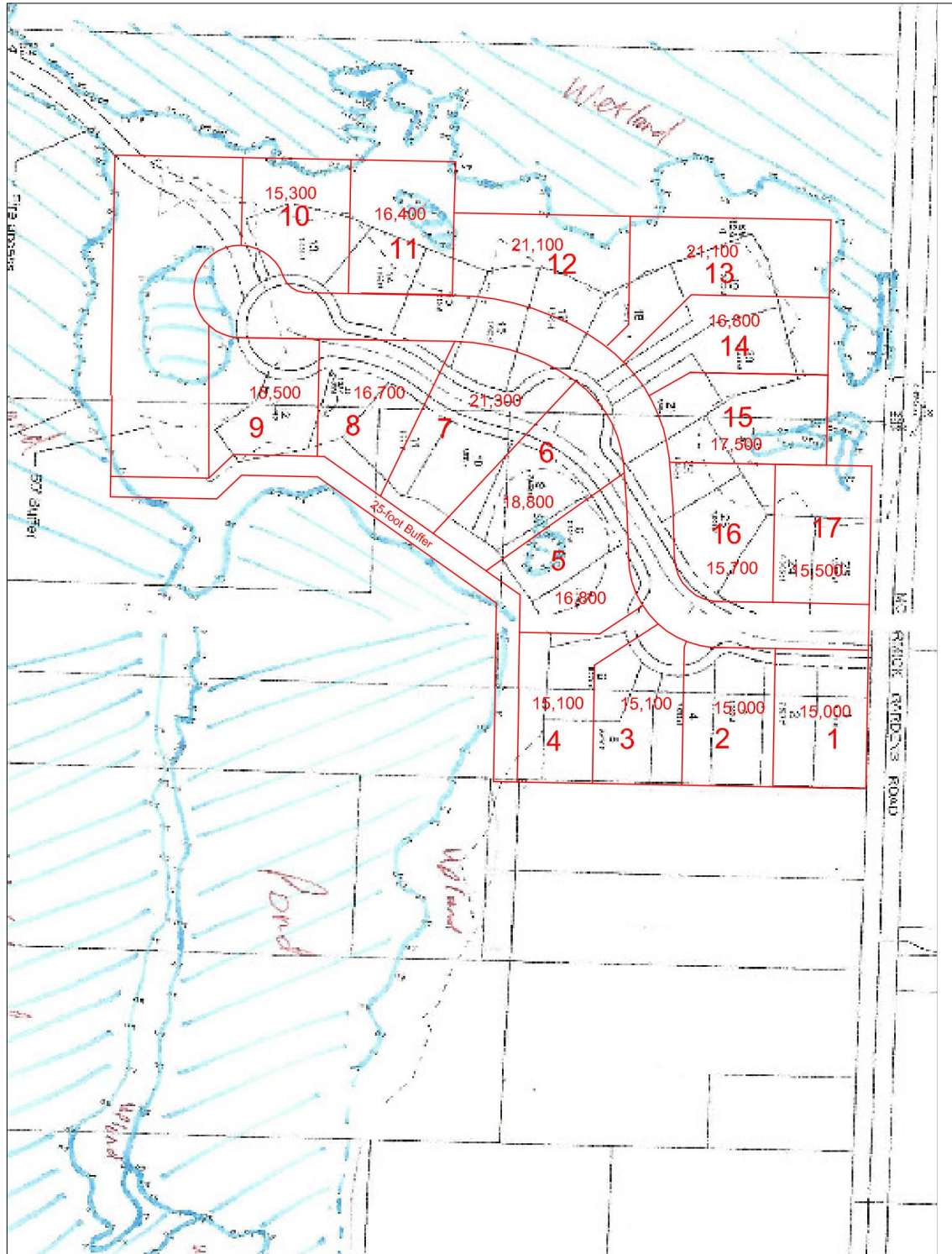
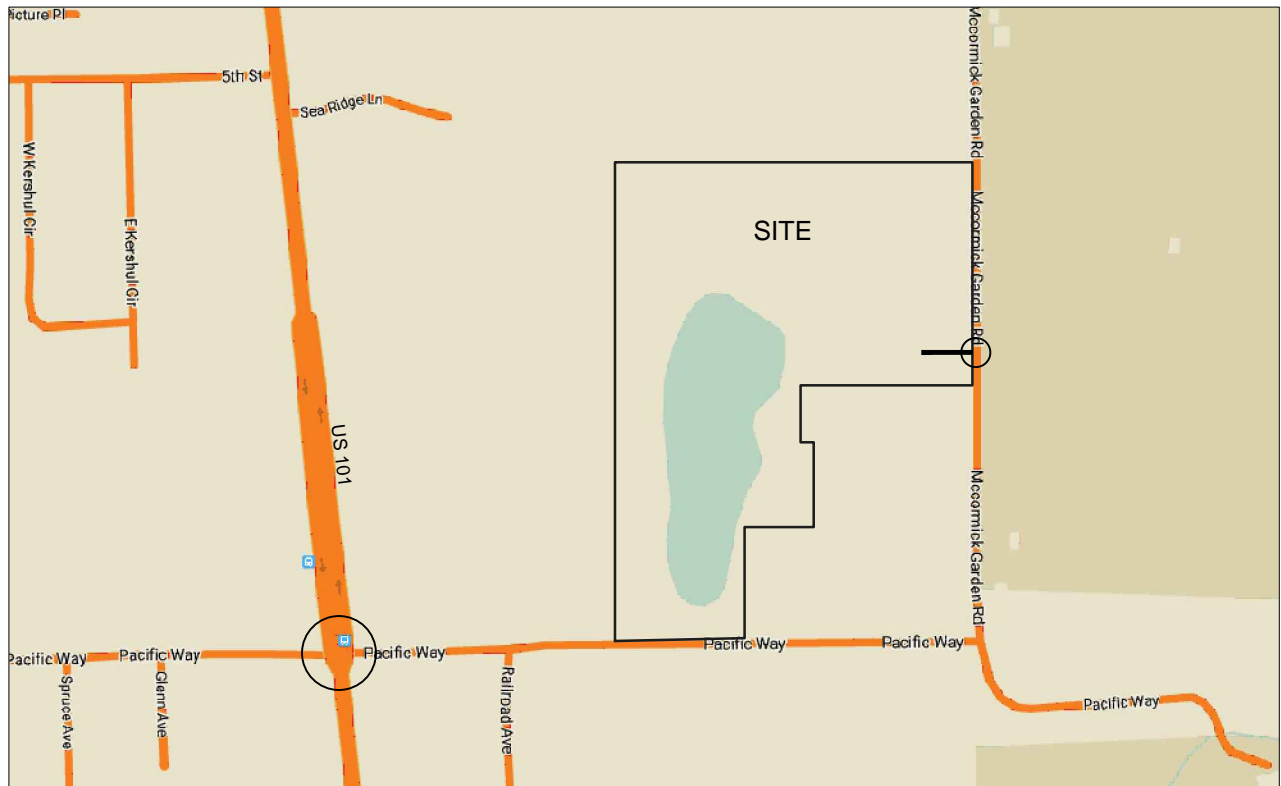


