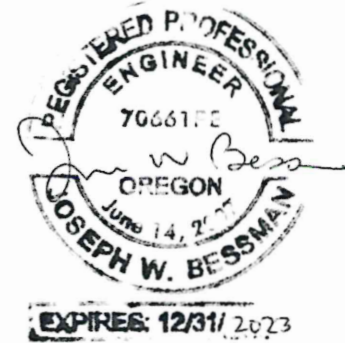




Date:	May 26, 2022
To:	Dago Garcia, PE, City of Woodburn Casey Knecht, PE, ODOT
From:	Joe Bessman, PE
Project Reference No.:	1584
Project Name:	Woodburn US Market



The purpose of this memorandum is to provide a formal response to review comments received from the City of Woodburn (through their on-call review consultant) and ODOT, as well as those from an opposition traffic engineer hired by a neighboring gas station that seeks to limit fuel sales competition. Each of the comments received are provided below and followed by our response. All comments are numbered sequentially for ease of reference.

City Comments

These comments reflect the materials received from the City dated May 10, 2022 that were prepared for the City of Woodburn by the City's on-call consultant, OTAK, as prepared by Chuck Green, PE.

City Comment #1: ODOT Access Restrictions: The OTAK review comments reference ODOT's findings that were raised late within the application process that the right-in, right-out is only allowed to serve the western parcel (tax lot 3700, 2600 Newberg Highway). The eastern parcel (Tax lot 3600, 2540 Newberg Highway) has no access rights onto OR 214 and is only permitted access onto Oregon Way.

Response: The subject property previously accommodated two separate drive-in banks that were recently demolished to support redevelopment of the properties. The former Wells Fargo bank, located at 2600 OR 214, was situated within an isolated parcel with its only access directly onto the highway and limited to right-in, right-out by the raised "C-curb" median. As noted within the ODOT comments and verified in review of the deed restrictions, access rights to this parcel were conveyed to ODOT by the former bank. These access rights effectively secure the right-in, right-out onto OR 214 for the benefit of this parcel only, precluding tax lot 3600 from using the OR 214 access. However, it is our understanding that tax lot 3700 can be provided access to the existing driveway onto Oregon Way, which is located outside of ODOT's access control boundary.

Within this area, Statewide access management goals would seek to reduce access to the major abutting street and would encourage shared access as a tool to consolidate separate driveway accesses onto OR 214. The neighboring Dutch Bros. and Dairy Queen to the west of the proposed development also provide a separate right-in, right-out access to OR 214, but in a less ideal location immediately beyond the channelized right-turn lane from Evergreen Road as shown in Figure 1.

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COMMUNITY DEVELOPMENT
DEPARTMENT

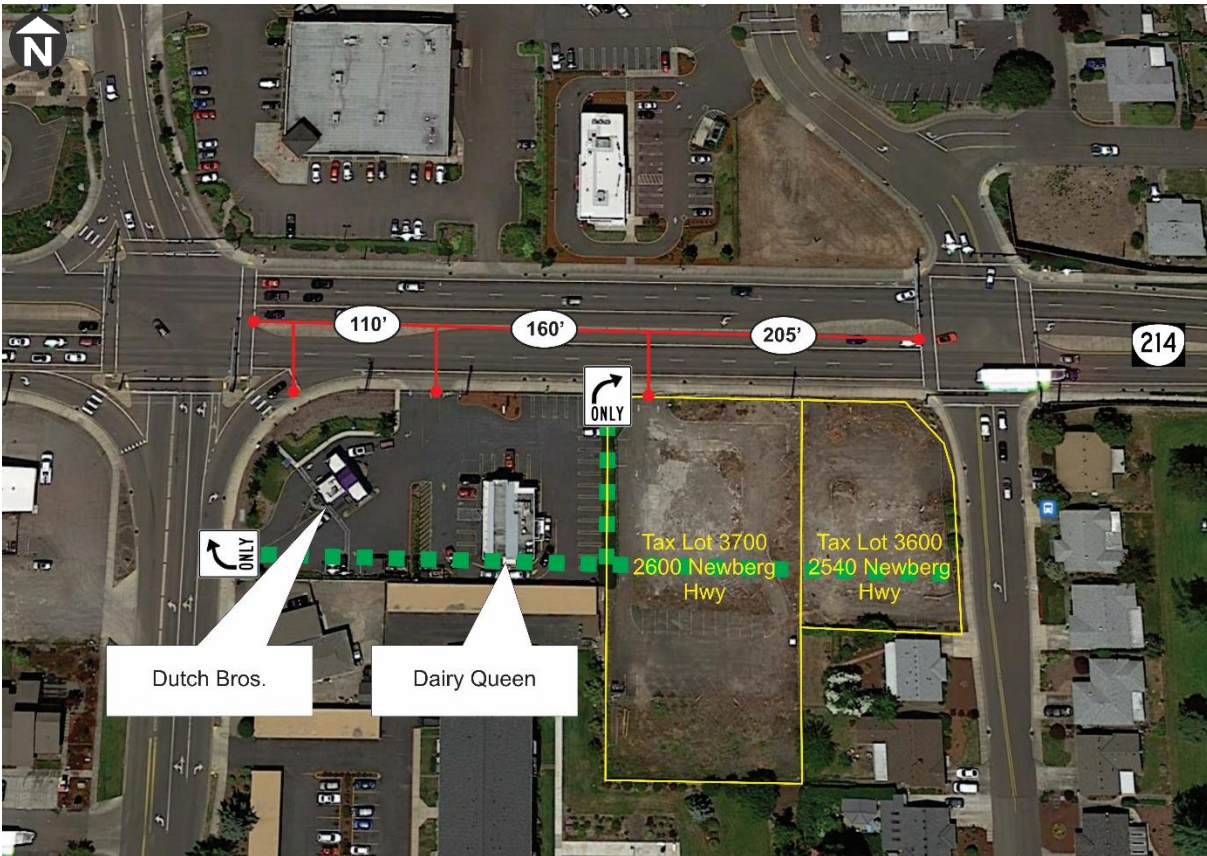


Figure 1. Access spacing and tax lots between Evergreen Avenue and Oregon Way.

As shown within the green dashed lines in Figure 1, an ideal circulatory system within this area would provide cross-access easements between parcels (as far south as practical in consideration of structures) allowing all of the commercial uses fronting OR 214 between Evergreen Avenue and Oregon Way access onto Oregon Way, which is the lowest-order abutting street that currently serves the lowest volume of traffic. Unlike Lawson Avenue and Evergreen Avenue, Oregon Way is located about 1,500 feet east of the northbound I-5 ramp terminal, in compliance with ODOT’s interchange access spacing standards of ¼ mile. A shared right-in, right-out access, located nearly centered within this block, would support future consolidation of access and would provide drivers with more reaction time while reducing demands on the signalized intersections.

Inter-parcel circulation for motorists on the south side of OR 214 would support and be consistent with the state directive to support economic development. Oregon Revised Statute (ORS) 374.331 Facility Plans (2) states:

“Every facility plan...must include a methodology that balances the economic development objectives of properties abutting state highways with the transportation safety and access management objectives of state highways...”

This is also consistent with an objective that ODOT has been tasked with, to support “Infill Development” as defined in Oregon Administrative Rules 734-051-1070 Definitions:

“(36) “Infill” (“Infill Development”) means development of vacant or remnant land passed over by previous development and that is consistent with zoning. Infill occurs in urban areas.”

The proposed development plan supports this ideal access configuration, providing a cross-access easement to the Dairy Queen/Dutch Bros. site that would allow their shared use of the OR 214 right-in, right-out access and connection to Oregon Way. However, in review of the ODOT comments we understand that allowing use of the OR 214 access by adjacent parcels (to include tax lot 3600) will require revisions to the current access agreements. These modifications will require application through a Grant of Access process to avoid violations to the current property deeds. This requires that the applicant demonstrate compliance with the provisions within Oregon Administrative Rule 734-051-2020, which generally requires demonstration of a public benefit to the highway system.

Our team believes that connecting these parcels is in the best interests of the subject property and those adjoining parcels, the abutting highway, is consistent with the Interchange Area Management Plan objectives, best meets area redevelopment and density goals within the established Urban Growth Boundary (UGB) and builds toward a safer and more functional roadway network. Our team has prepared a site plan that maintains this configuration and we will work with ODOT to pursue the appropriate approvals that would allow us to obtain the original access configuration presented.

As the ODOT Grant of Access process could be a year-long process to complete, we have also presented an alternative site layout that complies with the current access restrictions, providing a viable site layout that will allow our application to proceed. The revised site plan retains use of the existing right-in, right-out access only for Tax Lot 3700, with shared access available for both parcels onto Oregon Way beyond ODOT’s access control limit. The proposed design does not allow trips from Tax Lot 3600 to use the right-in, right-out onto OR 214.



Figure 2. Photo highlighting the permitted eastbound U-turn at Oregon Way.

Within this revised site layout, vehicles leaving the convenience market and fuel station would be able to exit onto OR 214 eastbound or make a permitted U-turn at the Oregon Way traffic signal and return to the I-5 corridor (see Figure 2). Alternatively, they could use the egress only route onto Oregon Way, providing access to OR 214 at the traffic signal. Office tenants would be limited to use of the Oregon Way access, which is a viable connection for this lower-intensity use. Figure 3 illustrates this configuration.

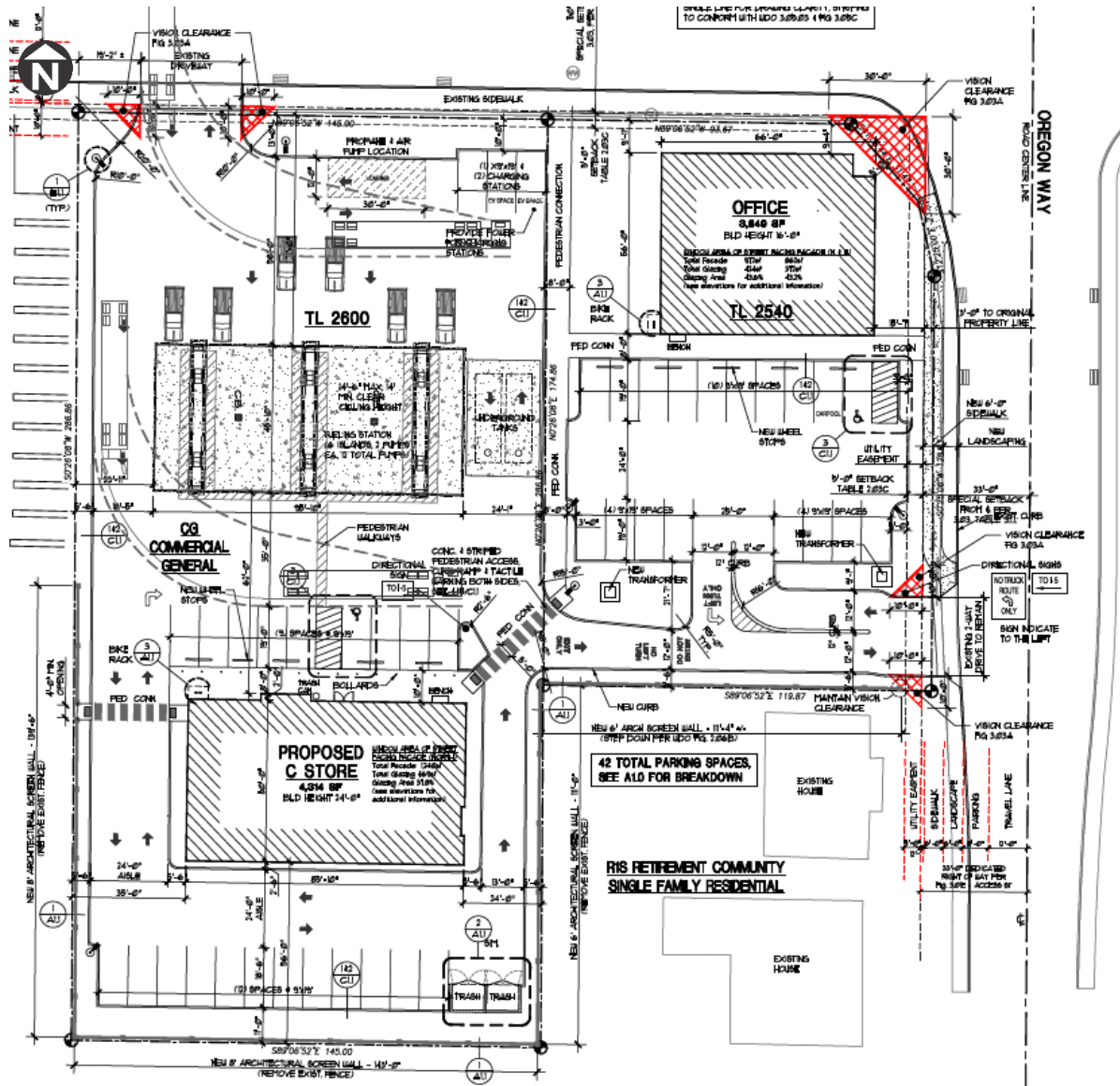


Figure 3. Site Plan Access Option 2 (prevents access from tax lot 3600 to the OR 214 access).

Provision of the egress-only connection to Oregon Way will reduce reliance on U-turns at the Oregon Way traffic signal for motorists returning to the I-5 corridor. However, it does not address site access for westbound OR 214 travelers. It is recommended that further modifications be provided to the site plan to allow full access to the convenience center from Oregon Way that continue to limit tax lot 3600 to the Oregon Way access only. Figure 4 illustrates a potential concept (Access Option 3) that would achieve this objective while maintaining the current deeded access restrictions.

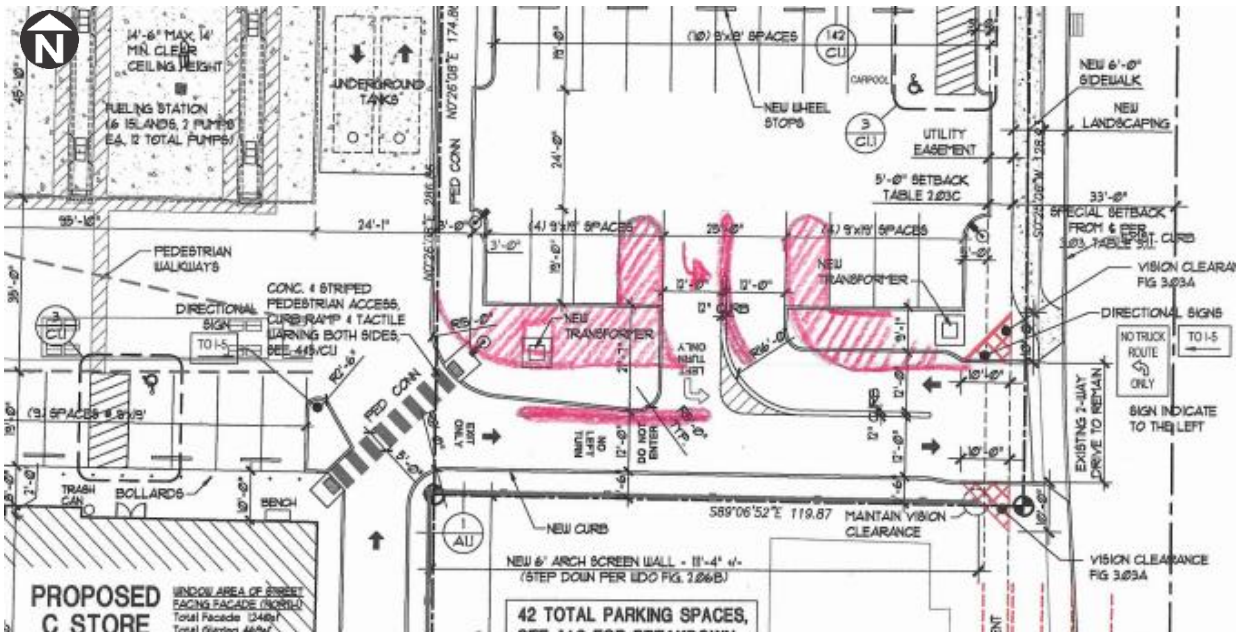


Figure 4. Potential access modifications to better support westbound OR 214 access via Oregon Way (Access Option 3).

Either of these access concepts would be an approvable interim configuration, and if the Grant of Access were approved either design could be readily converted to support the original configuration proposed. This would only require minor revisions to the curbing and channelization at the office entrance, and dedication of a crossover easement to the boundary of the Dairy Queen property.

Despite these various options related to vehicular access restrictions, pedestrian connections are provided throughout the development and into abutting commercial properties to the west. These connections support walking trips between uses, preventing short-distance vehicular trips that are reliant on the highway to travel between uses.

Following City approval, our team will work with ODOT to initiate the Grant of Access process. Based on the staff comments, neighbor comments, and other area studies we feel that the overall redevelopment plan shown in this concept best aligns with the Interchange Area Management Plan and City redevelopment goals.

City Comment #2: Transportation Impact Analysis Scenario: The analysis prepared within the Transportation Impact Analysis did not assess these alternative access options.

Response: The Transportation Impact Analysis was prepared prior to the team’s awareness of a deed restriction that would prevent crossover access between the abutting properties. Since that time, the building areas have been slightly modified to balance other site characteristics, with a nearly 2,000 square-foot reduction in the office building size and a slight reduction in the convenience center size. More critical, the supplemental trip generation letter the 11th Edition of the ITE Trip Generation Manual provides a more robust and reliable assessment of fuel center trips, which also significantly reduced the trip generation potential of the site relative to the prior analysis. Table 1 summarizes these values, as updated based on the most current site plan layout.