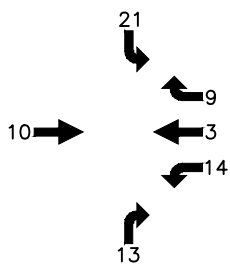
Figure 6

Palmberg Zone Change Traffic Impact Study

Worst-Case Site Traffic Assignment



US 101 @ Pacific Way



McCormick Gardens @ Site

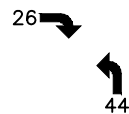
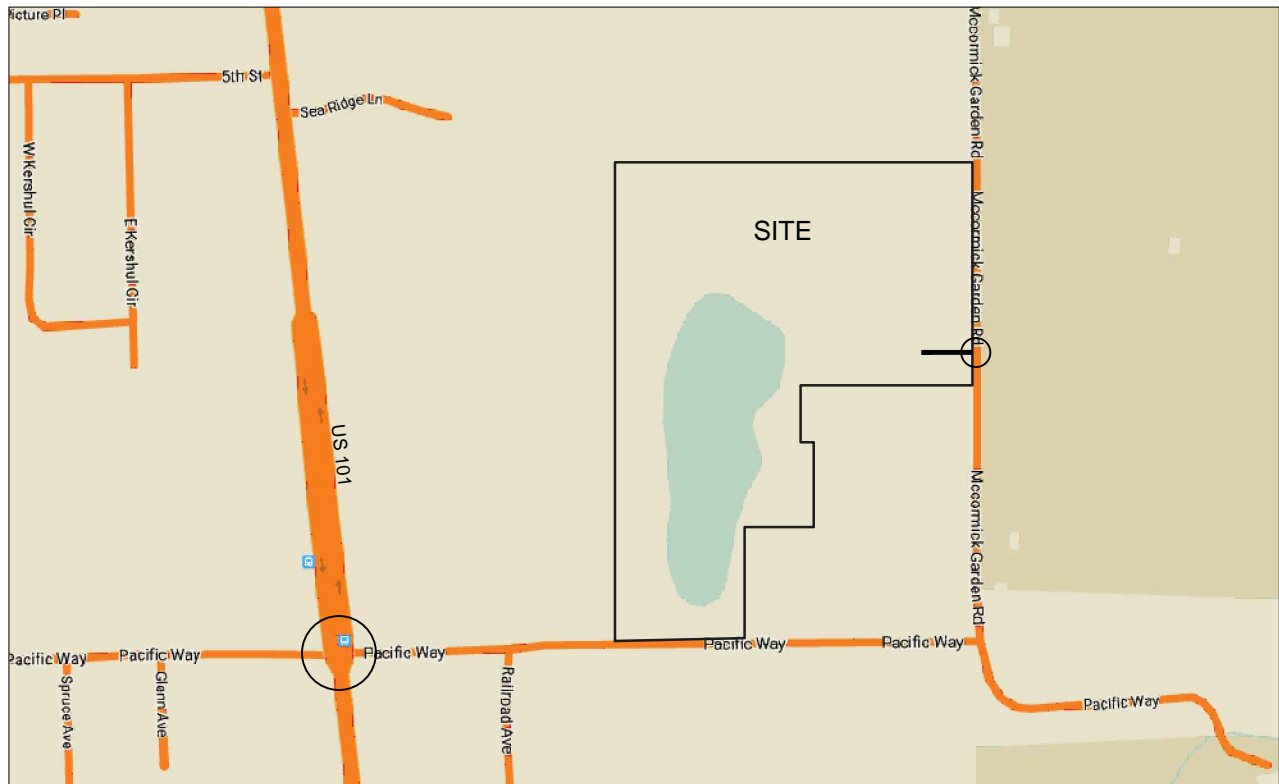


Figure 7

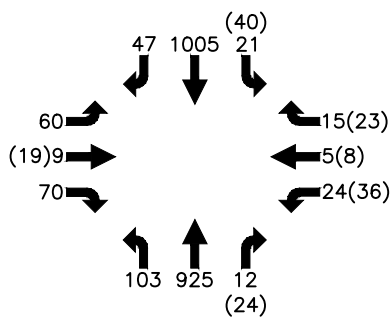
Palmberg Zone Change Traffic Impact Study 2020 Design Hour Volumes

LEGEND

- XX - R-A Zoning
- (XX) - R-2 Zoning



US 101 @ Pacific Way



McCormick Gardens @ Site

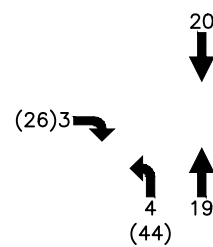
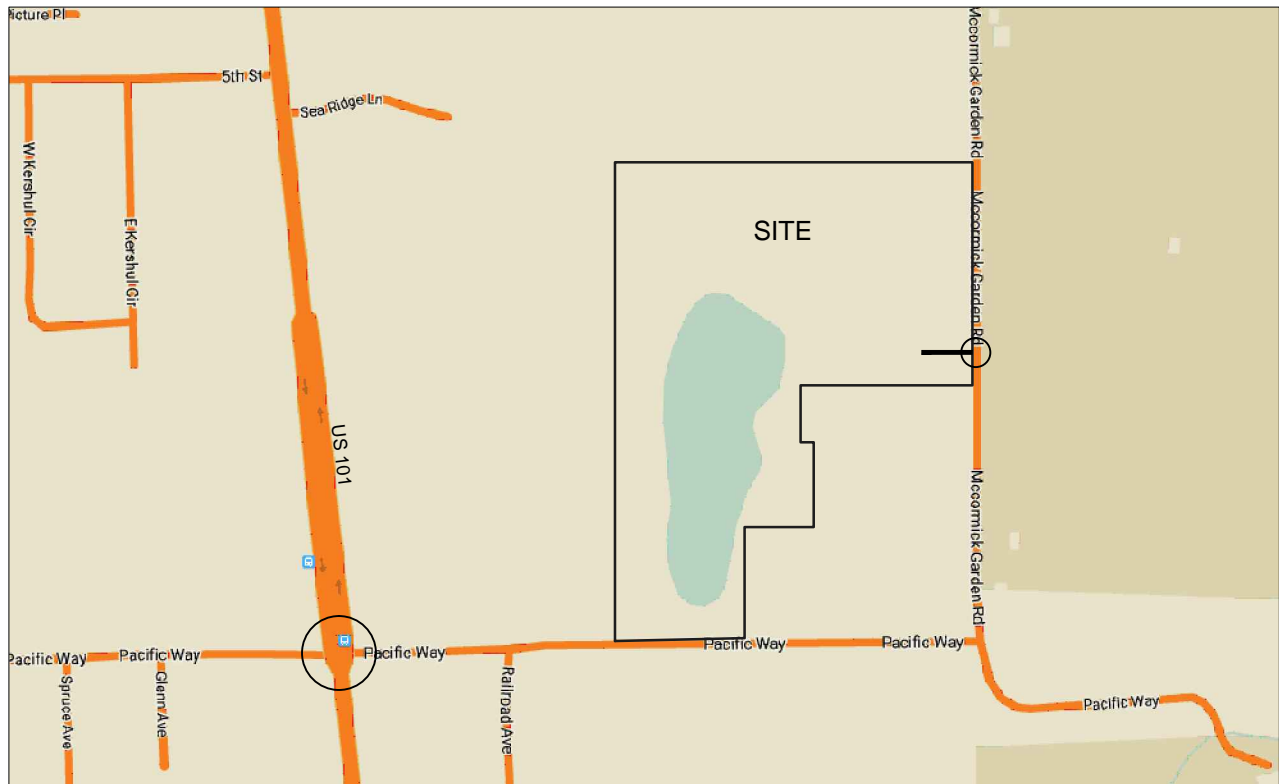


Figure 8

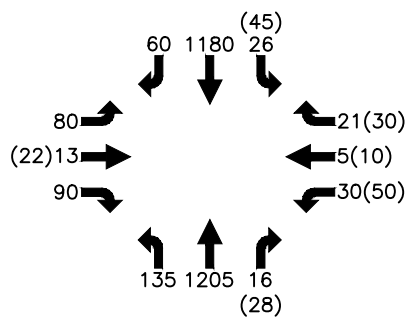
Palmberg Zone Change Traffic Impact Study 2040 Design Hour Volumes

LEGEND

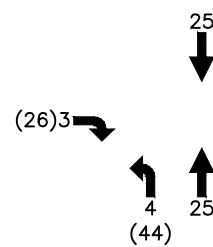
- XX - R-A Zoning
- (XX) - R-2 Zoning



US 101 @ Pacific Way



McCormick Gardens @ Site



CITY OF GEARHART, CLATSOP COUNTY

MCCORMICK GARDENS and Intersectional Crashes at MCCORMICK GARDENS, City of Gearhart, Clatsop County, 01/01/2012 to 12/31/2016

SER#	P	R	S	W	DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE	A	S	RD DPT	E	L	G	H	R	TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED	UNLOC?	D	C	S	L	K	LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P#	TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE
------	---	---	---	---	------	-------	-------------	----------	----------	---------	----------	---------	-------	------	-------	----------	------	---	---	--------	---	---	---	---	---	------	------	---------------	--------	------	-------	-------	------	------	-------	------	------	-----	---	---	-------	-----	--------	---	---	---	---	---	-----	------	-----	-------	----------	-------	-------	-------	-------	----	------	----	----	------	-------	---	---	-----	-----	-------	-----	-------	-------

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

009: OREGON COAST

Highway 009 ALL ROAD TYPES, MP 18.73 to 18.93 01/01/2012 to 12/31/2016, Both Add and Non-Add mileage

1 - 5 of 9 Crash records shown.

SER#	P	R	S	W	DATE	COUNTY	RD#	PC	CONN#	RD CHAR	INT-TYPE	SPCL USE	MOVE	FROM	PRTC	INJ	A	S	LICNS	PED	ERROR	ACT	EVENT	CAUSE						
INVEST	E	A	U	C	O	DAY	CITY	COMPNT	FIRST STREET	DIRECT	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR	QTY													
RD DPT	E	L	G	H	R	TIME	URBAN AREA	MLG TYP	SECOND STREET	LOCTN	LEGS	TRAF-CONTL	RNDBT	SURF	COLL	OWNER														
UNLOC?	D	C	S	L	K	LAT	LONG	MILEPNT	LRS		(#LANES)		DRVWY	LIGHT	SVRTY	V#	TYPE	TO	#	TYPE	SVRTY	E	X	RES	LOC					
00148	N	N	N		04/09/2012	CLATSOP	1	02		STRGHT	N		N	CLR	S-STRGHT	01	NONE	0	STRGHT						07,10					
NO RPT					MO	GEARHART	MN	0	OREGON COAST HY	N	(NONE)	UNKNOWN	N	DRY	REAR				STRGHT	S-N				000	00					
N					12P		18.77		PACIFIC WAY	06			N	DAY	INJ				TRUCK		01	DRVR	NONE	41	M	OR-Y	042	000	07	
N					46 1	-123 54			000900100S00		(04)																			
					29.9101544	42.4378536																			OR<25					
																				02	NONE	0	STRGHT							
																				PRVTE	S-N				006	00				
																				PSNGR	CAR	01	DRVR	INJC	74	M	OR-Y	017	017	10
00238	N	N	N		06/15/2012	CLATSOP	1	02		INTER	CROSS	N		CLR	ANGL-OTH	01	NONE	0	STRGHT						04					
NO RPT					FR	GEARHART	MN	0	OREGON COAST HY	CN	TRF SIGNAL		N	DRY	ANGL				PRVTE	E-W				000	00					
N					11A		18.83		PACIFIC WAY	02	0		N	DAY	PDO				PSNGR	CAR	01	DRVR	NONE	34	F	OR-Y	020	000	04	
N					46 1	-123 54			000900100S00																					
					27.1308068	42.0288116																				OR<25				
																				02	NONE	0	STRGHT							
																				PRVTE	S-N				000	00				
																				MOTRHOME		01	DRVR	NONE	66	M	OTH-Y	000	000	00
																										N-RES				
00521	N	N	N		10/19/2014	CLATSOP	1	02		INTER	CROSS	N		RAIN	ANGL-OTH	01	NONE	0	STRGHT						04					
NO RPT					SU	GEARHART	MN	0	OREGON COAST HY	CN	TRF SIGNAL		N	WET	TURN				PRVTE	S-N				000	00					
N					8P		18.83		PACIFIC WAY	02	0		N	DARK	PDO				PSNGR	CAR	01	DRVR	NONE	16	F	OR-Y	097	000	00	
N					46 1	-123 54	42.03		000900100S00																					
					27.1307639																					OR<25				
																				02	NONE	0	STRGHT							
																				PRVTE	E-W				000	00				
																				PSNGR	CAR	01	DRVR	NONE	58	M	OR-Y	097	000	00
																										OR<25				
00490	N	N	N		10/21/2013	CLATSOP	1	02		INTER	CROSS	N		CLR	ANGL-OTH	01	NONE	0	STRGHT						02					
NO RPT					MO	GEARHART	MN	0	OREGON COAST HY	CN	TRF SIGNAL		N	DRY	TURN				PRVTE	N-S				000	00					
N					4P		18.83		PACIFIC WAY	03	0		N	DAY	PDO				PSNGR	CAR	01	DRVR	NONE	45	M	OTH-Y	000	000	00	
N					46 1	-123 54	42.028776		000900100S00																					
					27.1307639																					OR<25				
																				02	NONE	0	TURN-R							
																				PRVTE	W-S				000	00				
																				PSNGR	CAR	01	DRVR	NONE	18	F	OR-Y	028	000	02
																										OR<25				
00389	N	N	N		08/02/2016	CLATSOP	1	14		STRGHT	N		N	UNK	S-STRGHT	01	NONE	9	STRGHT						13					
NONE					TU	GEARHART	MN	0	PARK DR	S	(NONE)	UNKNOWN	N	UNK	SS-O				N/A	S-N				000	00					
N					2P	SEASIDE UA	18.85		PACIFIC WAY	06			N	DAY	PDO				PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00	
N					46 1	-123 54	41.78		000900100S00		(04)																			
																										UNK				
																				02	NONE	9	STRGHT							
																				N/A	S-N				000	00				
																				PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00
																										UNK				

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

009: OREGON COAST

Highway 009 ALL ROAD TYPES, MP 18.73 to 18.93 01/01/2012 to 12/31/2016, Both Add and Non-Add mileage

6 - 9 of 9 Crash records shown.

SER#	P	R	S	W	DATE	COUNTY	RD#	PC	CONN#	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR	QTY	MOVE	A	S	PED	ERROR	ACT	EVENT	CAUSE			
INVEST	E	A	U	C	O	CITY	COMPNT	FIRST STREET	DIRECT	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR	QTY	MOVE	A	S	PED	ERROR	ACT	EVENT	CAUSE					
RD DPT	E	L	G	H	R	URBAN AREA	MLG	TYP	SECOND STREET	LOCTN	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED	ERROR	ACT	EVENT	CAUSE		
UNLOC7	D	C	S	L	K	LONG	MILEPNT	LRS	(#LANES)	CONTL	DRVWY	LIGHT	SVRVTY	V#	TYPE	TO	P#	TYPE	SVRVTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE		
00610	N	N	N	N	12/11/2014	CLATSOP	1	02		ALLEY	N		Y	CLR	FIX OBJ	01 NONE	0	STRGHT										095,053,017	
STATE					TH	GEARHART	MN	0	OREGON COAST HY	S	(NONE)	NONE	N	DRY	FIX	PRVTE	S -N							000	053,058,000				
Y					1P		18.85		PACIFIC WAY	08			N	DAY	INJ	PSNGR CAR			01	DRVR	INJA	64	M	OR-Y	080,081	028	17		
N					46 1 25.97	-123 54 41.78			000900100S00		(04)																		
00271	N	N	N	N	07/04/2012	CLATSOP	1	02		ALLEY	N		N	CLR	ANGL-OTH	01 NONE	0	STRGHT										02	
STATE					WE	GEARHART	MN	0	OREGON COAST HY	S	(NONE)	NONE	N	DRY	TURN	PRVTE	N -S							000	000				
N					10A		18.86		PACIFIC WAY	03			N	DAY	INJ	PSNGR CAR			01	DRVR	INJB	27	F	OR-Y	000	000	00		
N					46 1 25.3930551	-123 54 41.6602989			000900100S00		(03)																		
																02 NONE	0	TURN-L											
																PRVTE	W -N			01	DRVR	INJC	33	F	OTH-Y	028	018	00	
																PSNGR CAR												02	
																02 NONE	0	TURN-L											
																PRVTE	W -N			02	PSNG	INJC	27	M		000	000	00	
																PSNGR CAR													
00521	N	N	N		09/27/2016	CLATSOP	1	14		TRANS	N		N	CLR	S-STRGHT	01 NONE	9	STRGHT										02	
NO RPT					TU	GEARHART	MN	0	PARK DR	S	(NONE)	UNKNOWN	N	DRY	SS-O	N/A	N -S							000	000				
N					12P	SEASIDE UA	18.88		PACIFIC WAY	03			N	DAY	PDO	PSNGR CAR			01	DRVR	NONE	00	Unk	UNK	000	000	00		
N					46 1 24.24	-123 54 41.42			000900100S00		(02)																		
																02 NONE	9	STRGHT											
																N/A	N -S			01	DRVR	NONE	00	Unk	UNK	000	000	00	
																PSNGR CAR													
00129	N	N	N		04/01/2015	CLATSOP	1	14		STRGHT	N		N	UNK	S-1STOP	01 NONE	0	STRGHT										29	
NONE					WE	GEARHART	MN	0	OREGON COAST HY	S	(NONE)	BUS STPSGN	N	UNK	REAR	PRVTE	S -N							000	000				
N					1P	SEASIDE UA	18.92		PACIFIC WAY	04			N	DAY	INJ	PSNGR CAR			01	DRVR	NONE	54	F	OTH-Y	026	000	29		
N					46 1 21.88	-123 54 41.2			000900100S00		(03)																		
																02 NONE	0	STOP											
																PRVTE	S -N			01	DRVR	INJC	68	M	OR-Y	000	000	00	
																PSNGR CAR													