Table 1. Revised Trip Generation Estimates (ITE 11th Edition)

Land Use	ITE Code	Metric	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Existing Uses									
Drive-in Bank	912	5,714 SF	573	57	33	24	120	60	60
Pass-by Trips			-201	-17	-10	-7	-42	-21	-21
(29% AM, 35% PM)			372	40	23	17	78	39	39
Proposed Uses									
Small Office Building	712	3,649 SF	53	6	5	1	8	3	5
Convenience Market/Gas Station	945	4,314 SF 12 VFP	3,086	324	162	162	273	136	137
Pass-by Trips (76%)			-2,345	-246	-123	-123	-210	-105	-105
Total Proposed Uses			3,139	330	167	163	281	139	142
Total Pass-by Trips			-2345	-246	-123	-123	-210	-105	-105
Net New Trips			794	84	44	40	71	34	37
Total New Trips (Proposed Trips – Approved Bank Trips)									
Net New Trip Difference			+422	+44	+21	+23	-7	-5	-2

As shown in Table 1, these revised trip generation estimates using the most current ITE data show a reduction in system trips during the more critical weekday p.m. peak hour time period (with more trips on the driveways and the section of Oregon Way between the access and OR 214). Figures 5 and 6 illustrate how the revised trip generation rates impacts area intersections during this time period with either access option, accounting for credits for the demolished banks and pass-by trips.¹

While this figure shows the cumulative change from the banks to the fuel center and convenience market, the banks were not in operation when the traffic counts were collected and their impact is not reflected within the existing conditions analysis. Accordingly, the “no build” scenario presented herein includes these trip credits within the “In-Process” trips, and the “With Project” scenarios show their subtraction and the addition of the fuel center and convenience market. This better reflects the projected system conditions relative to current conditions.

The transportation system was re-analyzed using Access Option #2 and Access Option #3 during the more critical weekday p.m. peak hour, assuming that trip rates using the ITE 11th Edition rates were held constant despite the reduced access availability for westbound motorists in Access Option #2. Supporting operational analysis results are summarized in Table 2, and additional details including the queuing analyses are included within the technical appendices. Similar to the original analysis, this shows that the study area intersections will continue to meet adopted City of Woodburn and ODOT performance/mobility standards with either access configuration. These operations reflect either “no change” or a minor improvement from conditions with the banks.

¹ Values shown in Figures 5 and 6 should be applied for any required pro-rata contributions. Note that at most intersections the impact of the site reflects a reduction in trips from the prior banks (see Comment #5)

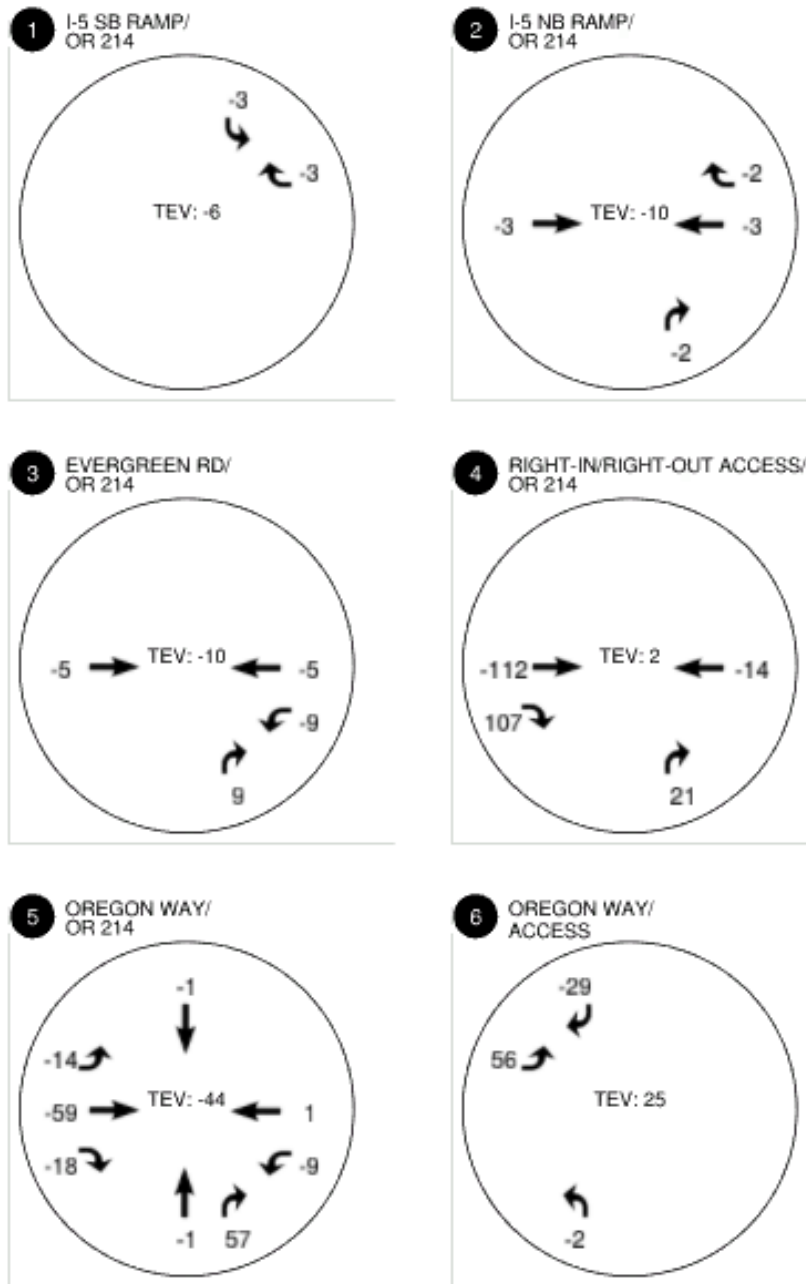


Figure 5. Access Option 2 Trip Assignment, Weekday PM Peak Hour. (Accounts for demolished banks and pass-by trips)
 TEV: Total Entering Vehicles

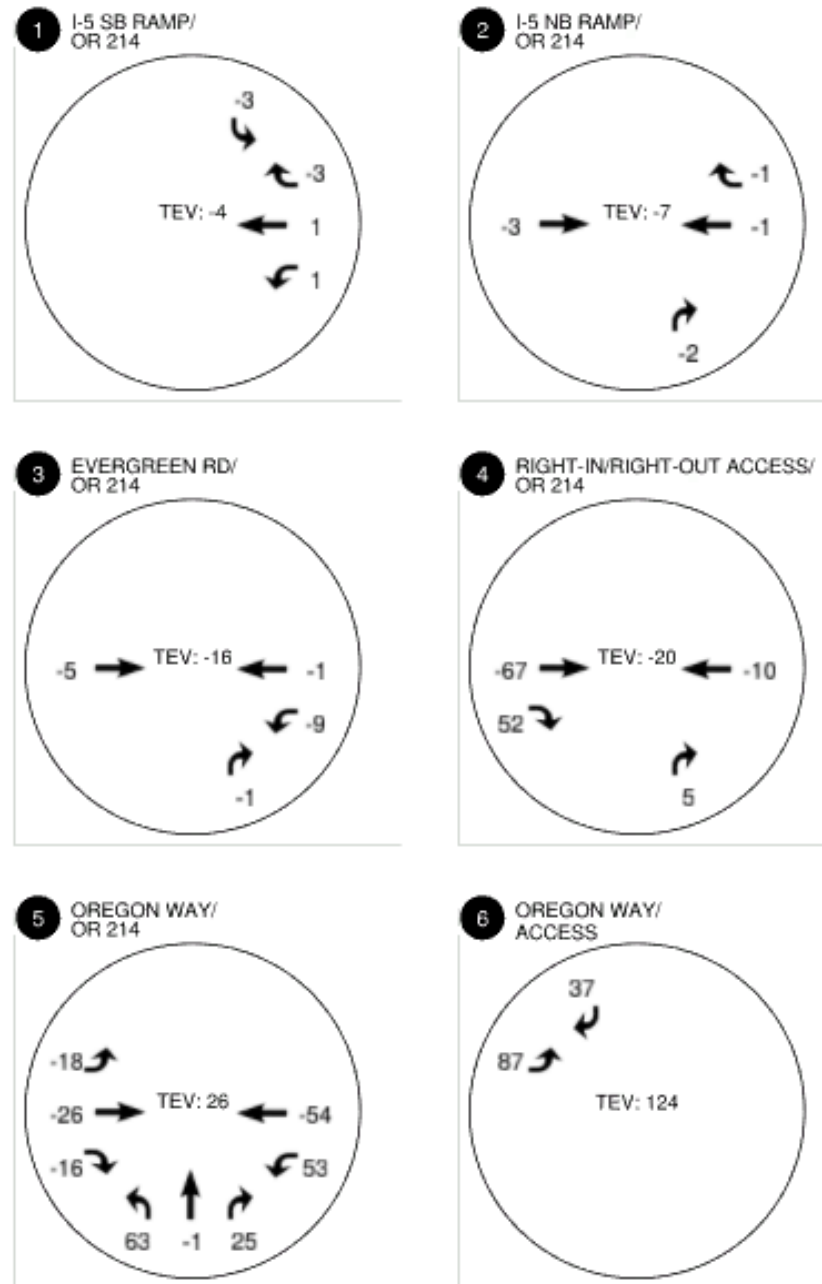


Figure 6. Access Option 3 Trip Assignment, Weekday PM Peak Hour. (Accounts for demolished banks and pass-by trips)
 TEV: Total Entering Vehicles

Table 2. Revised Intersection Operations Summary, Critical Weekday PM Peak Hour

Intersection	Jurisdiction	Performance Standard	2023 Without Project Weekday PM Peak Hour			2023 With Project (Option 2) Weekday PM Peak Hour			2023 With Project (Option 3) Weekday PM Peak Hour			2033 Without Project Weekday PM Peak Hour			2033 With Project (Option 2) Weekday PM Peak Hour			2033 With Project (Option 3) Weekday PM Peak Hour			Acceptable?
			LOS	Delay (sec)	v/c Ratio	LOS	Delay (sec)	v/c Ratio	LOS	Delay (sec)	v/c Ratio	LOS	Delay (sec)	v/c Ratio	LOS	Delay (sec)	v/c Ratio	LOS	Delay (sec)	v/c Ratio	
1: I-5 SB Ramps/ Newberg Hwy	ODOT	v/c ≤ 0.85	B	19.3	0.57	B	19.3	0.57	B	19.2	0.57	C	22.5	0.67	C	22.4	0.67	C	22.4	0.67	Yes (No Change from No Build)
2: I-5 NB Ramps/ Newberg Hwy	ODOT	v/c ≤ 0.85	B	14.1	0.56	B	14.1	0.56	B	14.1	0.56	B	16.8	0.72	B	16.7	0.72	B	16.7	0.72	Yes (No Change from No Build)
3: Evergreen Rd/ Newberg Hwy	ODOT	v/c ≤ 0.95	C	30.6	0.77	C	29.4	0.76	C	29.7	0.76	D	53.0	0.95	D	51.7	0.94	D	51.9	0.94	Yes (Improved from No Build)
4: RIRO Access/ Newberg Hwy	ODOT	v/c ≤ 0.95	NB B	14.2	0.08	NB B	14.7	0.13	NB B	14.2	0.09	NB C	15.1	0.08	NB C	15.8	0.14	NB C	15.1	0.10	Yes (Option 3 use of Oregon Way access relieves OR 214)
5: Oregon Way/ Newberg Hwy	ODOT	v/c ≤ 0.95	A	9.7	0.50	B	10.7	0.47	B	17.0	0.52	B	10.4	0.55	B	11.2	0.51	B	18.9	0.58	Yes (Option 3 Increases use of Oregon Way)
6: Oregon Way/ Access	City of Woodburn	v/c ≤ 0.90	EB B	10.3	0.05	EB B	10.7	0.14	EB B	11.6	0.20	EB B	10.6	0.05	EB B	11.0	0.15	EB B	11.9	0.21	Yes (Low queuing/delays)

City Comment #3: Safety Implications of Access Revisions: Staff review comments noted that with the current safety issues associated with left-turns along the OR 214 corridor, and with the proximity of the right-in, right-out access to the Oregon Way traffic signal the revised plans could further impact safety.

Response: As noted within the City review comments, reliance on right-in, right-out only access to the fuel station and convenience market would increase the number of vehicles turning right and then weaving into the left-turn lane to make a U-turn and return to I-5. The Oregon Way intersection (and every other signalized intersection within this area) currently experiences a crash rate that is higher than ODOT's 90th percentile of similarly configured signalized intersections Statewide, and the TIA highlighted that many of these crashes are associated with left-turns.

Within this area the signalized arterial system provides natural breaks in traffic that allow motorists using the commercial driveways to find adequate gaps in traffic flow. This may incur higher driveway delays as motorists seek gaps in both travel lanes. However, the broader context of this comment is that the provision of shared access onto Oregon Way not only resolves this issue from what was previously approved on this site, but also serves to improve access within this commercial block that will benefit public safety. Accordingly, we recognize the review comment and request that the comment is indicative of the City's support (and the benefit to ODOT's system) for the shared access configuration originally proposed that will require approval through the Grant of Access process.

With either Access Option 2 (egress only) or Access Option 3 (Oregon Way ingress and egress) the impact to left-turns on Oregon Way will be reduced. The layout of the site is oriented from the north to south, and this layout will encourage exiting patrons to use the traffic signal at the Oregon Way intersection to return to OR 214. In addition, with provision of the crossover access easements the site may be able to also provide access to the commercial uses to the west to also use the Oregon Way traffic signal.

City Comment #4: Study Area: The TIA did not address additional intersections located east of Oregon Way (Settlemier Way).

Response: The TIA only analyzed intersections that would be impacted by the proposed development. As shown in the supplemental trip generation estimates (see Table 1), the previously approved banks generate more system trips than the proposed commercial uses during the evening commute period. As would be expected with a convenience-oriented use, nearly all the fuel center and convenience market trips are pass-by trips (trips that are already on the roadway),² with very few new trips continuing east beyond Oregon Way.

² Revised trip generation rates for ITE Land Use 945 (Convenience Store/Gas Station) allows calculation based on both building size and number of fueling positions. The estimates shown apply the higher resulting value as the building size metric appears to better fit the dataset.

City Comment #5: Pro-Rata Contributions: The City has collected pro-rata contributions toward intersection safety improvements along the OR 214 corridor at various locations.

Response: The traffic report notes that there are several intersections within the site vicinity with crash histories that are higher than ODOT's 90th percentile of similarly configured intersections statewide. While full details on previously established pro-rata contributions were not provided in the staff response, our team would be willing to review the assessment provided as part of other development applications and provide a proportionate impact fee toward identified improvements. We would want to review the City's current SDC methodology to ensure that fees were not being double-counted against the site, and we would also expect to receive credit for trips associated with the demolished banks. Figures 5 and 6 provide the comparative weekday p.m. peak hour trip assignment that should be applied within this assessment, and generally show a reduction in trips throughout most of the surrounding network, consistent with the trip generation table.

Public Comments

Public comments were included within the City materials and reflect concerns of abutting neighbors that were received in response to the public notice. Public comments were only received from Ms. Rebecca Hayes, with comments and our response provided below.

Public Comment #6: Activities while waiting for vehicle charging: The commenter asked what types of activities would be available to motorists using the electric charging station.

Response: In addition to the response from OTAK staff, we would note that the site is contiguous to a fast-food restaurant and coffee stand (that does support walk-up trips). The charging stations would also be accessible to employees that are on the site, or could allow "quick charge" options while patrons use the convenience store or restrooms. With the proximity of the site to the I-5 corridor this service is expected to be in increasing demand for regional travelers, and as previously noted is a City-imposed requirement for the applicant.

Public Comment #7: Cross-access between properties: The public comments noted that travel issues in the area are exacerbated by the lack of cross-access easements.

Response: The comments again question the inability to provide cross-access easements to better support more direct travel routes within this area that avoid weaving issues. This comment is addressed above; we again note that there is a formal application process required of the applicant to obtain this crossover access. We will work with the City and ODOT to acquire what we believe is an access configuration that best serves the traveling public, and we also recognize the reduced impact this configuration provides to abutting properties.

Opposition Engineer Arguments

Additional opposition arguments were submitted by Wayne Kittelson as a representative of the firm Kittelson & Associates. The arguments appeared to be submitted on behalf of a competitor fuel center site (Chevron/Extra Mile site located adjacent to the I-5 interchange ramp) opposed to the redevelopment of this commercial site due to the introduction of a competitor site. The comments also cite Project Basie, and it was unclear if this distribution facility or Amazon staff were also in opposition to this fuel center project and are also being represented by Mr. Kittelson (the traffic study was also prepared by the same firm but Mr. Kittelson was not the engineer of record on Project Basie). Arguments from the opposition engineer are summarized below along with our response.

Opposition Argument #8: Account of Project Basie (Amazon Distribution Center): The opposition engineer argues that the traffic study for the US Market should have taken into account forecast trips from Project Basie, which is the new Amazon Distribution facility being sited on the west side of the City.

Response: It is unclear from the materials submitted if the opposition engineer was representing concerns as a representative of the Amazon site or simply arguing on behalf of their Chevron client. The US Market site is in no way opposed to Project Basie and sees this as an incredible opportunity for the City of Woodburn, and as a benefit to the proposed US Market fuel center to help supply fuel and convenience items to drivers and employees of this site.

Regardless, the overall comment is without merit; Project Basie reflects a change in the underlying land use assumptions within the City's Transportation System Plan and the Interchange Area Management Plan. To address these issues, the traffic study for Project Basie assesses long-term (year 2040) horizon year conditions to meet the Oregon Highway Plan and Transportation Planning Rule requirements of these plan changes, which necessarily require inclusion of appropriately zoned lands within the Urban Growth Boundary (to include the subject property). While our response to this argument is not a review of whether or not this analysis satisfies the necessary criteria, the responsibility and requirement for accounting for appropriately zoned and developable lands within the long-range analysis falls on Project Basie.

Further, the opposition engineer omits mention that the banks that were recently demolished retain their vested entitlements and would need to be accounted for in Project Basie regardless, and the proposed development provides only a minor change from these vested trip levels (a net reduction in system trips in the weekday p.m. peak hour). Finally, the TIA for US Market was submitted prior to the TIA for Project Basie, again requiring that its trips (or minimally its development potential as commercial lands) be accounted for.

Finally, and most critically, the list of in-process development projects was obtained with assistance from the City and confirmed with the City in writing following our discussion. Within the July 29, 2021 correspondence we detailed our discussions with Dago Garcia of the City of Woodburn seeking confirmation that all the appropriate in-process developments were accounted for. Accordingly, the opposition engineer's argument is baseless.

Opposition Argument #9: COVID impacts of traffic counts. The opposition engineer argues that traffic counts for US Market were obtained in 2019 and reflect unreasonably low travel conditions during the COVID 19 pandemic and speculates that they could be low.