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

ACCESS ENGINEERING

Peak Hour Intersection Turning Movement Count & Classification Summary

N/S Street:
E/W Street:

US 101
Pacific Way

Counted By:
Date:

GTD
7/27/17

AM Count																					
Time Period From-To AM	Northbound US 101					Southbound US 101					Eastbound Pacific Way					Westbound Pacific Way					ALL
	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	
6:00-6:15	2	33	0	35	4	0	41	1	42	1	2	0	7	9	0	0	0	0	0	0	86
6:15-6:30	2	40	1	43	2	0	40	0	40	2	10	0	2	12	0	0	0	0	0	0	95
6:30-6:45	0	57	1	58	4	1	62	2	65	0	8	0	1	9	0	1	1	1	3	0	135
6:45-7:00	3	64	0	67	3	0	65	2	67	2	8	0	0	8	0	4	0	1	5	0	147
Hour Total:	7	194	2	203	13	1	208	5	214	5	28	0	10	38	0	5	1	2	8	0	463
7:00-7:15	2	70	0	72	9	0	62	4	66	2	6	0	5	11	0	1	0	0	1	0	150
7:15-7:30	9	87	2	98	5	0	92	5	97	0	8	1	3	12	0	2	1	0	3	0	210
7:30-7:45	10	106	1	117	7	1	134	5	140	2	7	1	4	12	0	1	0	1	2	0	271
7:45-8:00	9	101	1	111	4	3	163	5	171	2	9	1	7	17	0	7	2	0	9	0	308
Hour Total:	30	364	4	398	25	4	451	19	474	6	30	3	19	52	0	11	3	1	15	0	939
8:00-8:15	16	104	1	121	4	1	138	5	144	2	10	0	12	22	0	4	1	1	6	0	293
8:15-8:30	11	104	3	118	3	2	146	9	157	6	7	2	6	15	0	3	0	0	3	0	293
8:30-8:45	16	130	2	148	6	0	161	10	171	4	7	1	14	22	0	4	3	0	7	0	348
8:45-9:00	13	109	0	122	5	1	136	6	143	3	13	0	16	29	0	5	1	2	8	0	302
Period Total:	56	447	6	509	18	4	581	30	615	15	37	3	48	88	0	16	5	3	24	0	1236
Grand Total:	93	1005	12	1110	56	9	1240	54	1303	26	95	6	77	178	0	32	9	6	47	0	2638
AM Peak Hr. 7:45-8:45 PHF % Trucks	52	439	7	498	18	6	608	29	643	15	33	4	39	76	0	18	6	1	25	0	1242
				0.841					0.940					0.864					0.694		0.892
				4%					2%					0%					0%		
Seasonal Factor (x 1.031)																					
Adj. PHV	54	453	7	514		6	627	30	663		34	4	40	78		19	6	1	26		1281

PEDS	6:00-7:45	0	6:00-7:45	2	6:00-7:45	1	6:00-7:45	1
Peak Hour	7:45-8:45	2	7:45-8:45	0	7:45-8:45	1	7:45-8:45	0
	8:45-9:00	0	8:45-9:00	0	8:45-9:00	0	8:45-9:00	0

Counted By:
Date:

GTD
8/1/17

PM Count																					
Time Period From-To PM	Northbound US 101					Southbound US 101					Eastbound Pacific Way					Westbound Pacific Way					ALL
	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	Left	Thru	Right	Total	Trucks	
3:00-3:15	23	184	2	209	0	3	209	41	253	1	14	5	19	38	0	4	2	4	10	0	510
3:15-3:30	16	186	3	205	2	4	211	12	227	1	9	1	15	25	0	5	3	3	11	0	468
3:30-3:45	13	191	4	208	4	4	210	12	226	0	13	4	13	30	0	9	1	6	16	0	480
3:45-4:00	34	207	2	243	2	5	241	10	256	7	13	2	17	32	0	6	1	1	8	0	539
Period Total:	86	768	11	865	8	16	871	75	962	9	49	12	64	125	0	24	7	14	45	0	1997
4:00-4:15	26	235	0	261	3	2	202	11	215	1	18	2	15	35	0	6	1	6	13	0	524
4:15-4:30	18	213	3	234	2	4	206	12	222	2	13	3	14	30	0	3	1	2	6	0	492
4:30-4:45	19	213	6	238	2	7	200	11	218	1	12	2	21	35	0	6	2	5	13	0	504
4:45-5:00	13	179	2	194	1	2	201	9	212	0	6	0	12	18	0	7	2	6	15	0	439
Hour Total:	76	840	11	927	8	15	809	43	867	4	49	7	62	118	0	22	6	19	47	0	1959
5:00-5:15	15	230	4	249	0	3	185	12	200	0	13	1	18	32	0	5	0	3	8	0	489
5:15-5:30	12	203	1	216	2	1	175	9	185	0	9	0	24	33	0	3	0	1	4	0	438
5:30-5:45	15	180	0	195	0	4	178	14	196	1	5	0	17	22	0	5	0	4	9	0	422
5:45-6:00	9	178	2	189	1	4	149	11	164	0	6	0	13	19	0	7	1	4	12	0	384
Period Total:	51	791	7	849	2	12	687	46	745	0	33	1	72	106	0	20	1	12	33	0	1733
Grand Total:	213	2399	29	2641	18	43	2367	164	2574	13	131	20	198	349	0	66	14	45	125	0	5689
PM Peak Hr. 3:45-4:45 PHF % Trucks	97	868	11	976	9	18	849	44	911	11	56	9	67	132	0	21	5	14	40	0	2059
				0.935					0.890					0.943					0.769		0.955
				1%					1%					0%					0%		
Seasonal Factor (x 1.018)																					
Adj. PHV	99	884	11	994		18	864	45	927		57	9	68	134		21	5	14	40		2095

PEDS	3:00-3:30	0	3:00-3:30	0	3:00-3:30	0	3:00-3:30	0
Peak Hour	3:30-4:30	0	3:30-4:30	0	3:30-4:30	0	3:30-4:30	0
	4:30-6:00	0	4:30-6:00	0	4:30-6:00	0	4:30-6:00	0

Gearhart Zone Change TIA

Seasonal Factor Calculation

ATR: 04-001 Hwy. 101 - Gearhart, MP 15.90

		2012	2013	2014	2015	2016	AVE	Seasonal Factor
Peak Month	August	134	131	133	127	127	131.33	
Count Date-AM	July 27	129	129	128	125	124	127.33	1.031
Count Date-PM	Aug 1	132	130	130	127	125	129.00	1.018

Source: ATR Trend Summaries 2012-2016, ODOT Transportation Development

Growth Rate Calculations

US 101 - (Oregon Coast Highway #9)

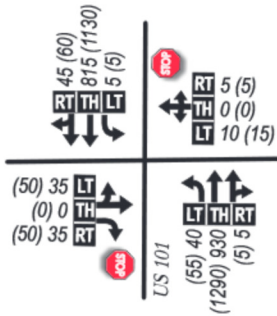
Location	M.P.	ADTs		RSQ	21 Year Annual	
		2015	2036		Factor	Rate
0.01 mile south of Cutler Lane	18.36	15000	19000	0.5396	1.267	1.27%
0.02 mile south of Pacific Way	18.85	15400	19700	0.4703	1.279	1.33%
0.02 mile north of Airport Road	19.32	17700	21200	0.7386	1.198	0.94%
Average						1.18%