Response: Within the report I incorrectly cited that traffic counts were collected on June 30th of 2019 (we had reviewed travel patterns between pre-COVID 2019 patterns and the recent 2021 counts). The traffic counts applied in the TIA were captured on June 30th of 2021 as shown in the included attachments and are reflective of the elevated summer travel patterns on the I-5 corridor with all appropriate adjustments using ODOT's COVID monitoring data and ODOT permanent traffic count locations. Further, the traffic counts were collected by a highly reputable third-party national data collection firm that completes data collection efforts for public and private developers, utilizing video recording and manual post-processing techniques.

To further refute this speculative argument, comparative review of the unadjusted April 14, 2021 traffic counts collected by Kittelson & Associates' subsidiary firm Quality Counts at the OR 214/Evergreen Avenue shows a total of 2,626 peak hour vehicles during the critical weekday p.m. peak hour, whereas

traffic counts collected by All Traffic Data/Key Data Network on June 30, 2021 showed a total of 2,694 a month later (see attachments. Accordingly, the argument is without merit.

Opposition Argument #10: Queuing Analysis: The opposition engineer argues that a queuing analysis was not performed for the US Market site, and expresses concern that queue blockages of the existing driveway access on OR 214 could lead to an unsafe situation where the driveway is blocked by queues.

Response: The opposition engineer claims that a queuing analysis was not performed and expresses concern that there is a potential for queues to block the driveway rendering it unsafe. However, a queuing analysis was included within the technical appendices (similar to how Project Basie’s queuing analysis was included) and was prepared using the same analytical methodology and software as Project Basie, and shows nearly identical results that support our findings.

The analysis shows that queues at the OR 214/Evergreen Avenue traffic signal are between 405 feet and 444 feet between the two reports. This eastbound queue effectively shows a blockage of his own clients’ Chevron access onto OR 214 at Lawson Avenue, resulting in the condition that the opposition engineer terms as being “severely affected by long queues”.

While Project Basie did not assess the OR 214/Oregon Way intersection (it is unclear why it would have been omitted as a classified intersection given that the study extended to Settlemier Avenue to the east), the TIA for US Market shows a queue of 134 feet in the morning and 177 feet to 185 feet in the evening peak hour depending on the access scenario. The access is 195 feet from the stop bar, indicating that unlike the Chevron access the US Market site does not experience the same blockages. Further, this is reflective of the back-of-queue, with shorter queues during other portions of the traffic signal cycle.

In addition to the eastbound queues along OR 214, the other notable item from the Project Basie TIA relates to the northbound queues on Evergreen Avenue, as cited below in Figure 7:

- The estimated 95th-percentile queue for the northbound left turn/through movement at the OR 214/Evergreen Road intersection is projected to exceed the existing storage length by 10-30 feet under year 2023 background and total conditions during both weekday AM peak hours. This queue is projected to be accommodated within the existing taper length. Therefore no mitigation is recommended at this location as a result of site development.

Figure 7. Project Basie TIA, 2023 conditions, pp47, Kittelson & Associates, September 2021

The submitted analysis shows that the queue at the Evergreen Avenue traffic signal extends well beyond the Dutch Bros. access (and even those of Panor 360 Condominiums to the south). This comment indicates that alternative access for the Dutch Bros. site to Oregon Way would be beneficial in serving these commercial properties, consistent with the original site plan and the public comments related to supporting the access changes requested. Figure 8 illustrates the queues between the two reports for additional context.

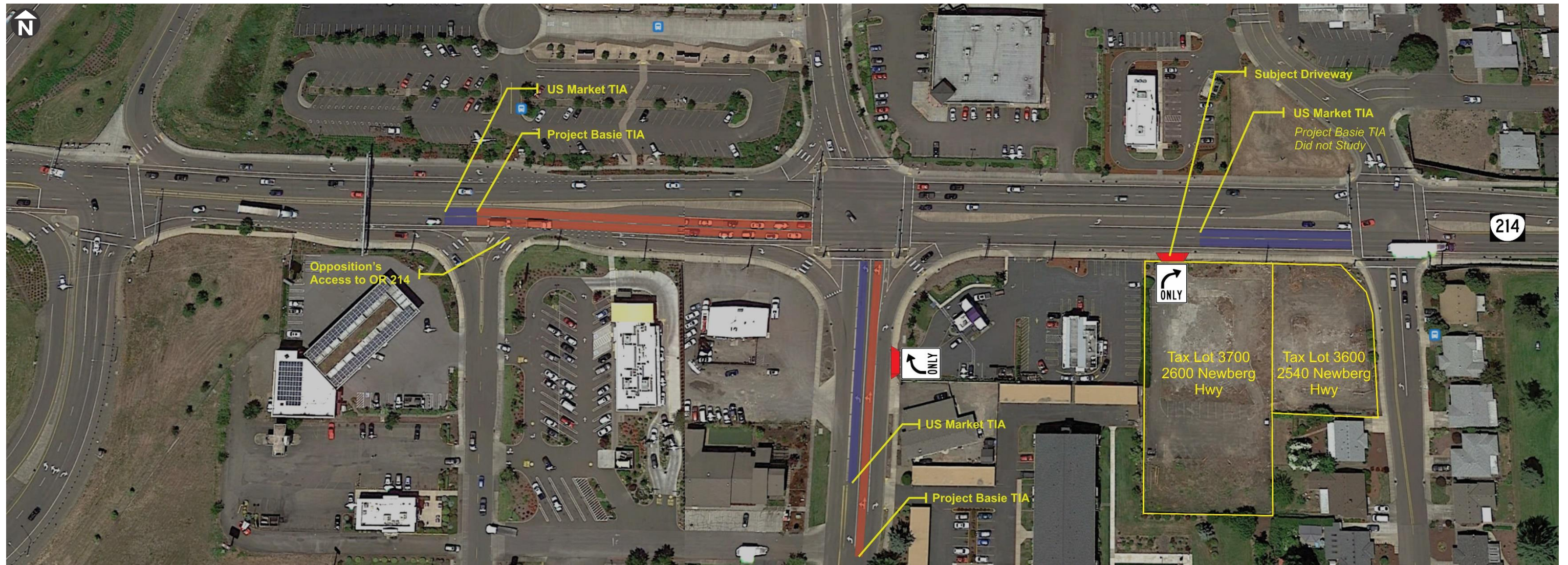


Figure 8. Year 2023 95th Percentile Queues within Project Basie and US Market Transportation Impact Analyses.

Opposition Argument #11: Evergreen Avenue Intersection: The opposition engineer argues that operational issues noted within the US Market TIA at the OR 214/Evergreen Avenue intersection should require similar pro-rata payments to what was required of Project Basie.

Response: The opposition engineer does not appear to understand the differences in the application for Project Basie and US Market. As a change in the land use assumptions underlying the City’s Transportation System Plan and the IAMP Project Basie’s burden of proof is to show a long-range analysis can be supported, and to provide mitigation should the project trips change the City’s long-term plans.

The US Market site is zoned outright for the proposed use and already assumed in the City’s long-range planning, and therefore only has the burden of ensuring adequate capacity at build-out. The analysis presented, using traffic counts that are nearly 20% higher than those used on Project Basie, show that the intersection can meet this near-term demand and continues to operate acceptably. Not surprisingly, the opposition engineer’s own traffic study makes similar findings in Table 12 of its 2023 analysis, showing that the OR 214/Evergreen Avenue intersection operates acceptably with Project Basie build-out in 2023 (see Figure 9).

Table 12 – 2023 Total Traffic Conditions (continued)

Intersection	Maximum Operating Standard/Target	Weekday 7:00-8:00 AM System Peak Hour				Weekday 4:30-5:30 System PM Peak Hour			
		Critical Approach/Lane	LOS	Delay (sec)	V/C	Critical Approach/Lane	LOS	Delay (sec)	V/C
OR 219/ Arbor Grove Road	V/C: 0.90 major / 0.90 minor approach	SB	B	10.2	0.05	SB	B	11.7	0.19
OR 219/ North Butteville Road	V/C: 0.90 major / 0.90 minor approach	SB	C	15.0	0.27	SB	F	>50.0	0.89
Relocated OR 219/ Butteville Road	V/C: 0.75 (per HDM)	See Table 13							
OR 219/ Willow Avenue	V/C: 0.95 major / 0.95 minor approach	SB	C	18.1	0.21	SB	C	20.4	0.21
OR 219/Woodland Avenue	V/C: 0.95	-	B	16.4	0.44	-	B	19.9	0.60
OR 219/ I-5 SB Ramp Terminal	V/C: 0.80	-	B	11.8	0.37	-	B	15.5	0.51
OR 219/ I-5 NB Ramp Terminal	V/C: 0.80	-	B	16.1	0.47	-	B	11.8	0.57
OR 214/Evergreen Road	V/C: 0.95	-	C	33.5	0.60	-	D	35.7	0.66

Figure 9. Project Basie operations analysis showing acceptable performance of the OR 214/Evergreen Avenue intersection.

Similar to the prior opposition arguments, it is again unclear what the opposition traffic engineer is arguing as the study prepared by his same firm comports with the findings presented in the US Market analysis.

CONCLUSIONS AND NEXT STEPS

Review of the agency and public comments received to date show that if the access agreements can be modified through a Grant of Access process it would benefit the surrounding transportation system. The analysis shows that shared connections between these commercial properties would allow the lower-volume Oregon Way signal with OR 214 to better support area travel and help relieve the higher-volume Evergreen Avenue corridor. These findings are corroborated in review of the Project Basie transportation materials as well as those shown within the US Market TIA.

However, as approval of the ODOT Grant of Access to allow this cross-access is not certain, separate analyses were prepared showing how the system will operate with revisions to the site layout reflective of the current deeded access constraints. These scenarios confirm the findings within the original analysis, showing that the study area intersections can support the rerouted travel demands.

Thank you for the opportunity to provide these supplemental transportation materials in response to comments received on this application. If you have any questions I can be reached at (503) 997-4473 or via email at joe@transightconsulting.com.

Attachments:

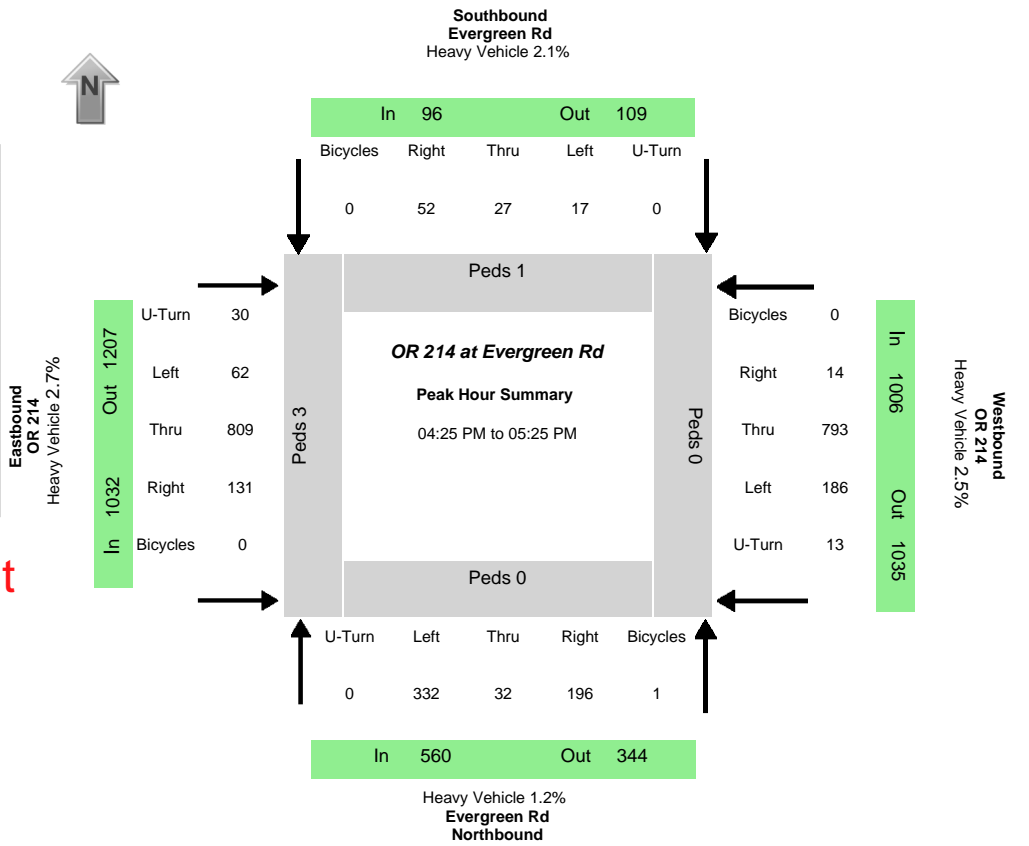
- Project Basie TIA Comparative Traffic Counts
- Confirmation of In-Process Trips for Application within US Market TIA
- Year 2023 “No Build” Analysis Worksheets
- Year 2023 “With Project” Analysis Worksheets (Access Option 2)
- Year 2023 “With Project” Analysis Worksheets (Access Option 3)
- Year 2033 “No Build” Analysis Worksheets
- Year 2033 “With Project” Analysis Worksheets (Access Option 2)
- Year 2033 “With Project” Analysis Worksheets (Access Option 3)



KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	Evergreen Rd
E/W street	OR 214
City, State	Woodburn OR
Site Notes	
Location	45.150989 - -122.875784
Start Date	Wednesday, June 30, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:25:00 PM
Peak 15 Min Start	04:25:00 PM
PHF (15-Min Int)	0.95

**US Market Traffic Count
2,694 Peak Hour Trips**



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
332	32	196	0	17	27	52	0	62	809	131	30	186	793	14	13	560	96	1032	1006	344	108	1207	1035
Percent Heavy Vehicles																							
2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	3.2%	1.5%	0.0%	0.0%	3.2%	0.0%	0.0%	1.3%	2.1%	2.7%	2.5%	0.6%	0.0%	2.8%	2.5%

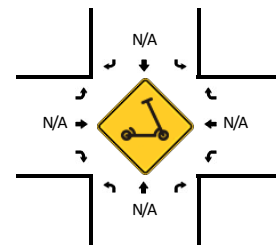
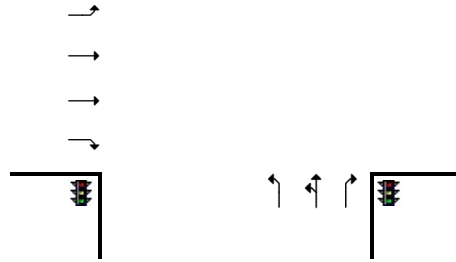
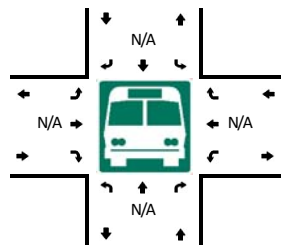
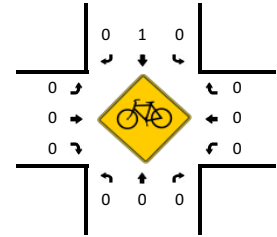
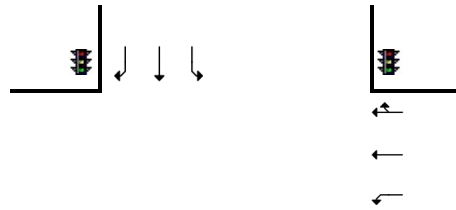
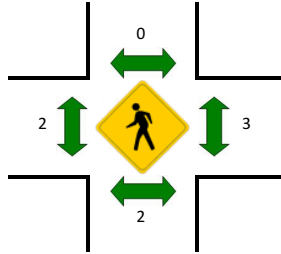
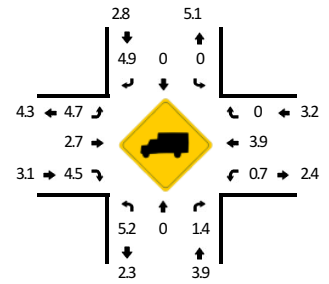
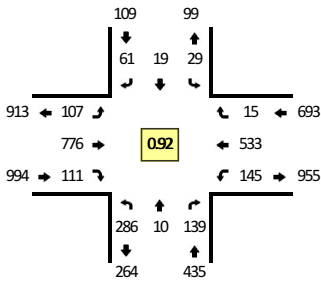
PHV - Bicycles														PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0	4

Time	Northbound Evergreen Rd				Southbound Evergreen Rd				Eastbound OR 214				Westbound OR 214				15 Min Sum	1 HR Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		
04:00:00 PM	29	4	18	0	0	2	3	0	5	65	5	0	22	49	0	1		
04:05:00 PM	39	3	20	0	2	3	6	0	7	78	7	4	10	60	0	2		
04:10:00 PM	22	1	16	0	0	5	7	0	8	57	15	4	15	57	2	1	654	
04:15:00 PM	27	1	15	0	1	4	5	0	4	36	12	3	7	57	0	0	623	
04:20:00 PM	34	3	13	0	3	1	5	0	13	63	7	2	20	65	1	1	613	
04:25:00 PM	34	2	19	0	2	1	9	0	8	73	10	4	16	61	0	0	642	
04:30:00 PM	31	1	19	0	3	1	3	0	7	84	9	2	20	69	3	1	723	
04:35:00 PM	24	0	13	0	4	1	5	0	9	65	9	4	11	70	1	2	710	
04:40:00 PM	28	1	18	0	0	4	4	0	6	71	15	2	13	52	0	0	685	
04:45:00 PM	32	3	15	0	0	2	2	0	5	45	12	1	15	57	1	1	623	
04:50:00 PM	27	3	16	0	1	5	3	0	5	68	14	0	19	63	0	2	631	
04:55:00 PM	25	2	12	0	0	1	4	0	5	68	7	2	19	71	3	4	640	2621
05:00:00 PM	35	5	20	0	1	4	4	0	4	61	10	4	13	69	1	0	680	2649
05:05:00 PM	23	5	13	0	2	1	5	0	2	58	7	4	11	90	2	0	677	2631
05:10:00 PM	27	1	18	0	0	5	2	0	4	65	11	1	18	67	1	1	675	2642
05:15:00 PM	20	2	15	0	2	1	10	0	2	67	12	4	14	59	1	1	654	2680
05:20:00 PM	26	7	18	0	2	1	1	0	5	84	15	2	17	65	1	1	676	2694
05:25:00 PM	31	5	10	0	0	2	4	0	4	78	12	3	17	66	0	1	688	2688
05:30:00 PM	24	1	9	0	3	2	6	0	6	59	6	5	8	63	2	0	672	2629
05:35:00 PM	20	3	20	0	2	2	3	0	6	68	8	1	11	58	1	2	632	2616
05:40:00 PM	31	1	10	0	4	3	9	0	6	55	5	4	16	44	3	0	590	2593
05:45:00 PM	23	2	10	0	2	2	1	0	6	61	7	1	9	55	0	1	576	2582
05:50:00 PM	22	0	11	0	2	1	1	0	7	69	12	5	10	57	2	1	571	2556
05:55:00 PM	36	0	17	0	3	3	2	0	7	80	23	1	12	42	2	0	608	2561

LOCATION: Evergreen Rd -- OR 214
CITY/STATE: Woodburn, OR

QC JOB #: 15462406
DATE: Tue, May 25 2021

Peak-Hour: 5:30 PM -- 6:30 PM
 Peak 15-Min: 5:35 PM -- 5:50 PM
Project Basie Traffic Count
2,626 Peak Hour Trips



5-Min Count Period Beginning At	Evergreen Rd (Northbound)				Evergreen Rd (Southbound)				OR 214 (Eastbound)				OR 214 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	27	3	13	0	1	2	2	0	7	49	8	5	18	60	1	3	199	
3:05 PM	26	4	12	0	4	2	11	0	5	59	7	1	12	46	0	0	189	
3:10 PM	27	3	11	0	0	3	3	0	2	54	5	2	13	65	1	0	189	
3:15 PM	16	0	16	0	3	2	12	0	6	66	8	2	9	54	1	0	195	
3:20 PM	22	3	15	0	2	3	5	0	5	77	9	4	10	46	0	1	202	
3:25 PM	30	4	16	0	1	2	8	0	9	69	9	1	8	53	1	1	212	
3:30 PM	25	3	10	0	4	1	5	0	3	81	6	3	9	52	3	0	205	
3:35 PM	32	2	9	0	8	3	4	0	3	67	11	3	15	57	0	1	215	
3:40 PM	28	2	15	0	0	3	8	0	4	74	8	6	14	60	0	2	224	
3:45 PM	18	2	16	0	2	6	4	0	10	68	8	4	15	48	2	3	206	
3:50 PM	26	2	12	0	4	1	4	0	8	75	10	4	11	70	2	1	230	
3:55 PM	32	5	16	0	4	1	3	0	10	58	15	3	9	55	2	1	214	2480
4:00 PM	26	3	11	0	1	3	5	0	6	73	13	1	18	53	2	1	216	2497
4:05 PM	33	1	11	0	4	4	9	0	10	70	9	3	9	69	2	1	235	2543
4:10 PM	34	2	5	0	4	2	9	0	8	76	11	2	13	61	0	0	227	2581
4:15 PM	22	4	10	0	0	1	4	0	3	58	11	1	7	61	1	2	185	2571
4:20 PM	31	3	11	0	4	3	7	0	6	69	5	6	18	53	3	1	220	2589
4:25 PM	17	2	10	0	1	5	7	0	5	53	6	3	18	54	4	1	186	2563
4:30 PM	26	2	16	0	1	5	5	0	5	64	10	5	12	49	4	0	204	2562
4:35 PM	34	2	15	0	6	2	4	0	5	76	10	6	13	57	2	1	233	2580
4:40 PM	33	2	13	0	1	3	6	0	5	74	12	1	17	73	2	1	243	2599
4:45 PM	29	0	17	0	4	3	7	0	6	79	8	1	19	59	1	0	233	2626
4:50 PM	27	4	13	0	0	1	7	0	8	71	14	2	18	51	1	2	219	2615
4:55 PM	18	0	5	0	1	3	3	0	6	73	12	5	18	46	1	1	192	2593
5:00 PM	25	2	10	0	1	1	6	0	6	68	9	0	12	52	2	0	194	2571
5:05 PM	18	3	10	0	2	4	12	0	5	57	7	2	14	70	0	2	206	2542
5:10 PM	33	2	11	0	2	2	4	0	5	71	7	2	16	74	0	0	229	2544
5:15 PM	18	2	11	0	3	3	8	0	9	86	9	4	21	58	1	1	234	2593
5:20 PM	31	3	12	0	3	0	5	0	6	70	11	1	13	50	2	1	208	2581
5:25 PM	24	4	16	0	2	2	3	0	5	74	10	7	17	64	0	1	229	2624
5:30 PM	14	1	10	0	2	0	7	0	5	69	6	6	5	40	1	1	167	2587
5:35 PM	25	1	17	0	3	2	5	0	7	72	8	1	11	63	1	3	219	2573
5:40 PM	30	1	13	0	3	2	7	0	4	59	8	1	17	50	3	2	200	2530
5:45 PM	20	1	16	0	0	1	5	0	5	76	13	0	11	39	0	0	187	2484
5:50 PM	27	1	8	0	4	0	2	0	7	64	16	4	14	44	2	0	193	2458
5:55 PM	30	0	12	0	5	0	8	0	3	63	14	5	9	35	1	1	186	2452
6:00 PM	36	1	13	0	1	0	6	0	8	59	6	5	8	39	0	0	182	2440
6:05 PM	16	1	8	0	2	0	5	0	5	72	6	0	12	52	3	0	182	2416

Joe Bessman

From: Jerilyn Weisbeck
Sent: Thursday, July 29, 2021 10:56 AM
To: dago.garcia@ci.woodburn.or.us
Cc: Joe Bessman
Subject: US Market Traffic Study - Approved Developments Question

Good morning Dago,

Thank you for your help yesterday with finding the approved developments in the City's online Projects system. It was very helpful!

Based on the information online, it appears that five developments should be included in the US Market traffic study (on the corner of Oregon Way and OR 214) for forecasting future volumes on the Newberg Highway. These include:

- Woodburn Urgent Care/Oregon Care Facility
- Schultz Farm
- Allison Way Apartments
- Smith Creek Development
- Woodland Crossing

Are there any other developments that I missed that should be included in our study? I was able to find traffic studies for all of these developments in the Projects system except for Woodland Crossing. The Final Order for the Woodland Crossing indicates that there is a TIA included in Exhibit "L" but I was unable to find it at the end of the document. Would it be possible to point me in the right direction to find the TIA or send me an electronic copy?

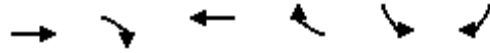
Thank you for your assistance!
Jerilyn

Jerilyn Wen Weisbeck, PE
Associate Engineer

Transight Consulting, LLC
Bend, Oregon
cell: (503) 894-4387
email: jerilyn@transightconsulting.com
web: <https://transightconsulting.net/>

Queues
1: I-5 SB ramps & OR 214













Year 2023 Without Project Conditions
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	770	396	690	628	549	300
v/c Ratio	0.34	0.28	0.39	0.44	0.78	0.49
Control Delay	7.5	0.5	16.6	1.1	44.3	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	0.5	16.6	1.1	44.3	15.5
Queue Length 50th (ft)	94	0	135	0	170	79
Queue Length 95th (ft)	150	0	163	13	213	142
Internal Link Dist (ft)	562		680			
Turn Bay Length (ft)	270		550		650	
Base Capacity (vph)	2232	1426	1759	1430	1048	626
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.39	0.44	0.52	0.48
Intersection Summary						













HCM Signalized Intersection Capacity Analysis
 1: I-5 SB ramps & OR 214

Year 2023 Without Project Conditions
 Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗	
Traffic Volume (vph)	0	708	364	0	635	578	0	0	0	505	0	276	
Future Volume (vph)	0	708	364	0	635	578	0	0	0	505	0	276	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5	
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00	
Frbp, ped/bikes		1.00	0.98		1.00	1.00				1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3260	1426		3260	1430				3131		1444	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3260	1426		3260	1430				3131		1444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	770	396	0	690	628	0	0	0	549	0	300	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	81	
Lane Group Flow (vph)	0	770	396	0	690	628	0	0	0	549	0	219	
Confl. Peds. (#/hr)			3	3					1	1			
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	0%	2%	2%	0%	2%	4%	0%	0%	0%	3%	0%	3%	
Turn Type		NA	Free		NA	Free				Prot		Perm	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4 5	
Actuated Green, G (s)		68.5	100.0		54.0	100.0				22.5		37.0	
Effective Green, g (s)		68.5	100.0		54.0	100.0				22.5		37.0	
Actuated g/C Ratio		0.68	1.00		0.54	1.00				0.22		0.37	
Clearance Time (s)		4.5			4.5					4.5			
Vehicle Extension (s)		6.0			4.0					2.5			
Lane Grp Cap (vph)		2233	1426		1760	1430				704		534	
v/s Ratio Prot		0.24			0.21					c0.18			
v/s Ratio Perm			0.28			c0.44						0.15	
v/c Ratio		0.34	0.28		0.39	0.44				0.78		0.41	
Uniform Delay, d1		6.5	0.0		13.4	0.0				36.4		23.4	
Progression Factor		1.00	1.00		1.12	1.00				1.00		1.00	
Incremental Delay, d2		0.4	0.5		0.2	0.9				5.3		0.4	
Delay (s)		6.9	0.5		15.3	0.9				41.7		23.8	
Level of Service		A	A		B	A				D		C	
Approach Delay (s)		4.7			8.4			0.0			35.4		
Approach LOS		A			A			A			D		
Intersection Summary													
HCM 2000 Control Delay			14.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			45.1%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: I-5 SB ramps & OR 214

Year 2023 Without Project Conditions
 Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↖↖		↗
Traffic Volume (veh/h)	0	708	364	0	635	578	0	0	0	505	0	276
Future Volume (veh/h)	0	708	364	0	635	578	0	0	0	505	0	276
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1723	1723	0	1723	1695				1709	0	1709
Adj Flow Rate, veh/h	0	770	0	0	690	0				549	0	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	4				3	0	3
Cap, veh/h	0	2196		0	2196					755	0	346
Arrive On Green	0.00	0.67	0.00	0.00	0.67	0.00				0.24	0.00	0.24
Sat Flow, veh/h	0	3359	1460	0	3359	1437				3158	0	1448
Grp Volume(v), veh/h	0	770	0	0	690	0				549	0	300
Grp Sat Flow(s),veh/h/ln	0	1637	1460	0	1637	1437				1579	0	1448
Q Serve(g_s), s	0.0	10.1	0.0	0.0	8.8	0.0				16.0	0.0	19.9
Cycle Q Clear(g_c), s	0.0	10.1	0.0	0.0	8.8	0.0				16.0	0.0	19.9
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2196		0	2196					755	0	346
V/C Ratio(X)	0.00	0.35		0.00	0.31					0.73	0.00	0.87
Avail Cap(c_a), veh/h	0	2196		0	2196					1058	0	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.85	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.1	0.0	0.0	6.9	0.0				35.0	0.0	36.5
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.1	0.0				1.2	0.0	10.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	0.0	0.0	2.8	0.0				6.2	0.0	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.5	0.0	0.0	7.0	0.0				36.3	0.0	46.8
LnGrp LOS	A	A		A	A					D	A	D
Approach Vol, veh/h		770	A		690	A					849	
Approach Delay, s/veh		7.5			7.0						40.0	
Approach LOS		A			A						D	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		71.6		28.4		71.6						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		57.5		33.5		42.5						
Max Q Clear Time (g_c+I1), s		12.1		21.9		10.8						
Green Ext Time (p_c), s		16.5		2.0		7.6						

Intersection Summary

HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: I-5 NB ramps & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour















Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	1081	198	1053	351	213	286	283
v/c Ratio	0.49	0.14	0.48	0.25	0.61	0.80	0.77
Control Delay	11.0	0.2	6.7	0.4	39.8	42.2	39.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	0.2	6.7	0.4	39.8	42.2	39.3
Queue Length 50th (ft)	206	0	72	0	128	145	134
Queue Length 95th (ft)	383	0	183	0	175	217	201
Internal Link Dist (ft)	680		865			472	
Turn Bay Length (ft)							
Base Capacity (vph)	2193	1403	2172	1387	565	533	549
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.14	0.48	0.25	0.38	0.54	0.52
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

Year 2023 Without Project Conditions

2: I-5 NB ramps & OR 214

Weekday PM Peak Hour

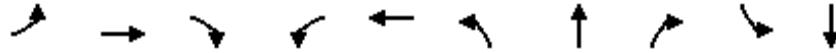
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↕	↗			
Traffic Volume (vph)	0	1016	186	0	990	330	223	0	512	0	0	0
Future Volume (vph)	0	1016	186	0	990	330	223	0	512	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	5.4	5.4	5.4			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frbp, ped/bikes		1.00	1.00		1.00	0.98	1.00	1.00	1.00			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3292	1403		3260	1387	1504	1303	1346			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3292	1403		3260	1387	1504	1303	1346			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1081	198	0	1053	351	237	0	545	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	54	54	0	0	0
Lane Group Flow (vph)	0	1081	198	0	1053	351	213	232	229	0	0	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	1%	6%	0%	2%	5%	5%	0%	5%	0%	0%	0%
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		66.6	100.0		66.6	100.0	23.5	23.5	23.5			
Effective Green, g (s)		66.6	100.0		66.6	100.0	23.5	23.5	23.5			
Actuated g/C Ratio		0.67	1.00		0.67	1.00	0.24	0.24	0.24			
Clearance Time (s)		4.5			4.5		5.4	5.4	5.4			
Vehicle Extension (s)		4.0			6.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		2192	1403		2171	1387	353	306	316			
v/s Ratio Prot		c0.33			0.32							
v/s Ratio Perm			0.14			0.25	0.14	0.18	0.17			
v/c Ratio		0.49	0.14		0.49	0.25	0.60	0.76	0.73			
Uniform Delay, d1		8.3	0.0		8.2	0.0	34.1	35.6	35.3			
Progression Factor		1.04	1.00		0.62	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.7	0.2		0.4	0.4	2.4	9.9	7.6			
Delay (s)		9.3	0.2		5.5	0.4	36.5	45.5	42.9			
Level of Service		A	A		A	A	D	D	D			
Approach Delay (s)		7.9			4.2			42.1			0.0	
Approach LOS		A			A			D			A	
Intersection Summary												
HCM 2000 Control Delay			14.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)				9.9	
Intersection Capacity Utilization			61.7%				ICU Level of Service				B	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Queues
3: Evergreen Rd & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour



























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	124	1038	267	257	893	252	250	227	22	109
v/c Ratio	0.41	0.85	0.37	0.76	0.60	0.77	0.76	0.47	0.19	0.62
Control Delay	13.4	34.6	5.7	43.6	17.1	51.9	50.7	7.2	48.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	34.6	5.7	43.6	17.1	51.9	50.7	7.2	48.0	34.0
Queue Length 50th (ft)	28	360	19	85	220	160	158	0	13	21
Queue Length 95th (ft)	70	#447	50	#280	254	230	227	54	38	#90
Internal Link Dist (ft)		865			282		429			498
Turn Bay Length (ft)	175		250	375		325		290	70	
Base Capacity (vph)	306	1222	722	340	1492	444	449	581	116	175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.85	0.37	0.76	0.60	0.57	0.56	0.39	0.19	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	945	243	234	796	16	432	25	207	20	31	68
Future Volume (vph)	113	945	243	234	796	16	432	25	207	20	31	68
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3197	1458	1662	3190		1533	1550	1451	1662	1510	
Flt Permitted	0.22	1.00	1.00	0.11	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	387	3197	1458	199	3190		1533	1550	1451	1662	1510	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	124	1038	267	257	875	18	475	27	227	22	34	75
RTOR Reduction (vph)	0	0	165	0	1	0	0	0	178	0	70	0
Lane Group Flow (vph)	124	1038	102	257	892	0	252	250	49	22	39	0
Confl. Peds. (#/hr)							1		2	2		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	2%	0%	4%	0%	3%	0%	1%	0%	0%	4%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	6		2	2					8			
Actuated Green, G (s)	54.1	38.2	38.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Effective Green, g (s)	54.1	38.2	38.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Actuated g/C Ratio	0.54	0.38	0.38	0.54	0.47		0.21	0.21	0.21	0.07	0.07	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	6.2	6.2	2.5	6.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	303	1221	556	340	1489		328	331	310	116	105	
v/s Ratio Prot	0.03	c0.32		c0.12	0.28		c0.16	0.16		0.01	c0.03	
v/s Ratio Perm	0.19		0.07	0.29					0.03			
v/c Ratio	0.41	0.85	0.18	0.76	0.60		0.77	0.76	0.16	0.19	0.37	
Uniform Delay, d1	12.7	28.3	20.5	22.1	19.7		37.0	36.8	32.0	43.8	44.4	
Progression Factor	0.88	0.94	1.48	1.39	0.73		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	6.7	0.6	8.3	1.7		9.9	9.0	0.2	0.6	1.6	
Delay (s)	11.7	33.2	30.9	39.1	16.1		46.9	45.8	32.1	44.4	46.0	
Level of Service	B	C	C	D	B		D	D	C	D	D	
Approach Delay (s)		30.9			21.2			41.9			45.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			17.5			
Intersection Capacity Utilization			78.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1123	29	0	1068	0	29
Future Vol, veh/h	1123	29	0	1068	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1248	32	0	1187	0	32

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	640
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	423
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	423
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	423	-	-	-
HCM Lane V/C Ratio	0.076	-	-	-
HCM Control Delay (s)	14.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Queues
5: Oregon Way & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	59	1155	31	1009	41	34	53	105
v/c Ratio	0.15	0.51	0.09	0.45	0.44	0.26	0.52	0.54
Control Delay	6.1	9.5	4.3	9.0	60.7	30.8	64.5	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	9.5	4.3	9.0	60.7	30.8	64.5	24.3
Queue Length 50th (ft)	10	120	4	152	26	10	33	13
Queue Length 95th (ft)	m16	190	13	241	#62	39	#82	62
Internal Link Dist (ft)		190		686		135		364
Turn Bay Length (ft)	305		155		150		50	
Base Capacity (vph)	399	2275	348	2242	95	540	105	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.51	0.09	0.45	0.43	0.06	0.50	0.18