Source: 2036 Future Volumes Table, ODOT Transportation Planning & Analysis Unit

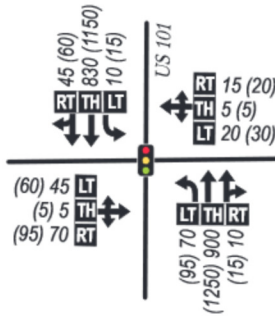
Gearhart TSP		PM Peak Hour		RSQ	24 Year Annual	
		2016	2040		Factor	Rate
	US 101	1865	2585	MODEL	1.386	1.61%
	Pacific Way	160	220	MODEL	1.375	1.56%
Average						1.59%

	2020	2040
Annual Growth Rate:	1.59%	1.59%
Annual Growth Factor	1.0159	1.0159
Years	2	22
Growth Factor	1.032	1.349

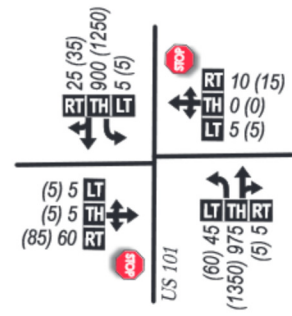
1. US 101 / Gearhart Loop Road



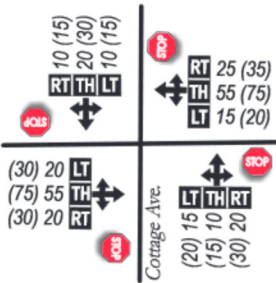
2. US 101 / Pacific Way



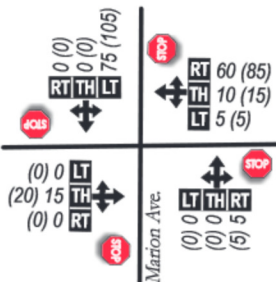
3. US 101 / G Street-Oster Road



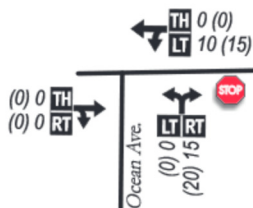
4. Pacific Way / Cottage Avenue



5. Pacific Way / Marion Avenue



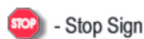
6. Pacific Way / Ocean Avenue



LEGEND



- Study Intersection



- Stop Sign



- Lane Configuration



LT TH RT - Turn Movement Volume
Left-Thru-Right

Existing 2016 (2040 Baseline) - Peak Hour Traffic Volumes

DKS



No Scale

Figure A1

Existing 2016 30 HV and Forecasted
Baseline 2040 DHV Traffic Volumes

(P.M. Peak Hour)

Appendix C

Synchro & SimTraffic Reports

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmborg Zone Change TIA
2018 - AM Peak - Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	34	4	40	19	6	1	55	458	7	6	635	30
Future Volume (vph)	34	4	40	19	6	1	55	458	7	6	635	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			1.00				
Frt		0.930			0.995			0.998				0.993
Flt Protected		0.979			0.965		0.950			0.950		
Satd. Flow (prot)	0	1582	0	0	1680	0	1662	3191	0	1662	3240	0
Flt Permitted		0.845			0.859		0.342			0.458		
Satd. Flow (perm)	0	1366	0	0	1495	0	598	3191	0	802	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			1			2				7
Link Speed (mph)		25			25			40				40
Link Distance (ft)		409			974			407				802
Travel Time (s)		11.2			26.6			6.9				13.7
Confl. Peds. (#/hr)			1	1					2			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	38	4	45	21	7	1	62	515	8	7	713	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	87	0	0	29	0	62	523	0	7	747	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		10			10			10				10
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2018 - AM Peak - Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	30.0	30.0		30.0	30.0		13.0	49.0		11.0	47.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		14.4%	54.4%		12.2%	52.2%	
Maximum Green (s)	26.0	26.0		26.0	26.0		9.0	44.2		7.0	42.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effct Green (s)		9.0			9.0		28.7	32.0		30.4	27.7	
Actuated g/C Ratio		0.21			0.21		0.67	0.74		0.71	0.64	
v/c Ratio		0.27			0.09		0.11	0.22		0.01	0.36	
Control Delay		12.0			16.3		5.1	6.0		5.0	9.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		12.0			16.3		5.1	6.0		5.0	9.7	
LOS		B			B		A	A		A	A	
Approach Delay		12.0			16.3			5.9			9.6	
Approach LOS		B			B			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	43
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.36
Intersection Signal Delay:	8.4
Intersection Capacity Utilization	38.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 3: US 101 & Pacific Way



HCM Signalized Intersection Capacity Analysis
 3: US 101 & Pacific Way

Palmberg Zone Change TIA
 2018 - AM Peak - Existing



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	34	4	40	19	6	1	55	458	7	6	635	30
Future Volume (vph)	34	4	40	19	6	1	55	458	7	6	635	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			1.00		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1583			1680		1662	3191		1662	3240	
Flt Permitted		0.85			0.86		0.34	1.00		0.46	1.00	
Satd. Flow (perm)		1367			1495		599	3191		802	3240	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	4	45	21	7	1	62	515	8	7	713	34
RTOR Reduction (vph)	0	40	0	0	1	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	47	0	0	28	0	62	522	0	7	744	0
Confl. Peds. (#/hr)			1	1					2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		5.6			5.6		29.5	28.8		29.5	26.2	
Effective Green, g (s)		5.6			5.6		29.5	29.6		29.5	27.0	
Actuated g/C Ratio		0.12			0.12		0.62	0.62		0.62	0.56	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		159			174		442	1971		506	1826	
v/s Ratio Prot							c0.01	c0.16		0.00	c0.23	
v/s Ratio Perm		c0.03			0.02		0.08			0.01		
v/c Ratio		0.30			0.16		0.14	0.26		0.01	0.41	
Uniform Delay, d1		19.3			19.0		3.7	4.2		3.5	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.3		0.1	0.1		0.0	0.2	
Delay (s)		20.1			19.4		3.8	4.3		3.6	6.1	
Level of Service		C			B		A	A		A	A	
Approach Delay (s)		20.1			19.4			4.2			6.1	
Approach LOS		C			B			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.36	A
Actuated Cycle Length (s)	47.9	Sum of lost time (s)
Intersection Capacity Utilization	38.9%	12.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmborg Zone Change TIA
2018 - PM Peak - Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↗		↗	↕↗	
Traffic Volume (vph)	58	9	68	21	5	14	100	895	11	18	874	46
Future Volume (vph)	58	9	68	21	5	14	100	895	11	18	874	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.952			0.998				0.992
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1597	0	0	1623	0	1662	3286	0	1662	3267	0
Flt Permitted		0.842			0.853		0.241			0.268		
Satd. Flow (perm)	0	1373	0	0	1421	0	422	3286	0	469	3267	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			15			2				8
Link Speed (mph)		25			25			40				40
Link Distance (ft)		409			974			407				802
Travel Time (s)		11.2			26.6			6.9				13.7
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	60	9	71	22	5	15	104	932	11	19	910	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	140	0	0	42	0	104	943	0	19	958	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		10			10			10				10
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2018 - PM Peak - Existing

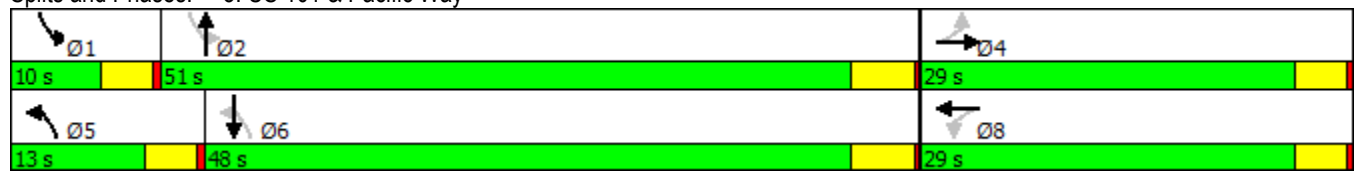


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	29.0	29.0		29.0	29.0		13.0	51.0		10.0	48.0	
Total Split (%)	32.2%	32.2%		32.2%	32.2%		14.4%	56.7%		11.1%	53.3%	
Maximum Green (s)	25.0	25.0		25.0	25.0		9.0	46.2		6.0	43.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effct Green (s)		10.2			10.2		33.6	36.7		36.2	29.8	
Actuated g/C Ratio		0.19			0.19		0.64	0.70		0.69	0.57	
v/c Ratio		0.45			0.15		0.24	0.41		0.04	0.52	
Control Delay		18.9			16.8		5.9	7.1		4.7	12.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		18.9			16.8		5.9	7.1		4.7	12.0	
LOS		B			B		A	A		A	B	
Approach Delay		18.9			16.8			7.0			11.9	
Approach LOS		B			B			A			B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 52.5
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 10.1
 Intersection LOS: B
 Intersection Capacity Utilization 53.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 3: US 101 & Pacific Way