Intersection Summary





















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Oregon Way & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	991	106	29	915	44	39	15	17	50	20	80
Future Volume (vph)	56	991	106	29	915	44	39	15	17	50	20	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3151		1662	3207		1662	1599		1662	1528	
Flt Permitted	0.25	1.00		0.21	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	430	3151		359	3207		1662	1599		1662	1528	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	1043	112	31	963	46	41	16	18	53	21	84
RTOR Reduction (vph)	0	4	0	0	2	0	0	17	0	0	78	0
Lane Group Flow (vph)	59	1151	0	31	1007	0	41	17	0	53	27	0
Confl. Peds. (#/hr)	3		3	3		3			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	1%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2								
Actuated Green, G (s)	72.4	68.9		72.4	67.5		3.4	6.0		5.1	7.7	
Effective Green, g (s)	72.4	68.9		72.4	67.5		3.4	6.0		5.1	7.7	
Actuated g/C Ratio	0.72	0.69		0.72	0.68		0.03	0.06		0.05	0.08	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	371	2171		305	2164		56	95		84	117	
v/s Ratio Prot	c0.01	c0.37		0.00	0.31		0.02	0.01		c0.03	c0.02	
v/s Ratio Perm	0.11			0.07								
v/c Ratio	0.16	0.53		0.10	0.47		0.73	0.18		0.63	0.23	
Uniform Delay, d1	4.4	7.6		4.6	7.7		47.8	44.7		46.5	43.4	
Progression Factor	1.52	1.09		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.1	0.7		36.9	0.7		12.7	0.8	
Delay (s)	6.8	8.9		4.7	8.4		84.7	45.3		59.3	44.1	
Level of Service	A	A		A	A		F	D		E	D	
Approach Delay (s)		8.8			8.3			66.9			49.2	
Approach LOS		A			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			12.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			57.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM 6th Signalized Intersection Summary
5: Oregon Way & OR 214

Year 2023 Without Project Conditions
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Traffic Volume (veh/h)	56	991	106	29	915	44	39	15	17	50	20	80
Future Volume (veh/h)	56	991	106	29	915	44	39	15	17	50	20	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1695	1736	1750	1709	1750	1750	1750	1750	1750	1750	1736
Adj Flow Rate, veh/h	59	1043	112	31	963	46	41	16	18	53	21	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	4	1	0	3	0	0	0	0	0	0	1
Cap, veh/h	393	2001	215	412	2132	102	50	71	79	66	32	126
Arrive On Green	0.05	1.00	1.00	0.02	0.68	0.68	0.03	0.09	0.09	0.04	0.10	0.10
Sat Flow, veh/h	1667	2927	314	1667	3154	151	1667	749	843	1667	304	1218
Grp Volume(v), veh/h	59	574	581	31	496	513	41	0	34	53	0	105
Grp Sat Flow(s),veh/h/ln	1667	1611	1630	1667	1624	1682	1667	0	1592	1667	0	1522
Q Serve(g_s), s	1.1	0.0	0.0	0.6	14.2	14.2	2.4	0.0	2.0	3.2	0.0	6.6
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.6	14.2	14.2	2.4	0.0	2.0	3.2	0.0	6.6
Prop In Lane	1.00		0.19	1.00		0.09	1.00		0.53	1.00		0.80
Lane Grp Cap(c), veh/h	393	1101	1115	412	1097	1136	50	0	150	66	0	158
V/C Ratio(X)	0.15	0.52	0.52	0.08	0.45	0.45	0.81	0.00	0.23	0.80	0.00	0.66
Avail Cap(c_a), veh/h	444	1101	1115	476	1097	1136	93	0	525	103	0	512
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	4.6	7.6	7.6	48.2	0.0	41.9	47.6	0.0	43.1
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.1	1.3	1.3	20.1	0.0	0.6	16.7	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.5	0.5	0.2	4.8	4.9	1.3	0.0	0.8	1.6	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.8	1.8	1.7	4.6	8.9	8.9	68.3	0.0	42.5	64.3	0.0	46.7
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		1214			1040			75				158
Approach Delay, s/veh		1.9			8.8			56.6				52.6
Approach LOS		A			A			E				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	72.9	7.0	14.4	6.5	72.1	8.0	13.4				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	5.6	38.7	5.6	33.6	5.6	38.7	6.2	33.0				
Max Q Clear Time (g_c+I1), s	2.6	2.0	4.4	8.6	3.1	16.2	5.2	4.0				
Green Ext Time (p_c), s	0.0	24.1	0.0	0.5	0.0	14.8	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			9.7									
HCM 6th LOS			A									

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	29	2	2	71	155	29
Future Vol, veh/h	29	2	2	71	155	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	34	2	2	84	182	34

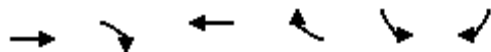
Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	287	199	216	0	0
Stage 1	199	-	-	-	-
Stage 2	88	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	708	847	1366	-	-
Stage 1	839	-	-	-	-
Stage 2	940	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	707	847	1366	-	-
Mov Cap-2 Maneuver	707	-	-	-	-
Stage 1	837	-	-	-	-
Stage 2	940	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1366	-	715	-	-
HCM Lane V/C Ratio	0.002	-	0.051	-	-
HCM Control Delay (s)	7.6	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Queues
1: I-5 SB ramps & OR 214













Year 2023 With Project, Option 2
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	770	396	690	625	546	300
v/c Ratio	0.34	0.28	0.39	0.44	0.78	0.49
Control Delay	7.5	0.5	16.6	1.1	44.3	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	0.5	16.6	1.1	44.3	15.6
Queue Length 50th (ft)	94	0	137	0	169	79
Queue Length 95th (ft)	150	0	162	13	212	142
Internal Link Dist (ft)	562		680			
Turn Bay Length (ft)	270		550			
Base Capacity (vph)	2235	1426	1762	1430	1048	625
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.39	0.44	0.52	0.48
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
 1: I-5 SB ramps & OR 214

Year 2023 With Project, Option 2
 Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗	
Traffic Volume (vph)	0	708	364	0	635	575	0	0	0	502	0	276	
Future Volume (vph)	0	708	364	0	635	575	0	0	0	502	0	276	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5	
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00	
Frbp, ped/bikes		1.00	0.98		1.00	1.00				1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3260	1426		3260	1430				3131		1444	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3260	1426		3260	1430				3131		1444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	770	396	0	690	625	0	0	0	546	0	300	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	81	
Lane Group Flow (vph)	0	770	396	0	690	625	0	0	0	546	0	219	
Confl. Peds. (#/hr)			3	3					1	1			
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	0%	2%	2%	0%	2%	4%	0%	0%	0%	3%	0%	3%	
Turn Type		NA	Free		NA	Free				Prot		Perm	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4 5	
Actuated Green, G (s)		68.6	100.0		54.1	100.0				22.4		36.9	
Effective Green, g (s)		68.6	100.0		54.1	100.0				22.4		36.9	
Actuated g/C Ratio		0.69	1.00		0.54	1.00				0.22		0.37	
Clearance Time (s)		4.5			4.5					4.5			
Vehicle Extension (s)		6.0			4.0					2.5			
Lane Grp Cap (vph)		2236	1426		1763	1430				701		532	
v/s Ratio Prot		0.24			0.21					c0.17			
v/s Ratio Perm			0.28			c0.44						0.15	
v/c Ratio		0.34	0.28		0.39	0.44				0.78		0.41	
Uniform Delay, d1		6.5	0.0		13.4	0.0				36.5		23.5	
Progression Factor		1.00	1.00		1.12	1.00				1.00		1.00	
Incremental Delay, d2		0.4	0.5		0.2	0.9				5.3		0.4	
Delay (s)		6.9	0.5		15.2	0.9				41.7		23.9	
Level of Service		A	A		B	A				D		C	
Approach Delay (s)		4.7			8.4			0.0			35.4		
Approach LOS		A			A			A			D		
Intersection Summary													
HCM 2000 Control Delay			14.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			45.1%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: I-5 SB ramps & OR 214

Year 2023 With Project, Option 2
 Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗
Traffic Volume (veh/h)	0	708	364	0	635	575	0	0	0	502	0	276
Future Volume (veh/h)	0	708	364	0	635	575	0	0	0	502	0	276
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1723	1723	0	1723	1695				1709	0	1709
Adj Flow Rate, veh/h	0	770	0	0	690	0				546	0	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	4				3	0	3
Cap, veh/h	0	2196		0	2196					755	0	346
Arrive On Green	0.00	0.67	0.00	0.00	0.67	0.00				0.24	0.00	0.24
Sat Flow, veh/h	0	3359	1460	0	3359	1437				3158	0	1448
Grp Volume(v), veh/h	0	770	0	0	690	0				546	0	300
Grp Sat Flow(s),veh/h/ln	0	1637	1460	0	1637	1437				1579	0	1448
Q Serve(g_s), s	0.0	10.1	0.0	0.0	8.8	0.0				15.9	0.0	19.9
Cycle Q Clear(g_c), s	0.0	10.1	0.0	0.0	8.8	0.0				15.9	0.0	19.9
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2196		0	2196					755	0	346
V/C Ratio(X)	0.00	0.35		0.00	0.31					0.72	0.00	0.87
Avail Cap(c_a), veh/h	0	2196		0	2196					1058	0	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.86	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.1	0.0	0.0	6.9	0.0				35.0	0.0	36.5
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.1	0.0				1.2	0.0	10.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	0.0	0.0	2.8	0.0				6.1	0.0	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.5	0.0	0.0	7.0	0.0				36.2	0.0	46.9
LnGrp LOS	A	A		A	A					D	A	D
Approach Vol, veh/h		770	A		690	A					846	
Approach Delay, s/veh		7.5			7.0						40.0	
Approach LOS		A			A						D	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		71.6		28.4		71.6						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		57.5		33.5		42.5						
Max Q Clear Time (g_c+I1), s		12.1		21.9		10.8						
Green Ext Time (p_c), s		16.5		2.0		7.6						

Intersection Summary

HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: I-5 NB ramps & OR 214













Year 2023 With Project, Option 2
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	1078	198	1050	349	213	285	282
v/c Ratio	0.49	0.14	0.48	0.25	0.61	0.80	0.77
Control Delay	10.8	0.2	6.6	0.4	40.0	42.2	39.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	0.2	6.6	0.4	40.0	42.2	39.3
Queue Length 50th (ft)	205	0	71	0	128	143	134
Queue Length 95th (ft)	382	0	184	0	176	216	201
Internal Link Dist (ft)	680		865			472	
Turn Bay Length (ft)							
Base Capacity (vph)	2196	1403	2175	1387	565	533	549
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.14	0.48	0.25	0.38	0.53	0.51
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
 2: I-5 NB ramps & OR 214

Year 2023 With Project, Option 2
 Weekday PM Peak Hour

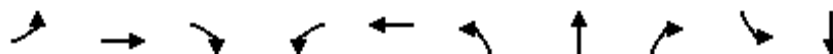
													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗	↗	↕	↗				
Traffic Volume (vph)	0	1013	186	0	987	328	223	0	510	0	0	0	
Future Volume (vph)	0	1013	186	0	987	328	223	0	510	0	0	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0	5.4	5.4	5.4				
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95				
Frbp, ped/bikes		1.00	1.00		1.00	0.98	1.00	1.00	1.00				
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00				
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00				
Satd. Flow (prot)		3292	1403		3260	1387	1504	1303	1346				
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00				
Satd. Flow (perm)		3292	1403		3260	1387	1504	1303	1346				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	0	1078	198	0	1050	349	237	0	543	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	54	54	0	0	0	
Lane Group Flow (vph)	0	1078	198	0	1050	349	213	231	228	0	0	0	
Confl. Peds. (#/hr)	2					2							
Heavy Vehicles (%)	0%	1%	6%	0%	2%	5%	5%	0%	5%	0%	0%	0%	
Turn Type		NA	Free		NA	Free	Perm	NA	Perm				
Protected Phases		2			6			8					
Permitted Phases			Free			Free	8		8				
Actuated Green, G (s)		66.7	100.0		66.7	100.0	23.4	23.4	23.4				
Effective Green, g (s)		66.7	100.0		66.7	100.0	23.4	23.4	23.4				
Actuated g/C Ratio		0.67	1.00		0.67	1.00	0.23	0.23	0.23				
Clearance Time (s)		4.5			4.5		5.4	5.4	5.4				
Vehicle Extension (s)		4.0			6.0		2.5	2.5	2.5				
Lane Grp Cap (vph)		2195	1403		2174	1387	351	304	314				
v/s Ratio Prot		c0.33			0.32								
v/s Ratio Perm			0.14			0.25	0.14	0.18	0.17				
v/c Ratio		0.49	0.14		0.48	0.25	0.61	0.76	0.73				
Uniform Delay, d1		8.2	0.0		8.2	0.0	34.2	35.7	35.4				
Progression Factor		1.03	1.00		0.62	1.00	1.00	1.00	1.00				
Incremental Delay, d2		0.7	0.2		0.4	0.4	2.5	10.3	7.7				
Delay (s)		9.2	0.2		5.4	0.4	36.7	46.0	43.0				
Level of Service		A	A		A	A	D	D	D				
Approach Delay (s)		7.8			4.2			42.4			0.0		
Approach LOS		A			A			D			A		
Intersection Summary													
HCM 2000 Control Delay			14.1		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					9.9			
Intersection Capacity Utilization			61.5%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Queues
3: Evergreen Rd & OR 214

Year 2023 With Project, Option 2
Weekday PM Peak Hour


























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	124	1033	267	247	887	252	250	237	22	109
v/c Ratio	0.41	0.82	0.36	0.74	0.59	0.77	0.76	0.48	0.19	0.62
Control Delay	13.3	32.6	5.6	40.6	17.0	51.9	50.7	7.2	48.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	32.6	5.6	40.6	17.0	51.9	50.7	7.2	48.0	34.0
Queue Length 50th (ft)	28	357	18	62	222	160	158	0	13	21
Queue Length 95th (ft)	69	#444	49	#254	264	230	227	55	38	#90
Internal Link Dist (ft)		865			282		429			498
Turn Bay Length (ft)	175		250	375		325		290	70	
Base Capacity (vph)	307	1253	733	332	1492	444	449	589	116	175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.82	0.36	0.74	0.59	0.57	0.56	0.40	0.19	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & OR 214

Year 2023 With Project, Option 2
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	940	243	225	791	16	432	25	216	20	31	68
Future Volume (vph)	113	940	243	225	791	16	432	25	216	20	31	68
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3197	1458	1662	3190		1533	1550	1451	1662	1510	
Flt Permitted	0.22	1.00	1.00	0.12	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	391	3197	1458	215	3190		1533	1550	1451	1662	1510	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	124	1033	267	247	869	18	475	27	237	22	34	75
RTOR Reduction (vph)	0	0	162	0	1	0	0	0	186	0	70	0
Lane Group Flow (vph)	124	1033	105	247	886	0	252	250	51	22	39	0
Confl. Peds. (#/hr)							1		2	2		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	2%	0%	4%	0%	3%	0%	1%	0%	0%	4%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	6		2	2					8			
Actuated Green, G (s)	54.1	39.2	39.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Effective Green, g (s)	54.1	39.2	39.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Actuated g/C Ratio	0.54	0.39	0.39	0.54	0.47		0.21	0.21	0.21	0.07	0.07	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	6.2	6.2	2.5	6.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	305	1253	571	331	1489		328	331	310	116	105	
v/s Ratio Prot	0.03	c0.32		c0.11	0.28		c0.16	0.16		0.01	c0.03	
v/s Ratio Perm	0.19		0.07	0.29					0.03			
v/c Ratio	0.41	0.82	0.18	0.75	0.59		0.77	0.76	0.16	0.19	0.37	
Uniform Delay, d1	12.7	27.3	19.9	19.8	19.7		37.0	36.8	32.0	43.8	44.4	
Progression Factor	0.87	0.93	1.44	1.39	0.72		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	5.5	0.6	7.9	1.6		9.9	9.0	0.2	0.6	1.6	
Delay (s)	11.6	30.9	29.2	35.5	15.9		46.9	45.8	32.2	44.4	46.0	
Level of Service	B	C	C	D	B		D	D	C	D	D	
Approach Delay (s)		28.9			20.2			41.8			45.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			17.5			
Intersection Capacity Utilization			78.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1011	136	0	1054	0	50
Future Vol, veh/h	1011	136	0	1054	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1123	151	0	1171	0	56

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	637
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	425
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	425
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	425	-	-	-
HCM Lane V/C Ratio	0.131	-	-	-
HCM Control Delay (s)	14.7	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-

Queues
5: Oregon Way & OR 214

Year 2023 With Project, Option 2
Weekday PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	1074	21	1010	41	93	53	104
v/c Ratio	0.11	0.47	0.06	0.45	0.41	0.52	0.49	0.47
Control Delay	6.6	9.2	4.2	9.1	58.3	24.2	61.2	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	9.2	4.2	9.1	58.3	24.2	61.2	20.9
Queue Length 50th (ft)	10	150	3	163	25	9	33	12
Queue Length 95th (ft)	m13	177	10	237	#62	56	#82	62
Internal Link Dist (ft)		190		686		135		364
Turn Bay Length (ft)	305		155		150		50	
Base Capacity (vph)	387	2272	367	2237	101	551	112	568
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.47	0.06	0.45	0.41	0.17	0.47	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Oregon Way & OR 214