HCM Signalized Intersection Capacity Analysis
 3: US 101 & Pacific Way

Palmberg Zone Change TIA
 2018 - PM Peak - Existing



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↔		↗	↕↔	
Traffic Volume (vph)	58	9	68	21	5	14	100	895	11	18	874	46
Future Volume (vph)	58	9	68	21	5	14	100	895	11	18	874	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1596			1623		1662	3287		1662	3269	
Flt Permitted		0.84			0.85		0.24	1.00		0.27	1.00	
Satd. Flow (perm)		1372			1421		421	3287		469	3269	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	60	9	71	22	5	15	104	932	11	19	910	48
RTOR Reduction (vph)	0	49	0	0	13	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	91	0	0	29	0	104	942	0	19	954	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		8.3			8.3		35.3	34.6		35.3	30.2	
Effective Green, g (s)		8.3			8.3		35.3	35.4		35.3	31.0	
Actuated g/C Ratio		0.15			0.15		0.63	0.63		0.63	0.55	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		201			209		375	2063		308	1796	
v/s Ratio Prot							c0.03	c0.29		0.00	c0.29	
v/s Ratio Perm		c0.07			0.02		0.15			0.04		
v/c Ratio		0.45			0.14		0.28	0.46		0.06	0.53	
Uniform Delay, d1		22.0			20.9		4.6	5.5		4.1	8.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.2		0.3	0.2		0.1	0.4	
Delay (s)		23.2			21.2		4.9	5.7		4.2	8.5	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		23.2			21.2			5.6			8.4	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.49	A
Actuated Cycle Length (s)	56.4	Sum of lost time (s)
Intersection Capacity Utilization	53.7%	12.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2020 - DHVs - R-A Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	60	9	70	24	5	15	103	925	12	21	1005	47
Future Volume (vph)	60	9	70	24	5	15	103	925	12	21	1005	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			1.00				
Frt		0.932			0.954			0.998				0.993
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1586	0	0	1626	0	1662	3191	0	1662	3240	0
Flt Permitted		0.841			0.842		0.165			0.223		
Satd. Flow (perm)	0	1363	0	0	1405	0	289	3191	0	390	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			17			2				7
Link Speed (mph)		25			25			40				40
Link Distance (ft)		409			974			407				802
Travel Time (s)		11.2			26.6			6.9				13.7
Confl. Peds. (#/hr)			1	1					2			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	67	10	79	27	6	17	116	1039	13	24	1129	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	50	0	116	1052	0	24	1182	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		10			10			10				10
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2020 - DHVs - R-A Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	29.0	29.0		29.0	29.0		13.0	51.2		9.8	48.0	
Total Split (%)	32.2%	32.2%		32.2%	32.2%		14.4%	56.9%		10.9%	53.3%	
Maximum Green (s)	25.0	25.0		25.0	25.0		9.0	46.4		5.8	43.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effct Green (s)		11.2			11.2		40.1	40.1		41.9	34.7	
Actuated g/C Ratio		0.18			0.18		0.64	0.64		0.67	0.55	
v/c Ratio		0.54			0.19		0.35	0.52		0.06	0.66	
Control Delay		24.1			19.3		7.4	9.2		4.7	13.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		24.1			19.3		7.4	9.2		4.7	13.9	
LOS		C			B		A	A		A	B	
Approach Delay		24.1			19.3			9.0			13.7	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 62.8
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.3
 Intersection Capacity Utilization 58.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: US 101 & Pacific Way



Lanes, Volumes, Timings
7: McCormick Gardens Rd & Site Access



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	4	19	20	1
Future Volume (vph)	1	3	4	19	20	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width (ft)	12	12	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892				0.995	
Flt Protected	0.990			0.992		
Satd. Flow (prot)	1545	0	0	1620	1625	0
Flt Permitted	0.990			0.992		
Satd. Flow (perm)	1545	0	0	1620	1625	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	346			469	360	
Travel Time (s)	9.4			12.8	9.8	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	4	5	25	27	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	30	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.21	1.21	1.21	1.21
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	14.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Signalized Intersection Capacity Analysis
 3: US 101 & Pacific Way

Palmberg Zone Change TIA
 2020 - DHVs - R-A Zone



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	60	9	70	24	5	15	103	925	12	21	1005	47
Future Volume (vph)	60	9	70	24	5	15	103	925	12	21	1005	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1586			1625		1662	3192		1662	3241	
Flt Permitted		0.84			0.84		0.16	1.00		0.22	1.00	
Satd. Flow (perm)		1363			1406		289	3192		390	3241	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	67	10	79	27	6	17	116	1039	13	24	1129	53
RTOR Reduction (vph)	0	47	0	0	14	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	109	0	0	36	0	116	1051	0	24	1179	0
Confl. Peds. (#/hr)			1	1					2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		11.2			11.2		41.0	39.2		41.0	35.7	
Effective Green, g (s)		11.2			11.2		41.0	40.0		41.0	36.5	
Actuated g/C Ratio		0.17			0.17		0.63	0.62		0.63	0.56	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		234			242		294	1964		281	1819	
v/s Ratio Prot							c0.03	c0.33		0.00	c0.36	
v/s Ratio Perm		c0.08			0.03		0.22			0.05		
v/c Ratio		0.47			0.15		0.39	0.54		0.09	0.65	
Uniform Delay, d1		24.2			22.8		6.1	7.2		4.9	9.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			0.2		0.6	0.4		0.1	0.9	
Delay (s)		25.3			23.1		6.7	7.5		5.0	10.7	
Level of Service		C			C		A	A		A	B	
Approach Delay (s)		25.3			23.1			7.4			10.6	
Approach LOS		C			C			A			B	

Intersection Summary

HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	1	3	4	19	20	1
Future Vol, veh/h	1	3	4	19	20	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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	4	5	25	27	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	63	27	28	0	0
Stage 1	27	-	-	-	-
Stage 2	36	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	948	1054	1599	-	-
Stage 1	1001	-	-	-	-
Stage 2	992	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	945	1054	1599	-	-
Mov Cap-2 Maneuver	945	-	-	-	-
Stage 1	1001	-	-	-	-
Stage 2	989	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1599	-	1024	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection: 3: US 101 & Pacific Way

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	130	64	86	331	193	60	312	269
Average Queue (ft)	63	34	50	113	71	18	129	93
95th Queue (ft)	102	67	83	223	143	46	213	174
Link Distance (ft)	369	904		384	384		779	779
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			125			125		
Storage Blk Time (%)				4			4	
Queuing Penalty (veh)				4			1	

Intersection: 7: McCormick Gardens Rd & Site Access

Movement	EB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	3
95th Queue (ft)	20
Link Distance (ft)	317
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 5