Year 2023 With Project, Option 2
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Traffic Volume (vph)	42	932	88	20	916	44	39	14	74	50	19	80
Future Volume (vph)	42	932	88	20	916	44	39	14	74	50	19	80
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3156		1662	3207		1662	1512		1662	1526	
Flt Permitted	0.24	1.00		0.23	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	425	3156		396	3207		1662	1512		1662	1526	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	981	93	21	964	46	41	15	78	53	20	84
RTOR Reduction (vph)	0	4	0	0	2	0	0	72	0	0	76	0
Lane Group Flow (vph)	44	1070	0	21	1008	0	41	21	0	53	28	0
Confl. Peds. (#/hr)	3		3	3		3			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	1%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2								
Actuated Green, G (s)	70.2	67.9		70.2	66.5		3.7	7.8		5.5	9.6	
Effective Green, g (s)	70.2	67.9		70.2	66.5		3.7	7.8		5.5	9.6	
Actuated g/C Ratio	0.70	0.68		0.70	0.66		0.04	0.08		0.06	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	344	2142		307	2132		61	117		91	146	
v/s Ratio Prot	c0.00	c0.34		0.00	0.31		0.02	0.01		c0.03	c0.02	
v/s Ratio Perm	0.08			0.05								
v/c Ratio	0.13	0.50		0.07	0.47		0.67	0.18		0.58	0.19	
Uniform Delay, d1	5.1	7.8		5.0	8.2		47.6	43.1		46.1	41.6	
Progression Factor	1.56	1.14		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.1	0.8		23.3	0.5		7.6	0.5	
Delay (s)	8.0	9.5		5.1	8.9		70.9	43.7		53.8	42.1	
Level of Service	A	A		A	A		E	D		D	D	
Approach Delay (s)		9.4			8.9			52.0			46.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
5: Oregon Way & OR 214

Year 2023 With Project, Option 2
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	932	88	20	916	44	39	14	74	50	19	80
Future Volume (veh/h)	42	932	88	20	916	44	39	14	74	50	19	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1695	1736	1750	1709	1750	1750	1750	1750	1750	1750	1736
Adj Flow Rate, veh/h	44	981	93	21	964	46	41	15	78	53	20	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	4	1	0	3	0	0	0	0	0	0	1
Cap, veh/h	388	2036	193	431	2140	102	50	23	121	66	31	129
Arrive On Green	0.04	1.00	1.00	0.01	0.68	0.68	0.03	0.10	0.10	0.04	0.11	0.11
Sat Flow, veh/h	1667	2967	281	1667	3155	151	1667	244	1268	1667	292	1228
Grp Volume(v), veh/h	44	533	541	21	496	514	41	0	93	53	0	104
Grp Sat Flow(s),veh/h/ln	1667	1611	1637	1667	1624	1682	1667	0	1512	1667	0	1521
Q Serve(g_s), s	0.8	0.0	0.0	0.4	14.1	14.1	2.4	0.0	5.9	3.2	0.0	6.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	0.4	14.1	14.1	2.4	0.0	5.9	3.2	0.0	6.6
Prop In Lane	1.00		0.17	1.00		0.09	1.00		0.84	1.00		0.81
Lane Grp Cap(c), veh/h	388	1105	1124	431	1102	1141	50	0	145	66	0	160
V/C Ratio(X)	0.11	0.48	0.48	0.05	0.45	0.45	0.81	0.00	0.64	0.80	0.00	0.65
Avail Cap(c_a), veh/h	446	1105	1124	503	1102	1141	93	0	499	103	0	511
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	4.6	7.4	7.4	48.2	0.0	43.6	47.6	0.0	43.0
Incr Delay (d2), s/veh	0.1	1.5	1.5	0.0	1.3	1.3	20.1	0.0	3.5	16.7	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	0.5	0.1	4.7	4.9	1.3	0.0	2.3	1.6	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	1.5	1.5	4.6	8.8	8.7	68.3	0.0	47.1	64.3	0.0	46.3
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		1118			1031			134			157	
Approach Delay, s/veh		1.7			8.7			53.6			52.4	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	73.1	7.0	14.5	6.1	72.3	8.0	13.6				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	5.6	38.7	5.6	33.6	5.6	38.7	6.2	33.0				
Max Q Clear Time (g_c+I1), s	2.4	2.0	4.4	8.6	2.8	16.1	5.2	7.9				
Green Ext Time (p_c), s	0.0	22.2	0.0	0.5	0.0	14.9	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay				10.7								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	2	0	71	155	0
Future Vol, veh/h	85	2	0	71	155	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	100	2	0	84	182	0

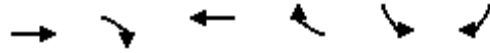
Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	266	182	182	0	0
Stage 1	182	-	-	-	-
Stage 2	84	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	727	866	1405	-	-
Stage 1	854	-	-	-	-
Stage 2	944	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	727	866	1405	-	-
Mov Cap-2 Maneuver	727	-	-	-	-
Stage 1	854	-	-	-	-
Stage 2	944	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1405	-	730	-	-
HCM Lane V/C Ratio	-	-	0.14	-	-
HCM Control Delay (s)	0	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Queues
1: I-5 SB ramps & OR 214













Year 2023 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	770	396	691	625	546	300
v/c Ratio	0.34	0.28	0.39	0.44	0.78	0.49
Control Delay	7.5	0.5	16.6	1.1	44.3	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	0.5	16.6	1.1	44.3	15.6
Queue Length 50th (ft)	94	0	136	0	169	79
Queue Length 95th (ft)	150	0	164	13	212	142
Internal Link Dist (ft)	562		680			
Turn Bay Length (ft)	270		550			
Base Capacity (vph)	2235	1426	1762	1430	1048	625
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.39	0.44	0.52	0.48
Intersection Summary						













HCM Signalized Intersection Capacity Analysis
1: I-5 SB ramps & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗	
Traffic Volume (vph)	0	708	364	0	636	575	0	0	0	502	0	276	
Future Volume (vph)	0	708	364	0	636	575	0	0	0	502	0	276	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5	
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00	
Frbp, ped/bikes		1.00	0.98		1.00	1.00				1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3260	1426		3260	1430				3131		1444	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3260	1426		3260	1430				3131		1444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	770	396	0	691	625	0	0	0	546	0	300	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	81	
Lane Group Flow (vph)	0	770	396	0	691	625	0	0	0	546	0	219	
Confl. Peds. (#/hr)			3	3					1	1			
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	0%	2%	2%	0%	2%	4%	0%	0%	0%	3%	0%	3%	
Turn Type		NA	Free		NA	Free				Prot		Perm	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4 5	
Actuated Green, G (s)		68.6	100.0		54.1	100.0				22.4		36.9	
Effective Green, g (s)		68.6	100.0		54.1	100.0				22.4		36.9	
Actuated g/C Ratio		0.69	1.00		0.54	1.00				0.22		0.37	
Clearance Time (s)		4.5			4.5					4.5			
Vehicle Extension (s)		6.0			4.0					2.5			
Lane Grp Cap (vph)		2236	1426		1763	1430				701		532	
v/s Ratio Prot		0.24			0.21					c0.17			
v/s Ratio Perm			0.28			c0.44						0.15	
v/c Ratio		0.34	0.28		0.39	0.44				0.78		0.41	
Uniform Delay, d1		6.5	0.0		13.4	0.0				36.5		23.5	
Progression Factor		1.00	1.00		1.13	1.00				1.00		1.00	
Incremental Delay, d2		0.4	0.5		0.2	0.9				5.3		0.4	
Delay (s)		6.9	0.5		15.2	0.9				41.7		23.9	
Level of Service		A	A		B	A				D		C	
Approach Delay (s)		4.7			8.4			0.0			35.4		
Approach LOS		A			A			A			D		
Intersection Summary													
HCM 2000 Control Delay			14.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			45.1%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: I-5 SB ramps & OR 214

Year 2023 With Project, Option 3
 Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗
Traffic Volume (veh/h)	0	708	364	0	636	575	0	0	0	502	0	276
Future Volume (veh/h)	0	708	364	0	636	575	0	0	0	502	0	276
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1723	1723	0	1723	1695				1709	0	1709
Adj Flow Rate, veh/h	0	770	0	0	691	0				546	0	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	4				3	0	3
Cap, veh/h	0	2196		0	2196					755	0	346
Arrive On Green	0.00	0.67	0.00	0.00	0.67	0.00				0.24	0.00	0.24
Sat Flow, veh/h	0	3359	1460	0	3359	1437				3158	0	1448
Grp Volume(v), veh/h	0	770	0	0	691	0				546	0	300
Grp Sat Flow(s),veh/h/ln	0	1637	1460	0	1637	1437				1579	0	1448
Q Serve(g_s), s	0.0	10.1	0.0	0.0	8.8	0.0				15.9	0.0	19.9
Cycle Q Clear(g_c), s	0.0	10.1	0.0	0.0	8.8	0.0				15.9	0.0	19.9
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2196		0	2196					755	0	346
V/C Ratio(X)	0.00	0.35		0.00	0.31					0.72	0.00	0.87
Avail Cap(c_a), veh/h	0	2196		0	2196					1058	0	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	0.00	0.00	0.85	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.1	0.0	0.0	6.9	0.0				35.0	0.0	36.5
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.1	0.0				1.2	0.0	10.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	0.0	0.0	2.8	0.0				6.1	0.0	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.5	0.0	0.0	7.0	0.0				36.2	0.0	46.9
LnGrp LOS	A	A		A	A					D	A	D
Approach Vol, veh/h		770	A		691	A					846	
Approach Delay, s/veh		7.5			7.0						40.0	
Approach LOS		A			A						D	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		71.6		28.4		71.6						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		57.5		33.5		42.5						
Max Q Clear Time (g_c+I1), s		12.1		21.9		10.8						
Green Ext Time (p_c), s		16.5		2.0		7.6						

Intersection Summary

HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: I-5 NB ramps & OR 214













Year 2023 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	1078	198	1052	350	213	285	282
v/c Ratio	0.49	0.14	0.48	0.25	0.61	0.80	0.77
Control Delay	10.8	0.2	6.6	0.4	40.0	42.2	39.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	0.2	6.6	0.4	40.0	42.2	39.3
Queue Length 50th (ft)	205	0	72	0	128	143	134
Queue Length 95th (ft)	382	0	183	0	176	216	201
Internal Link Dist (ft)	680		865			472	
Turn Bay Length (ft)							
Base Capacity (vph)	2196	1403	2175	1387	565	533	549
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.14	0.48	0.25	0.38	0.53	0.51
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
2: I-5 NB ramps & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour

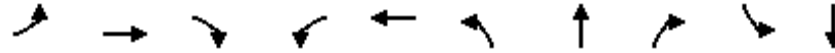
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↕	↗			
Traffic Volume (vph)	0	1013	186	0	989	329	223	0	510	0	0	0
Future Volume (vph)	0	1013	186	0	989	329	223	0	510	0	0	0
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	5.4	5.4	5.4			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frbp, ped/bikes		1.00	1.00		1.00	0.98	1.00	1.00	1.00			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3292	1403		3260	1387	1504	1303	1346			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3292	1403		3260	1387	1504	1303	1346			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1078	198	0	1052	350	237	0	543	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	54	54	0	0	0
Lane Group Flow (vph)	0	1078	198	0	1052	350	213	231	228	0	0	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	1%	6%	0%	2%	5%	5%	0%	5%	0%	0%	0%
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		66.7	100.0		66.7	100.0	23.4	23.4	23.4			
Effective Green, g (s)		66.7	100.0		66.7	100.0	23.4	23.4	23.4			
Actuated g/C Ratio		0.67	1.00		0.67	1.00	0.23	0.23	0.23			
Clearance Time (s)		4.5			4.5		5.4	5.4	5.4			
Vehicle Extension (s)		4.0			6.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		2195	1403		2174	1387	351	304	314			
v/s Ratio Prot		c0.33			0.32							
v/s Ratio Perm			0.14			0.25	0.14	0.18	0.17			
v/c Ratio		0.49	0.14		0.48	0.25	0.61	0.76	0.73			
Uniform Delay, d1		8.2	0.0		8.2	0.0	34.2	35.7	35.4			
Progression Factor		1.03	1.00		0.61	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.7	0.2		0.4	0.4	2.5	10.3	7.7			
Delay (s)		9.2	0.2		5.4	0.4	36.7	46.0	43.0			
Level of Service		A	A		A	A	D	D	D			
Approach Delay (s)		7.8			4.2			42.4			0.0	
Approach LOS		A			A			D			A	
Intersection Summary												
HCM 2000 Control Delay			14.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)				9.9	
Intersection Capacity Utilization			61.5%				ICU Level of Service				B	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Queues
3: Evergreen Rd & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	124	1033	267	247	892	252	250	226	22	109
v/c Ratio	0.41	0.82	0.36	0.74	0.60	0.77	0.76	0.46	0.19	0.62
Control Delay	13.4	32.6	5.6	39.7	18.5	51.9	50.7	7.2	48.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	32.6	5.6	39.7	18.5	51.9	50.7	7.2	48.0	34.0
Queue Length 50th (ft)	28	357	18	76	232	160	158	0	13	21
Queue Length 95th (ft)	69	#444	49	m#249	325	230	227	54	38	#90
Internal Link Dist (ft)		865			282		429			498
Turn Bay Length (ft)	175		250	375		325		290	70	
Base Capacity (vph)	306	1253	733	332	1492	444	449	581	116	175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.82	0.36	0.74	0.60	0.57	0.56	0.39	0.19	0.62

Intersection Summary
























95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	940	243	225	795	16	432	25	206	20	31	68
Future Volume (vph)	113	940	243	225	795	16	432	25	206	20	31	68
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3197	1458	1662	3190		1533	1550	1451	1662	1510	
Flt Permitted	0.22	1.00	1.00	0.12	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	387	3197	1458	215	3190		1533	1550	1451	1662	1510	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	124	1033	267	247	874	18	475	27	226	22	34	75
RTOR Reduction (vph)	0	0	162	0	1	0	0	0	178	0	70	0
Lane Group Flow (vph)	124	1033	105	247	891	0	252	250	48	22	39	0
Confl. Peds. (#/hr)							1		2	2		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	2%	0%	4%	0%	3%	0%	1%	0%	0%	4%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	6		2	2					8			
Actuated Green, G (s)	54.1	39.2	39.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Effective Green, g (s)	54.1	39.2	39.2	54.1	46.7		21.4	21.4	21.4	7.0	7.0	
Actuated g/C Ratio	0.54	0.39	0.39	0.54	0.47		0.21	0.21	0.21	0.07	0.07	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	6.2	6.2	2.5	6.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	303	1253	571	331	1489		328	331	310	116	105	
v/s Ratio Prot	0.03	c0.32		c0.11	0.28		c0.16	0.16		0.01	c0.03	
v/s Ratio Perm	0.19		0.07	0.29					0.03			
v/c Ratio	0.41	0.82	0.18	0.75	0.60		0.77	0.76	0.16	0.19	0.37	
Uniform Delay, d1	12.7	27.3	19.9	19.8	19.7		37.0	36.8	32.0	43.8	44.4	
Progression Factor	0.87	0.93	1.44	1.35	0.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	5.5	0.6	7.8	1.6		9.9	9.0	0.2	0.6	1.6	
Delay (s)	11.7	30.9	29.3	34.5	17.3		46.9	45.8	32.1	44.4	46.0	
Level of Service	B	C	C	C	B		D	D	C	D	D	
Approach Delay (s)		28.9			21.0			41.9			45.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			77.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1056	81	0	1058	0	34
Future Vol, veh/h	1056	81	0	1058	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1173	90	0	1176	0	38

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	632
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	428
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	428
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	428	-	-	-
HCM Lane V/C Ratio	0.088	-	-	-
HCM Control Delay (s)	14.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

Queues
5: Oregon Way & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	1111	86	952	107	59	53	105
v/c Ratio	0.10	0.56	0.26	0.45	0.79	0.28	0.52	0.55
Control Delay	5.9	10.4	6.0	9.6	85.4	21.6	64.7	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	10.4	6.0	9.6	85.4	21.6	64.7	25.2
Queue Length 50th (ft)	6	108	11	138	~81	9	33	13
Queue Length 95th (ft)	m12	185	29	219	#189	47	#82	62
Internal Link Dist (ft)		190		686		135		364
Turn Bay Length (ft)	305		155		150		50	
Base Capacity (vph)	383	1986	331	2115	136	537	105	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.56	0.26	0.45	0.79	0.11	0.50	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Oregon Way & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Traffic Volume (vph)	38	965	90	82	861	44	102	14	42	50	20	80
Future Volume (vph)	38	965	90	82	861	44	102	14	42	50	20	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3157		1662	3205		1662	1538		1662	1528	
Flt Permitted	0.26	1.00		0.20	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	447	3157		345	3205		1662	1538		1662	1528	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	1016	95	86	906	46	107	15	44	53	21	84
RTOR Reduction (vph)	0	4	0	0	2	0	0	39	0	0	77	0
Lane Group Flow (vph)	40	1107	0	86	950	0	107	20	0	53	28	0
Confl. Peds. (#/hr)	3		3	3		3			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	1%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2								
Actuated Green, G (s)	67.1	61.2		67.1	63.5		8.2	11.3		5.1	8.2	
Effective Green, g (s)	67.1	61.2		67.1	63.5		8.2	11.3		5.1	8.2	
Actuated g/C Ratio	0.67	0.61		0.67	0.64		0.08	0.11		0.05	0.08	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	343	1932		309	2035		136	173		84	125	
v/s Ratio Prot	0.00	c0.35		c0.02	0.30		c0.06	c0.01		0.03	c0.02	
v/s Ratio Perm	0.07			0.17								
v/c Ratio	0.12	0.57		0.28	0.47		0.79	0.12		0.63	0.22	
Uniform Delay, d1	6.0	11.6		6.9	9.5		45.0	39.9		46.5	42.9	
Progression Factor	1.41	0.84		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.4	0.8		24.4	0.2		12.7	0.7	
Delay (s)	8.6	10.6		7.3	10.2		69.5	40.1		59.3	43.6	
Level of Service	A	B		A	B		E	D		E	D	
Approach Delay (s)		10.5			10.0			59.0			48.8	
Approach LOS		B			A			E			D	