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmborg Zone Change TIA
2020 - DHVs - R-2 Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	60	19	70	36	8	23	103	925	24	40	1005	47
Future Volume (vph)	60	19	70	36	8	23	103	925	24	40	1005	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			1.00				
Frt		0.936			0.953			0.996			0.993	
Flt Protected		0.980			0.974		0.950			0.950		
Satd. Flow (prot)	0	1595	0	0	1624	0	1662	3185	0	1662	3240	0
Flt Permitted		0.866			0.804		0.161			0.209		
Satd. Flow (perm)	0	1410	0	0	1340	0	282	3185	0	366	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			26			4			7	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		409			974			407			802	
Travel Time (s)		11.2			26.6			6.9			13.7	
Confl. Peds. (#/hr)			1	1					2			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	67	21	79	40	9	26	116	1039	27	45	1129	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	167	0	0	75	0	116	1066	0	45	1182	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2020 - DHVs - R-2 Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	29.0	29.0		29.0	29.0		13.0	51.2		9.8	48.0	
Total Split (%)	32.2%	32.2%		32.2%	32.2%		14.4%	56.9%		10.9%	53.3%	
Maximum Green (s)	25.0	25.0		25.0	25.0		9.0	46.4		5.8	43.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effct Green (s)		11.7			11.7		39.7	37.6		40.6	34.4	
Actuated g/C Ratio		0.19			0.19		0.63	0.60		0.64	0.55	
v/c Ratio		0.55			0.28		0.36	0.56		0.13	0.67	
Control Delay		25.6			20.1		7.7	10.9		5.2	14.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		25.6			20.1		7.7	10.9		5.2	14.3	
LOS		C			C		A	B		A	B	
Approach Delay		25.6			20.1			10.6			14.0	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	63
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	13.4
Intersection LOS:	B
Intersection Capacity Utilization:	58.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: US 101 & Pacific Way



Lanes, Volumes, Timings
7: McCormick Gardens Rd & Site Access



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	26	44	19	20	1
Future Volume (vph)	1	26	44	19	20	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width (ft)	12	12	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869				0.995	
Flt Protected	0.999			0.966		
Satd. Flow (prot)	1519	0	0	1578	1625	0
Flt Permitted	0.999			0.966		
Satd. Flow (perm)	1519	0	0	1578	1625	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	346			469	360	
Travel Time (s)	9.4			12.8	9.8	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	35	59	25	27	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	0	84	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.21	1.21	1.21	1.21
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Signalized Intersection Capacity Analysis

3: US 101 & Pacific Way

Palmberg Zone Change TIA
2020 - DHVs - R-2 Zone



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Traffic Volume (vph)	60	19	70	36	8	23	103	925	24	40	1005	47
Future Volume (vph)	60	19	70	36	8	23	103	925	24	40	1005	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1596			1624		1662	3186		1662	3241	
Flt Permitted		0.87			0.80		0.16	1.00		0.21	1.00	
Satd. Flow (perm)		1410			1341		281	3186		366	3241	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	67	21	79	40	9	26	116	1039	27	45	1129	53
RTOR Reduction (vph)	0	41	0	0	21	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	126	0	0	54	0	116	1064	0	45	1179	0
Confl. Peds. (#/hr)			1	1					2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		11.7			11.7		39.8	36.8		39.8	34.5	
Effective Green, g (s)		11.7			11.7		39.8	37.6		39.8	35.3	
Actuated g/C Ratio		0.18			0.18		0.62	0.58		0.62	0.55	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		256			244		287	1863		287	1779	
v/s Ratio Prot							c0.03	0.33		0.01	c0.36	
v/s Ratio Perm		c0.09			0.04		0.22			0.09		
v/c Ratio		0.49			0.22		0.40	0.57		0.16	0.66	
Uniform Delay, d1		23.6			22.4		6.4	8.3		5.4	10.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			0.3		0.7	0.5		0.2	1.0	
Delay (s)		24.7			22.7		7.1	8.8		5.5	11.3	
Level of Service		C			C		A	A		A	B	
Approach Delay (s)		24.7			22.7			8.7			11.1	
Approach LOS		C			C			A			B	

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	1	26	44	19	20	1
Future Vol, veh/h	1	26	44	19	20	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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	35	59	25	27	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	170	27	28	0	0
Stage 1	27	-	-	-	-
Stage 2	143	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	825	1054	1599	-	-
Stage 1	1001	-	-	-	-
Stage 2	889	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	794	1054	1599	-	-
Mov Cap-2 Maneuver	794	-	-	-	-
Stage 1	1001	-	-	-	-
Stage 2	856	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	5.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1599	-	1041	-	-
HCM Lane V/C Ratio	0.037	-	0.035	-	-
HCM Control Delay (s)	7.3	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection: 3: US 101 & Pacific Way

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	126	82	120	204	224	103	182	162
Average Queue (ft)	62	38	52	92	58	26	108	69
95th Queue (ft)	107	65	94	163	139	72	181	135
Link Distance (ft)	369	904		384	384		779	779
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			125			125		
Storage Blk Time (%)			0	2			4	
Queuing Penalty (veh)			0	2			2	

Intersection: 7: McCormick Gardens Rd & Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	34	35
Average Queue (ft)	15	4
95th Queue (ft)	42	21
Link Distance (ft)	317	416
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 4

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmborg Zone Change TIA
2040 - DHVs - R-A Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	80	13	90	30	5	21	135	1205	28	26	1180	60
Future Volume (vph)	80	13	90	30	5	21	135	1205	28	26	1180	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			1.00				
Frt		0.934			0.949			0.997				0.993
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1590	0	0	1618	0	1662	3188	0	1662	3240	0
Flt Permitted		0.856			0.781		0.112			0.142		
Satd. Flow (perm)	0	1390	0	0	1297	0	196	3188	0	248	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			24			4				8
Link Speed (mph)		25			25			40				40
Link Distance (ft)		409			974			407				802
Travel Time (s)		11.2			26.6			6.9				13.7
Confl. Peds. (#/hr)			1	1					2			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	90	15	101	34	6	24	147	1310	30	28	1283	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	206	0	0	64	0	147	1340	0	28	1348	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		10			10			10				10
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2040 - DHVs - R-A Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	29.0	29.0		29.0	29.0		13.2	51.4		9.6	47.8	
Total Split (%)	32.2%	32.2%		32.2%	32.2%		14.7%	57.1%		10.7%	53.1%	
Maximum Green (s)	25.0	25.0		25.0	25.0		9.2	46.6		5.6	43.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effct Green (s)		13.6			13.6		44.9	45.9		47.7	37.5	
Actuated g/C Ratio		0.19			0.19		0.63	0.65		0.67	0.53	
v/c Ratio		0.67			0.24		0.53	0.65		0.10	0.79	
Control Delay		32.0			20.4		16.1	11.8		5.4	18.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		32.0			20.4		16.1	11.8		5.4	18.6	
LOS		C			C		B	B		A	B	
Approach Delay		32.0			20.4			12.2			18.4	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 71.1
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 16.4
 Intersection Capacity Utilization 69.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: US 101 & Pacific Way



Lanes, Volumes, Timings
7: McCormick Gardens Rd & Site Access



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	4	25	25	1
Future Volume (vph)	1	3	4	25	25	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width (ft)	12	12	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892				0.995	
Flt Protected	0.990			0.992		
Satd. Flow (prot)	1545	0	0	1620	1625	0
Flt Permitted	0.990			0.992		
Satd. Flow (perm)	1545	0	0	1620	1625	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	346			469	360	
Travel Time (s)	9.4			12.8	9.8	
Peak Hour Factor	0.75	0.75	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	4	5	28	28	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	33	29	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.21	1.21	1.21	1.21
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	15.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Signalized Intersection Capacity Analysis

3: US 101 & Pacific Way

Palmberg Zone Change TIA
2040 - DHVs - R-A Zone



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Traffic Volume (vph)	80	13	90	30	5	21	135	1205	28	26	1180	60
Future Volume (vph)	80	13	90	30	5	21	135	1205	28	26	1180	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1589			1618		1662	3187		1662	3239	
Flt Permitted		0.86			0.78		0.11	1.00		0.14	1.00	
Satd. Flow (perm)		1391			1297		196	3187		248	3239	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	15	101	34	6	24	147	1310	30	28	1283	65
RTOR Reduction (vph)	0	43	0	0	20	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	163	0	0	44	0	147	1338	0	28	1344	0
Confl. Peds. (#/hr)			1	1					2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		13.6			13.6		46.9	45.0		46.9	39.4	
Effective Green, g (s)		13.6			13.6		46.9	45.8		46.9	40.2	
Actuated g/C Ratio		0.19			0.19		0.64	0.62		0.64	0.55	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		258			240		275	1991		195	1776	
v/s Ratio Prot							c0.05	0.42		0.00	c0.42	
v/s Ratio Perm		c0.12			0.03		0.29			0.09		
v/c Ratio		0.63			0.19		0.53	0.67		0.14	0.76	
Uniform Delay, d1		27.5			25.2		8.8	8.9		6.2	12.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.4			0.3		1.6	1.0		0.2	2.0	
Delay (s)		31.9			25.4		10.4	9.9		6.5	14.8	
Level of Service		C			C		B	A		A	B	
Approach Delay (s)		31.9			25.4			9.9			14.6	
Approach LOS		C			C			A			B	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	73.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	3	4	25	25	1
Future Vol, veh/h	1	3	4	25	25	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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	4	5	28	28	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	67	29	30	0	0
Stage 1	29	-	-	-	-
Stage 2	38	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	943	1052	1596	-	-
Stage 1	999	-	-	-	-
Stage 2	990	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	940	1052	1596	-	-
Mov Cap-2 Maneuver	940	-	-	-	-
Stage 1	999	-	-	-	-
Stage 2	987	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1022	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection: 3: US 101 & Pacific Way