Intersection Summary

HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
5: Oregon Way & OR 214

Year 2023 With Project, Option 3
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Traffic Volume (veh/h)	38	965	90	82	861	44	102	14	42	50	20	80
Future Volume (veh/h)	38	965	90	82	861	44	102	14	42	50	20	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1695	1736	1750	1709	1750	1750	1750	1750	1750	1750	1736
Adj Flow Rate, veh/h	40	1016	95	86	906	46	107	15	44	53	21	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	4	1	0	3	0	0	0	0	0	0	1
Cap, veh/h	390	1903	178	433	2059	105	93	47	138	66	32	127
Arrive On Green	0.04	1.00	1.00	0.03	0.65	0.65	0.06	0.12	0.12	0.04	0.10	0.10
Sat Flow, veh/h	1667	2971	278	1667	3144	160	1667	391	1146	1667	304	1218
Grp Volume(v), veh/h	40	551	560	86	468	484	107	0	59	53	0	105
Grp Sat Flow(s),veh/h/ln	1667	1611	1638	1667	1624	1680	1667	0	1537	1667	0	1522
Q Serve(g_s), s	0.8	0.0	0.0	1.8	14.0	14.0	5.6	0.0	3.5	3.2	0.0	6.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.8	14.0	14.0	5.6	0.0	3.5	3.2	0.0	6.6
Prop In Lane	1.00		0.17	1.00		0.10	1.00		0.75	1.00		0.80
Lane Grp Cap(c), veh/h	390	1032	1049	433	1063	1100	93	0	185	66	0	158
V/C Ratio(X)	0.10	0.53	0.53	0.20	0.44	0.44	1.15	0.00	0.32	0.80	0.00	0.66
Avail Cap(c_a), veh/h	449	1032	1049	469	1063	1100	93	0	507	103	0	512
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.3	0.0	0.0	5.6	8.4	8.4	47.2	0.0	40.2	47.6	0.0	43.1
Incr Delay (d2), s/veh	0.1	2.0	1.9	0.2	1.3	1.3	138.0	0.0	0.7	16.7	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.6	0.6	4.8	4.9	5.9	0.0	1.4	1.6	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	2.0	1.9	5.7	9.7	9.6	185.2	0.0	41.0	64.3	0.0	46.6
LnGrp LOS	A	A	A	A	A	A	F	A	D	E	A	D
Approach Vol, veh/h		1151			1038			166				158
Approach Delay, s/veh		2.1			9.3			133.9				52.6
Approach LOS		A			A			F				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	68.6	9.6	14.4	6.0	70.0	8.0	16.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	5.6	38.7	5.6	33.6	5.6	38.7	6.2	33.0				
Max Q Clear Time (g_c+I1), s	3.8	2.0	7.6	8.6	2.8	16.0	5.2	5.5				
Green Ext Time (p_c), s	0.0	23.1	0.0	0.5	0.0	14.2	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay					17.0							
HCM 6th LOS					B							

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	116	2	2	71	155	66
Future Vol, veh/h	116	2	2	71	155	66
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	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	136	2	2	84	182	78

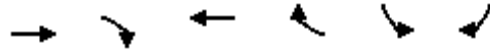
Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	309	221	260	0	0
Stage 1	221	-	-	-	-
Stage 2	88	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	687	824	1316	-	-
Stage 1	821	-	-	-	-
Stage 2	940	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	686	824	1316	-	-
Mov Cap-2 Maneuver	686	-	-	-	-
Stage 1	819	-	-	-	-
Stage 2	940	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	688	-	-
HCM Lane V/C Ratio	0.002	-	0.202	-	-
HCM Control Delay (s)	7.7	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Queues
1: I-5 SB ramps & OR 214













Year 2033 With Project, Option 2
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	828	471	734	715	778	312
v/c Ratio	0.41	0.33	0.48	0.50	0.84	0.45
Control Delay	11.4	0.6	19.6	2.0	41.8	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	0.6	19.6	2.0	41.8	13.5
Queue Length 50th (ft)	132	0	132	20	238	83
Queue Length 95th (ft)	205	0	140	37	282	135
Internal Link Dist (ft)	562		680			
Turn Bay Length (ft)		270		550	650	430
Base Capacity (vph)	2019	1426	1543	1430	1063	694
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.33	0.48	0.50	0.73	0.45
Intersection Summary						













HCM Signalized Intersection Capacity Analysis
 1: I-5 SB ramps & OR 214

Year 2033 With Project, Option 2
 Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗	
Traffic Volume (vph)	0	762	433	0	675	658	0	0	0	716	0	287	
Future Volume (vph)	0	762	433	0	675	658	0	0	0	716	0	287	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5	
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00	
Frbp, ped/bikes		1.00	0.98		1.00	1.00				1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3260	1426		3260	1430				3131		1444	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3260	1426		3260	1430				3131		1444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	828	471	0	734	715	0	0	0	778	0	312	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	62	
Lane Group Flow (vph)	0	828	471	0	734	715	0	0	0	778	0	250	
Confl. Peds. (#/hr)			3	3					1	1			
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	0%	2%	2%	0%	2%	4%	0%	0%	0%	3%	0%	3%	
Turn Type		NA	Free		NA	Free				Prot		Perm	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4 5	
Actuated Green, G (s)		61.5	100.0		47.0	100.0				29.5		44.0	
Effective Green, g (s)		61.5	100.0		47.0	100.0				29.5		44.0	
Actuated g/C Ratio		0.62	1.00		0.47	1.00				0.29		0.44	
Clearance Time (s)		4.5			4.5					4.5			
Vehicle Extension (s)		6.0			4.0					2.5			
Lane Grp Cap (vph)		2004	1426		1532	1430				923		635	
v/s Ratio Prot		0.25			0.23					c0.25			
v/s Ratio Perm			0.33			c0.50						0.17	
v/c Ratio		0.41	0.33		0.48	0.50				0.84		0.39	
Uniform Delay, d1		9.9	0.0		18.1	0.0				33.1		19.0	
Progression Factor		1.00	1.00		0.97	1.00				1.00		1.00	
Incremental Delay, d2		0.6	0.6		0.3	1.1				7.0		0.3	
Delay (s)		10.6	0.6		17.8	1.1				40.0		19.3	
Level of Service		B	A		B	A				D		B	
Approach Delay (s)		7.0			9.6			0.0			34.1		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM 2000 Control Delay			15.6									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			52.5%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: I-5 SB ramps & OR 214

Year 2033 With Project, Option 2
 Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↖↖		↗
Traffic Volume (veh/h)	0	762	433	0	675	658	0	0	0	716	0	287
Future Volume (veh/h)	0	762	433	0	675	658	0	0	0	716	0	287
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1723	1723	0	1723	1695				1709	0	1709
Adj Flow Rate, veh/h	0	828	0	0	734	0				778	0	312
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	4				3	0	3
Cap, veh/h	0	2067		0	2067					880	0	404
Arrive On Green	0.00	0.63	0.00	0.00	0.63	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3359	1460	0	3359	1437				3158	0	1448
Grp Volume(v), veh/h	0	828	0	0	734	0				778	0	312
Grp Sat Flow(s),veh/h/ln	0	1637	1460	0	1637	1437				1579	0	1448
Q Serve(g_s), s	0.0	12.5	0.0	0.0	10.7	0.0				23.6	0.0	19.8
Cycle Q Clear(g_c), s	0.0	12.5	0.0	0.0	10.7	0.0				23.6	0.0	19.8
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2067		0	2067					880	0	404
V/C Ratio(X)	0.00	0.40		0.00	0.36					0.88	0.00	0.77
Avail Cap(c_a), veh/h	0	2067		0	2067					1058	0	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	0.00	0.00	0.79	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.1	0.0	0.0	8.8	0.0				34.5	0.0	33.2
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.1	0.0				7.6	0.0	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0	0.0	3.5	0.0				9.8	0.0	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.7	0.0	0.0	8.9	0.0				42.1	0.0	38.9
LnGrp LOS	A	A		A	A					D	A	D
Approach Vol, veh/h		828	A		734	A					1090	
Approach Delay, s/veh		9.7			8.9						41.2	
Approach LOS		A			A						D	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		67.6		32.4		67.6						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		57.5		33.5		42.5						
Max Q Clear Time (g_c+I1), s		14.5		25.6		12.7						
Green Ext Time (p_c), s		17.7		2.3		8.0						
Intersection Summary												
HCM 6th Ctrl Delay			22.4									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

Queues
2: I-5 NB ramps & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour















Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	1328	206	1171	470	222	348	350
v/c Ratio	0.67	0.15	0.60	0.34	0.50	0.85	0.82
Control Delay	17.4	0.2	9.2	0.4	31.5	47.4	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	0.2	9.2	0.4	31.5	47.4	44.6
Queue Length 50th (ft)	408	0	212	0	118	201	192
Queue Length 95th (ft)	509	m0	230	m0	175	298	284
Internal Link Dist (ft)	680		865			472	
Turn Bay Length (ft)							
Base Capacity (vph)	1987	1403	1967	1387	565	511	528
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.15	0.60	0.34	0.39	0.68	0.66

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: I-5 NB ramps & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour

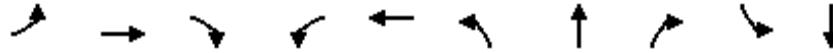
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗	↘	↕	↗			
Traffic Volume (vph)	0	1248	194	0	1101	442	232	0	633	0	0	0
Future Volume (vph)	0	1248	194	0	1101	442	232	0	633	0	0	0
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	5.4	5.4	5.4			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frbp, ped/bikes		1.00	1.00		1.00	0.98	1.00	1.00	1.00			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3292	1403		3260	1387	1504	1301	1346			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3292	1403		3260	1387	1504	1301	1346			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1328	206	0	1171	470	247	0	673	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	25	25	0	0	0
Lane Group Flow (vph)	0	1328	206	0	1171	470	222	323	325	0	0	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	1%	6%	0%	2%	5%	5%	0%	5%	0%	0%	0%
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		60.4	100.0		60.4	100.0	29.7	29.7	29.7			
Effective Green, g (s)		60.4	100.0		60.4	100.0	29.7	29.7	29.7			
Actuated g/C Ratio		0.60	1.00		0.60	1.00	0.30	0.30	0.30			
Clearance Time (s)		4.5			4.5		5.4	5.4	5.4			
Vehicle Extension (s)		4.0			6.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1988	1403		1969	1387	446	386	399			
v/s Ratio Prot		c0.40			0.36							
v/s Ratio Perm			0.15			0.34	0.15	0.25	0.24			
v/c Ratio		0.67	0.15		0.59	0.34	0.50	0.84	0.81			
Uniform Delay, d1		13.1	0.0		12.2	0.0	29.0	32.9	32.6			
Progression Factor		1.06	1.00		0.60	1.00	1.00	1.00	1.00			
Incremental Delay, d2		1.5	0.2		0.6	0.4	0.6	14.2	11.7			
Delay (s)		15.4	0.2		7.9	0.4	29.6	47.1	44.3			
Level of Service		B	A		A	A	C	D	D			
Approach Delay (s)		13.4			5.8			41.8			0.0	
Approach LOS		B			A			D			A	
Intersection Summary												
HCM 2000 Control Delay			16.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)				9.9	
Intersection Capacity Utilization			74.1%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Queues
3: Evergreen Rd & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour


























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	129	1219	574	298	950	352	356	264	23	117
v/c Ratio	0.54	1.07	0.66	1.00	0.70	0.87	0.87	0.46	0.20	0.66
Control Delay	20.3	77.0	8.4	85.5	21.0	57.4	57.5	6.4	48.2	38.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	77.0	8.4	85.5	21.0	57.4	57.5	6.4	48.2	38.3
Queue Length 50th (ft)	29	~447	23	~168	270	216	220	1	14	26
Queue Length 95th (ft)	m72	#586	130	#346	272	#366	#370	59	40	#104
Internal Link Dist (ft)		865			282		429			498
Turn Bay Length (ft)	175		250	375		325		290	70	
Base Capacity (vph)	240	1134	871	297	1366	444	448	606	116	176
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.07	0.66	1.00	0.70	0.79	0.79	0.44	0.20	0.66

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1109	522	271	847	17	615	29	240	21	36	70
Future Volume (vph)	117	1109	522	271	847	17	615	29	240	21	36	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3197	1458	1662	3190		1533	1548	1451	1662	1520	
Flt Permitted	0.18	1.00	1.00	0.11	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	312	3197	1458	197	3190		1533	1548	1451	1662	1520	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	129	1219	574	298	931	19	676	32	264	23	40	77
RTOR Reduction (vph)	0	0	354	0	1	0	0	0	193	0	70	0
Lane Group Flow (vph)	129	1219	220	298	949	0	352	356	71	23	47	0
Confl. Peds. (#/hr)							1		2	2		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	2%	0%	4%	0%	3%	0%	1%	0%	0%	4%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	6		2	2					8			
Actuated Green, G (s)	49.1	35.5	35.5	49.1	42.8		26.4	26.4	26.4	7.0	7.0	
Effective Green, g (s)	49.1	35.5	35.5	49.1	42.8		26.4	26.4	26.4	7.0	7.0	
Actuated g/C Ratio	0.49	0.36	0.36	0.49	0.43		0.26	0.26	0.26	0.07	0.07	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	6.2	6.2	2.5	6.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	238	1134	517	295	1365		404	408	383	116	106	
v/s Ratio Prot	0.03	c0.38		c0.14	0.30		0.23	c0.23		0.01	c0.03	
v/s Ratio Perm	0.23		0.15	0.36					0.05			
v/c Ratio	0.54	1.07	0.43	1.01	0.70		0.87	0.87	0.19	0.20	0.45	
Uniform Delay, d1	16.1	32.2	24.5	29.0	23.3		35.2	35.2	28.5	43.9	44.6	
Progression Factor	1.04	0.95	1.87	1.33	0.75		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	46.0	1.9	52.8	2.7		18.1	18.1	0.2	0.6	2.2	
Delay (s)	18.1	76.7	47.8	91.3	20.2		53.2	53.2	28.7	44.5	46.8	
Level of Service	B	E	D	F	C		D	D	C	D	D	
Approach Delay (s)		64.2			37.2			46.6			46.4	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			51.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			87.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1111	136	0	1140	0	50
Future Vol, veh/h	1111	136	0	1140	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1234	151	0	1267	0	56

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	693
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	390
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	390
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	390	-	-	-
HCM Lane V/C Ratio	0.142	-	-	-
HCM Control Delay (s)	15.8	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.5	-	-	-

Queues
5: Oregon Way & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	1176	22	1091	49	95	55	111
v/c Ratio	0.13	0.52	0.07	0.49	0.52	0.53	0.54	0.56
Control Delay	6.5	10.6	4.3	9.4	65.6	24.7	65.5	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	10.6	4.3	9.4	65.6	24.7	65.5	25.2
Queue Length 50th (ft)	9	137	3	171	31	11	35	14
Queue Length 95th (ft)	m11	m160	10	270	#79	57	#85	65
Internal Link Dist (ft)		190		686		135		364
Turn Bay Length (ft)	305		155		150		50	
Base Capacity (vph)	361	2276	335	2243	97	552	106	572
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.52	0.07	0.49	0.51	0.17	0.52	0.19

Intersection Summary





















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Oregon Way & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1015	103	21	991	46	47	16	74	52	22	84
Future Volume (vph)	43	1015	103	21	991	46	47	16	74	52	22	84
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3154		1662	3207		1662	1517		1662	1530	
Flt Permitted	0.22	1.00		0.20	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	385	3154		349	3207		1662	1517		1662	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	1068	108	22	1043	48	49	17	78	55	23	88
RTOR Reduction (vph)	0	4	0	0	2	0	0	72	0	0	81	0
Lane Group Flow (vph)	45	1172	0	22	1089	0	49	23	0	55	30	0
Confl. Peds. (#/hr)	3		3	3		3			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	1%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2								
Actuated Green, G (s)	71.2	68.9		71.2	67.5		4.7	7.2		5.1	7.6	
Effective Green, g (s)	71.2	68.9		71.2	67.5		4.7	7.2		5.1	7.6	
Actuated g/C Ratio	0.71	0.69		0.71	0.68		0.05	0.07		0.05	0.08	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	321	2173		278	2164		78	109		84	116	
v/s Ratio Prot	c0.01	c0.37		0.00	0.34		0.03	0.01		c0.03	c0.02	
v/s Ratio Perm	0.09			0.05								
v/c Ratio	0.14	0.54		0.08	0.50		0.63	0.21		0.65	0.26	
Uniform Delay, d1	4.9	7.7		4.9	8.0		46.8	43.7		46.6	43.5	
Progression Factor	1.56	1.29		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.1	0.8		12.9	0.7		15.2	0.9	
Delay (s)	7.7	10.3		5.0	8.8		59.7	44.4		61.8	44.4	
Level of Service	A	B		A	A		E	D		E	D	
Approach Delay (s)		10.2			8.8			49.6			50.1	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			14.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			56.4%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
5: Oregon Way & OR 214

Year 2033 With Project, Option 2
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	1015	103	21	991	46	47	16	74	52	22	84
Future Volume (veh/h)	43	1015	103	21	991	46	47	16	74	52	22	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1695	1736	1750	1709	1750	1750	1750	1750	1750	1750	1736
Adj Flow Rate, veh/h	45	1068	108	22	1043	48	49	17	78	55	23	88
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	4	1	0	3	0	0	0	0	0	0	1
Cap, veh/h	352	1994	202	397	2115	97	61	28	128	69	34	130
Arrive On Green	0.04	1.00	1.00	0.01	0.67	0.67	0.04	0.10	0.10	0.04	0.11	0.11
Sat Flow, veh/h	1667	2947	298	1667	3161	145	1667	271	1246	1667	316	1209
Grp Volume(v), veh/h	45	583	593	22	536	555	49	0	95	55	0	111
Grp Sat Flow(s),veh/h/ln	1667	1611	1634	1667	1624	1682	1667	0	1517	1667	0	1524
Q Serve(g_s), s	0.9	0.0	0.0	0.4	16.3	16.3	2.9	0.0	6.0	3.3	0.0	7.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.4	16.3	16.3	2.9	0.0	6.0	3.3	0.0	7.0
Prop In Lane	1.00		0.18	1.00		0.09	1.00		0.82	1.00		0.79
Lane Grp Cap(c), veh/h	352	1090	1106	397	1086	1126	61	0	156	69	0	164
V/C Ratio(X)	0.13	0.54	0.54	0.06	0.49	0.49	0.80	0.00	0.61	0.80	0.00	0.68
Avail Cap(c_a), veh/h	410	1090	1106	467	1086	1126	93	0	501	103	0	512
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	4.9	8.2	8.2	47.8	0.0	42.9	47.5	0.0	42.9
Incr Delay (d2), s/veh	0.1	1.9	1.9	0.0	1.6	1.5	19.9	0.0	2.8	18.5	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.6	0.1	5.5	5.7	1.5	0.0	2.4	1.7	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	1.9	1.9	4.9	9.8	9.7	67.7	0.0	45.7	66.0	0.0	46.5
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		1221			1113			144				166
Approach Delay, s/veh		2.0			9.6			53.2				53.0
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.4	72.2	7.7	14.8	6.1	71.4	8.1	14.3				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	5.6	38.7	5.6	33.6	5.6	38.7	6.2	33.0				
Max Q Clear Time (g_c+I1), s	2.4	2.0	4.9	9.0	2.9	18.3	5.3	8.0				
Green Ext Time (p_c), s	0.0	24.5	0.0	0.5	0.0	14.7	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay				11.2								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	2	0	81	174	0
Future Vol, veh/h	85	2	0	81	174	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	100	2	0	95	205	0