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	195	100	138	403	268	56	244	255
Average Queue (ft)	78	35	63	161	91	14	163	124
95th Queue (ft)	138	71	105	320	204	42	244	220
Link Distance (ft)	369	904		384	384		779	779
Upstream Blk Time (%)				1				
Queuing Penalty (veh)				0				
Storage Bay Dist (ft)			125			125		
Storage Blk Time (%)			0	5			12	
Queuing Penalty (veh)			3	7			3	

Intersection: 7: McCormick Gardens Rd & Site Access

Movement	EB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	4
95th Queue (ft)	22
Link Distance (ft)	317
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 13

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmborg Zone Change TIA
2040 - DHVs - R-2 Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↗		↗	↕↗	
Traffic Volume (vph)	80	22	90	50	10	30	135	1205	28	45	1180	60
Future Volume (vph)	80	22	90	50	10	30	135	1205	28	45	1180	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	125		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			1.00				
Frt		0.937			0.955			0.997				0.993
Flt Protected		0.980			0.973		0.950			0.950		
Satd. Flow (prot)	0	1597	0	0	1626	0	1662	3188	0	1662	3240	0
Flt Permitted		0.838			0.714		0.108			0.134		
Satd. Flow (perm)	0	1366	0	0	1193	0	189	3188	0	234	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			28			4				8
Link Speed (mph)		25			25			40				40
Link Distance (ft)		409			974			407				802
Travel Time (s)		11.2			26.6			6.9				13.7
Confl. Peds. (#/hr)			1	1					2			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	90	25	101	56	11	34	147	1310	30	49	1283	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	101	0	147	1340	0	49	1348	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		10			10			10				10
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		2	2		2	2	
Detector Template	Left			Left								
Leading Detector (ft)	20	78		20	78		78	323		78	323	
Trailing Detector (ft)	0	2		0	2		2	157		2	157	
Detector 1 Position(ft)	0	2		0	2		2	157		2	157	
Detector 1 Size(ft)	20	20		20	20		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		72			72		72	317		72	317	
Detector 2 Size(ft)		6			6		6	6		6	6	
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
3: US 101 & Pacific Way

Palmberg Zone Change TIA
2040 - DHVs - R-2 Zone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	27.0	27.0		29.0	29.0		9.5	23.3		9.5	27.8	
Total Split (s)	29.0	29.0		29.0	29.0		13.4	51.2		9.8	47.6	
Total Split (%)	32.2%	32.2%		32.2%	32.2%		14.9%	56.9%		10.9%	52.9%	
Maximum Green (s)	25.0	25.0		25.0	25.0		9.4	46.4		5.8	42.8	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	-0.8		0.0	-0.8	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.7		2.0	2.7	
Time Before Reduce (s)	8.0	8.0		8.0	8.0		8.0	10.0		8.0	10.0	
Time To Reduce (s)	4.0	4.0		4.0	4.0		4.0	13.0		4.0	13.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		18.0	18.0			9.0			16.0	
Pedestrian Calls (#/hr)	1	1		0	0			2			0	
Act Effect Green (s)		14.3			14.3		45.3	44.3		47.3	37.7	
Actuated g/C Ratio		0.20			0.20		0.63	0.61		0.66	0.52	
v/c Ratio		0.70			0.39		0.54	0.68		0.18	0.79	
Control Delay		34.4			25.1		17.2	13.7		6.4	19.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		34.4			25.1		17.2	13.7		6.4	19.3	
LOS		C			C		B	B		A	B	
Approach Delay		34.4			25.1			14.0			18.8	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 72.1
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 69.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: US 101 & Pacific Way



Lanes, Volumes, Timings
7: McCormick Gardens Rd & Site Access



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	26	44	25	25	1
Future Volume (vph)	1	26	44	25	25	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width (ft)	12	12	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869				0.996	
Flt Protected	0.999			0.969		
Satd. Flow (prot)	1519	0	0	1583	1627	0
Flt Permitted	0.999			0.969		
Satd. Flow (perm)	1519	0	0	1583	1627	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	346			469	360	
Travel Time (s)	9.4			12.8	9.8	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	35	59	33	33	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	0	92	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.21	1.21	1.21	1.21
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Signalized Intersection Capacity Analysis

3: US 101 & Pacific Way

Palmberg Zone Change TIA
2040 - DHVs - R-2 Zone



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕↕		↗	↕↕	
Traffic Volume (vph)	80	22	90	50	10	30	135	1205	28	45	1180	60
Future Volume (vph)	80	22	90	50	10	30	135	1205	28	45	1180	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1596			1625		1662	3187		1662	3239	
Flt Permitted		0.84			0.71		0.11	1.00		0.13	1.00	
Satd. Flow (perm)		1366			1192		190	3187		235	3239	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	25	101	56	11	34	147	1310	30	49	1283	65
RTOR Reduction (vph)	0	39	0	0	23	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	177	0	0	78	0	147	1338	0	49	1344	0
Confl. Peds. (#/hr)			1	1					2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		14.3			14.3		46.5	43.5		46.5	38.9	
Effective Green, g (s)		14.3			14.3		46.5	44.3		46.5	39.7	
Actuated g/C Ratio		0.19			0.19		0.63	0.60		0.63	0.54	
Clearance Time (s)		4.0			4.0		4.0	4.8		4.0	4.8	
Vehicle Extension (s)		2.5			2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		265			231		272	1918		206	1747	
v/s Ratio Prot							c0.06	0.42		0.01	c0.42	
v/s Ratio Perm		c0.13			0.07		0.29			0.14		
v/c Ratio		0.67			0.34		0.54	0.70		0.24	0.77	
Uniform Delay, d1		27.4			25.6		9.3	10.1		6.9	13.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.6			0.6		1.7	1.2		0.4	2.2	
Delay (s)		33.0			26.2		11.0	11.3		7.3	15.6	
Level of Service		C			C		B	B		A	B	
Approach Delay (s)		33.0			26.2			11.2			15.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection

Int Delay, s/veh 4.6

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations						
Traffic Vol, veh/h	1	26	44	25	25	1
Future Vol, veh/h	1	26	44	25	25	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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	35	59	33	33	1

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	185	34	35	0	-	0
Stage 1	34	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	809	1045	1589	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	778	1045	1589	-	-	-
Mov Cap-2 Maneuver	778	-	-	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	848	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s 8.6 4.7 0
HCM LOS A

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1589	-	1032	-	-
HCM Lane V/C Ratio	0.037	-	0.035	-	-
HCM Control Delay (s)	7.4	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection: 3: US 101 & Pacific Way

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	181	135	152	367	367	224	407	342
Average Queue (ft)	96	52	63	136	115	38	194	157
95th Queue (ft)	163	104	118	252	237	124	314	267
Link Distance (ft)	369	904		384	384		779	779
Upstream Blk Time (%)				0	0			
Queuing Penalty (veh)				0	0			
Storage Bay Dist (ft)			125			125		
Storage Blk Time (%)			1	5			15	
Queuing Penalty (veh)			4	7			7	

Intersection: 7: McCormick Gardens Rd & Site Access

Movement	EB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	19
95th Queue (ft)	46
Link Distance (ft)	317
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 17