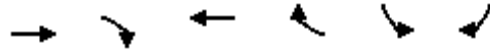
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	300	205	205	0	-	0
Stage 1	205	-	-	-	-	-
Stage 2	95	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	696	841	1378	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	934	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	696	841	1378	-	-	-
Mov Cap-2 Maneuver	696	-	-	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	934	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1378	-	699	-	-
HCM Lane V/C Ratio	-	-	0.146	-	-
HCM Control Delay (s)	0	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Queues
1: I-5 SB ramps & OR 214













Year 2033 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	828	471	735	715	778	312
v/c Ratio	0.41	0.33	0.48	0.50	0.84	0.45
Control Delay	11.4	0.6	19.7	1.9	41.8	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	0.6	19.7	1.9	41.8	13.5
Queue Length 50th (ft)	132	0	132	20	238	83
Queue Length 95th (ft)	205	0	141	37	282	135
Internal Link Dist (ft)	562		680			
Turn Bay Length (ft)		270		550	650	430
Base Capacity (vph)	2019	1426	1543	1430	1063	694
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.33	0.48	0.50	0.73	0.45
Intersection Summary						













HCM Signalized Intersection Capacity Analysis
 1: I-5 SB ramps & OR 214

Year 2033 With Project, Option 3
 Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑	↗				↖↗		↗	
Traffic Volume (vph)	0	762	433	0	676	658	0	0	0	716	0	287	
Future Volume (vph)	0	762	433	0	676	658	0	0	0	716	0	287	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5	
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00	
Frbp, ped/bikes		1.00	0.98		1.00	1.00				1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3260	1426		3260	1430				3131		1444	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3260	1426		3260	1430				3131		1444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	828	471	0	735	715	0	0	0	778	0	312	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	62	
Lane Group Flow (vph)	0	828	471	0	735	715	0	0	0	778	0	250	
Confl. Peds. (#/hr)			3	3					1	1			
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	0%	2%	2%	0%	2%	4%	0%	0%	0%	3%	0%	3%	
Turn Type		NA	Free		NA	Free				Prot		Perm	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4 5	
Actuated Green, G (s)		61.5	100.0		47.0	100.0				29.5		44.0	
Effective Green, g (s)		61.5	100.0		47.0	100.0				29.5		44.0	
Actuated g/C Ratio		0.62	1.00		0.47	1.00				0.29		0.44	
Clearance Time (s)		4.5			4.5					4.5			
Vehicle Extension (s)		6.0			4.0					2.5			
Lane Grp Cap (vph)		2004	1426		1532	1430				923		635	
v/s Ratio Prot		0.25			0.23					c0.25			
v/s Ratio Perm			0.33			c0.50						0.17	
v/c Ratio		0.41	0.33		0.48	0.50				0.84		0.39	
Uniform Delay, d1		9.9	0.0		18.1	0.0				33.1		19.0	
Progression Factor		1.00	1.00		0.97	1.00				1.00		1.00	
Incremental Delay, d2		0.6	0.6		0.3	1.1				7.0		0.3	
Delay (s)		10.6	0.6		17.9	1.1				40.0		19.3	
Level of Service		B	A		B	A				D		B	
Approach Delay (s)		7.0			9.6			0.0			34.1		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM 2000 Control Delay			15.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			52.5%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: I-5 SB ramps & OR 214

Year 2033 With Project, Option 3
 Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↖↖		↗
Traffic Volume (veh/h)	0	762	433	0	676	658	0	0	0	716	0	287
Future Volume (veh/h)	0	762	433	0	676	658	0	0	0	716	0	287
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1723	1723	0	1723	1695				1709	0	1709
Adj Flow Rate, veh/h	0	828	0	0	735	0				778	0	312
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	4				3	0	3
Cap, veh/h	0	2067		0	2067					880	0	404
Arrive On Green	0.00	0.63	0.00	0.00	0.63	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3359	1460	0	3359	1437				3158	0	1448
Grp Volume(v), veh/h	0	828	0	0	735	0				778	0	312
Grp Sat Flow(s),veh/h/ln	0	1637	1460	0	1637	1437				1579	0	1448
Q Serve(g_s), s	0.0	12.5	0.0	0.0	10.7	0.0				23.6	0.0	19.8
Cycle Q Clear(g_c), s	0.0	12.5	0.0	0.0	10.7	0.0				23.6	0.0	19.8
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2067		0	2067					880	0	404
V/C Ratio(X)	0.00	0.40		0.00	0.36					0.88	0.00	0.77
Avail Cap(c_a), veh/h	0	2067		0	2067					1058	0	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.79	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.1	0.0	0.0	8.8	0.0				34.5	0.0	33.2
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.1	0.0				7.6	0.0	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0	0.0	3.5	0.0				9.8	0.0	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.7	0.0	0.0	8.9	0.0				42.1	0.0	38.9
LnGrp LOS	A	A		A	A					D	A	D
Approach Vol, veh/h		828	A		735	A					1090	
Approach Delay, s/veh		9.7			8.9						41.2	
Approach LOS		A			A						D	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		67.6		32.4		67.6						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		57.5		33.5		42.5						
Max Q Clear Time (g_c+I1), s		14.5		25.6		12.7						
Green Ext Time (p_c), s		17.7		2.3		8.0						

Intersection Summary

HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: I-5 NB ramps & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour















Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	1328	206	1173	471	222	348	350
v/c Ratio	0.67	0.15	0.60	0.34	0.50	0.85	0.82
Control Delay	17.4	0.2	9.2	0.4	31.5	47.4	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	0.2	9.2	0.4	31.5	47.4	44.6
Queue Length 50th (ft)	408	0	213	0	118	201	192
Queue Length 95th (ft)	509	m0	229	m0	175	298	284
Internal Link Dist (ft)	680		865			472	
Turn Bay Length (ft)							
Base Capacity (vph)	1987	1403	1967	1387	565	511	528
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.15	0.60	0.34	0.39	0.68	0.66

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 2: I-5 NB ramps & OR 214

Year 2033 With Project, Option 3
 Weekday PM Peak Hour

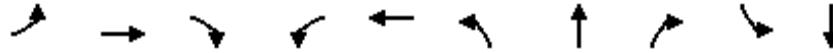
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↕	↗			
Traffic Volume (vph)	0	1248	194	0	1103	443	232	0	633	0	0	0
Future Volume (vph)	0	1248	194	0	1103	443	232	0	633	0	0	0
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	5.4	5.4	5.4			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frbp, ped/bikes		1.00	1.00		1.00	0.98	1.00	1.00	1.00			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3292	1403		3260	1387	1504	1301	1346			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3292	1403		3260	1387	1504	1301	1346			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1328	206	0	1173	471	247	0	673	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	25	25	0	0	0
Lane Group Flow (vph)	0	1328	206	0	1173	471	222	323	325	0	0	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	1%	6%	0%	2%	5%	5%	0%	5%	0%	0%	0%
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		60.4	100.0		60.4	100.0	29.7	29.7	29.7			
Effective Green, g (s)		60.4	100.0		60.4	100.0	29.7	29.7	29.7			
Actuated g/C Ratio		0.60	1.00		0.60	1.00	0.30	0.30	0.30			
Clearance Time (s)		4.5			4.5		5.4	5.4	5.4			
Vehicle Extension (s)		4.0			6.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1988	1403		1969	1387	446	386	399			
v/s Ratio Prot		c0.40			0.36							
v/s Ratio Perm			0.15			0.34	0.15	0.25	0.24			
v/c Ratio		0.67	0.15		0.60	0.34	0.50	0.84	0.81			
Uniform Delay, d1		13.1	0.0		12.2	0.0	29.0	32.9	32.6			
Progression Factor		1.06	1.00		0.60	1.00	1.00	1.00	1.00			
Incremental Delay, d2		1.5	0.2		0.6	0.4	0.6	14.2	11.7			
Delay (s)		15.5	0.2		7.9	0.4	29.6	47.1	44.3			
Level of Service		B	A		A	A	C	D	D			
Approach Delay (s)		13.4			5.8			41.8			0.0	
Approach LOS		B			A			D			A	
Intersection Summary												
HCM 2000 Control Delay			16.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)				9.9	
Intersection Capacity Utilization			74.1%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Queues
3: Evergreen Rd & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	129	1219	574	298	954	352	356	253	23	117
v/c Ratio	0.54	1.07	0.66	1.00	0.70	0.87	0.87	0.44	0.20	0.66
Control Delay	20.5	77.0	8.5	83.5	22.6	57.4	57.5	6.3	48.2	38.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	77.0	8.5	83.5	22.6	57.4	57.5	6.3	48.2	38.3
Queue Length 50th (ft)	30	~447	23	~167	278	216	220	0	14	26
Queue Length 95th (ft)	m72	#586	130	m#330	m313	#366	#370	57	40	#104
Internal Link Dist (ft)		865			282		429			498
Turn Bay Length (ft)	175		250	375		325		290	70	
Base Capacity (vph)	238	1134	871	297	1366	444	448	600	116	176
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.07	0.66	1.00	0.70	0.79	0.79	0.42	0.20	0.66

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.
























95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1109	522	271	851	17	615	29	230	21	36	70
Future Volume (vph)	117	1109	522	271	851	17	615	29	230	21	36	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3197	1458	1662	3190		1533	1548	1451	1662	1520	
Flt Permitted	0.18	1.00	1.00	0.11	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	309	3197	1458	197	3190		1533	1548	1451	1662	1520	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	129	1219	574	298	935	19	676	32	253	23	40	77
RTOR Reduction (vph)	0	0	354	0	1	0	0	0	186	0	70	0
Lane Group Flow (vph)	129	1219	220	298	953	0	352	356	67	23	47	0
Confl. Peds. (#/hr)							1		2	2		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	2%	0%	4%	0%	3%	0%	1%	0%	0%	4%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	6		2	2					8			
Actuated Green, G (s)	49.1	35.5	35.5	49.1	42.8		26.4	26.4	26.4	7.0	7.0	
Effective Green, g (s)	49.1	35.5	35.5	49.1	42.8		26.4	26.4	26.4	7.0	7.0	
Actuated g/C Ratio	0.49	0.36	0.36	0.49	0.43		0.26	0.26	0.26	0.07	0.07	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	6.2	6.2	2.5	6.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	236	1134	517	295	1365		404	408	383	116	106	
v/s Ratio Prot	0.03	c0.38		c0.14	0.30		0.23	c0.23		0.01	c0.03	
v/s Ratio Perm	0.23		0.15	0.36					0.05			
v/c Ratio	0.55	1.07	0.43	1.01	0.70		0.87	0.87	0.17	0.20	0.45	
Uniform Delay, d1	16.1	32.2	24.5	29.0	23.3		35.2	35.2	28.4	43.9	44.6	
Progression Factor	1.04	0.95	1.88	1.25	0.82		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	46.0	1.9	52.1	2.7		18.1	18.1	0.2	0.6	2.2	
Delay (s)	18.2	76.7	47.9	88.4	21.7		53.2	53.2	28.6	44.5	46.8	
Level of Service	B	E	D	F	C		D	D	C	D	D	
Approach Delay (s)		64.2			37.6			46.7			46.4	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			51.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			17.5			
Intersection Capacity Utilization			87.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1156	81	0	1144	0	34
Future Vol, veh/h	1156	81	0	1144	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1284	90	0	1271	0	38

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	687
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	394
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	394
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	394	-	-	-
HCM Lane V/C Ratio	0.096	-	-	-
HCM Control Delay (s)	15.1	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

Queues
5: Oregon Way & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	1214	87	1033	116	61	55	112
v/c Ratio	0.11	0.60	0.29	0.48	1.02	0.31	0.56	0.57
Control Delay	6.4	13.7	6.4	9.8	140.0	22.8	67.1	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	13.7	6.4	9.8	140.0	22.8	67.1	25.3
Queue Length 50th (ft)	8	151	12	157	~93	11	35	15
Queue Length 95th (ft)	m10	m166	29	248	#205	48	#85	65
Internal Link Dist (ft)		190		686		135		364
Turn Bay Length (ft)	305		155		150		50	
Base Capacity (vph)	361	2018	306	2148	114	539	103	572
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.60	0.28	0.48	1.02	0.11	0.53	0.20

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Oregon Way & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	1048	105	83	936	46	110	16	42	52	23	84
Future Volume (vph)	39	1048	105	83	936	46	110	16	42	52	23	84
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3154		1662	3206		1662	1545		1662	1532	
Flt Permitted	0.23	1.00		0.17	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	404	3154		299	3206		1662	1545		1662	1532	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1103	111	87	985	48	116	17	44	55	24	88
RTOR Reduction (vph)	0	5	0	0	2	0	0	39	0	0	81	0
Lane Group Flow (vph)	41	1209	0	87	1031	0	116	22	0	55	31	0
Confl. Peds. (#/hr)	3		3	3		3			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	1%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2								
Actuated Green, G (s)	68.2	62.3		68.2	64.5		6.8	10.3		5.0	8.5	
Effective Green, g (s)	68.2	62.3		68.2	64.5		6.8	10.3		5.0	8.5	
Actuated g/C Ratio	0.68	0.62		0.68	0.64		0.07	0.10		0.05	0.08	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	322	1964		284	2067		113	159		83	130	
v/s Ratio Prot	0.00	c0.38		c0.02	0.32		c0.07	0.01		0.03	c0.02	
v/s Ratio Perm	0.08			0.19								
v/c Ratio	0.13	0.62		0.31	0.50		1.03	0.14		0.66	0.24	
Uniform Delay, d1	5.8	11.5		7.0	9.3		46.6	40.8		46.7	42.7	
Progression Factor	1.56	1.13		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.5		0.4	0.9		92.0	0.3		16.4	0.7	
Delay (s)	9.1	13.6		7.5	10.2		138.6	41.1		63.1	43.4	
Level of Service	A	B		A	B		F	D		E	D	
Approach Delay (s)		13.5			9.9			105.0			49.9	
Approach LOS		B			A			F			D	

Intersection Summary		
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.58	C
Actuated Cycle Length (s)	100.0	Sum of lost time (s)
Intersection Capacity Utilization	64.6%	ICU Level of Service
Analysis Period (min)	15	C
c Critical Lane Group		

HCM 6th Signalized Intersection Summary
5: Oregon Way & OR 214

Year 2033 With Project, Option 3
Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	1048	105	83	936	46	110	16	42	52	23	84
Future Volume (veh/h)	39	1048	105	83	936	46	110	16	42	52	23	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1695	1736	1750	1709	1750	1750	1750	1750	1750	1750	1736
Adj Flow Rate, veh/h	41	1103	111	87	985	48	116	17	44	55	24	88
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	4	1	0	3	0	0	0	0	0	0	1
Cap, veh/h	357	1874	188	404	2049	100	93	53	137	69	35	130
Arrive On Green	0.04	1.00	1.00	0.03	0.65	0.65	0.06	0.12	0.12	0.04	0.11	0.11
Sat Flow, veh/h	1667	2948	296	1667	3151	154	1667	430	1113	1667	327	1199
Grp Volume(v), veh/h	41	602	612	87	508	525	116	0	61	55	0	112
Grp Sat Flow(s),veh/h/ln	1667	1611	1634	1667	1624	1681	1667	0	1543	1667	0	1526
Q Serve(g_s), s	0.8	0.0	0.0	1.8	15.9	15.9	5.6	0.0	3.6	3.3	0.0	7.1
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.8	15.9	15.9	5.6	0.0	3.6	3.3	0.0	7.1
Prop In Lane	1.00		0.18	1.00		0.09	1.00		0.72	1.00		0.79
Lane Grp Cap(c), veh/h	357	1024	1039	404	1056	1093	93	0	190	69	0	165
V/C Ratio(X)	0.11	0.59	0.59	0.22	0.48	0.48	1.24	0.00	0.32	0.80	0.00	0.68
Avail Cap(c_a), veh/h	416	1024	1039	439	1056	1093	93	0	509	103	0	513
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	0.0	5.7	8.9	8.9	47.2	0.0	40.0	47.5	0.0	42.9
Incr Delay (d2), s/veh	0.1	2.5	2.5	0.2	1.6	1.5	172.0	0.0	0.7	18.5	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	0.7	0.6	5.5	5.7	6.8	0.0	1.4	1.7	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.9	2.5	2.5	5.9	10.5	10.4	219.2	0.0	40.8	66.0	0.0	46.5
LnGrp LOS	A	A	A	A	B	B	F	A	D	E	A	D
Approach Vol, veh/h		1255			1120			177				167
Approach Delay, s/veh		2.6			10.1			157.7				52.9
Approach LOS		A			B			F				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.5	68.1	9.6	14.8	6.0	69.5	8.1	16.3				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	5.6	38.7	5.6	33.6	5.6	38.7	6.2	33.0				
Max Q Clear Time (g_c+I1), s	3.8	2.0	7.6	9.1	2.8	17.9	5.3	5.6				
Green Ext Time (p_c), s	0.0	25.3	0.0	0.5	0.0	14.3	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				18.9								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	116	2	2	81	174	66
Future Vol, veh/h	116	2	2	81	174	66
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	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	136	2	2	95	205	78

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	343	244	283	0	0
Stage 1	244	-	-	-	-
Stage 2	99	-	-	-	-
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	657	800	1291	-	-
Stage 1	801	-	-	-	-
Stage 2	930	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	656	800	1291	-	-
Mov Cap-2 Maneuver	656	-	-	-	-
Stage 1	799	-	-	-	-
Stage 2	930	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1291	-	658	-	-
HCM Lane V/C Ratio	0.002	-	0.211	-	-
HCM Control Delay (s)	7.8	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-