

TECHNICAL MEMORANDUM

DATE: February 9, 2024
TO: Brett Perkins, Perk Development
FROM: Alex Atchison, PE, PTOE
SUBJECT: Gravel Point Development – Updated Traffic Assessment
CC: Darren Sandeno
PROJECT NUMBER: 217-8837-002
PROJECT NAME: Gravel Point Development

This technical memorandum analyzes potential traffic impacts of the proposed Gravel Point development in Bandon, Oregon. This traffic assessment is an update to the traffic assessment conducted in September 2023.

All major elements of a formal traffic impact analysis have been included in this updated assessment. This transportation technical memo evaluates traffic volumes, roadway safety conditions, estimated weekday PM peak hour trips generated by the project, and traffic operations for the existing and future conditions.

PROJECT OVERVIEW

The proposed Gravel Point project includes a 110-room hotel and 32 associated suites on a 24.8-acre site along Beach Loop Drive in the City of Bandon, Oregon. The hotel will have amenities that include a spa, meeting rooms and a 258-seat restaurant and bar. Main site access will be off Beach Loop Drive. Additional access will also be provided from Carter Street. The proposed project is anticipated to be constructed by 2026.

Study Area

This traffic assessment evaluates traffic operations at four intersections: Highway 101/Seabird Drive, Beach Loop Drive/Seabird Drive, Beach Loop Drive/11th Street SW, and Beach Loop Drive/Main Site Access. **Figure 1** shows the study area and study intersections. The intersections of Highway 101/Seabird Drive and Beach Loop Drive/Seabird Drive are both stop-controlled on Seabird Drive only. The intersection of Beach Loop Drive/11th Street SW is stop-controlled on all approaches. **Figure 2** illustrates the site access points on Beach Loop Drive and Carter Street SW.



EXPIRES: 12/31/25



Figure 1. Study Area



Figure 2. Site Access

EXISTING TRANSPORTATION FACILITIES

Roadways

Roadway functional classifications are used to determine design standards for roads and are assigned to all public roads using federal guidelines approved by the Federal Highway Administration (FHWA). Roadways are classified using arterial, collector, and local designations, depending on the intended function, type of service, amount of traffic the facility carries, and the adjacent land use needs. Functional classification is designed to serve the transportation needs within the community. In general, arterials serve longer trips and through traffic, have limited access points, and are less desirable for pedestrian and bicycle trips. Collectors connect the arterial system to the local street system. Local streets serve shorter trips with nearby destinations, have frequent access points and are ideal for pedestrian and bicycle trips.

Figure 3 illustrates the functional classifications of the roadways surrounding the project site, as shown in the *Bandon TSP Update - Updated Existing Conditions Report (2023)*.

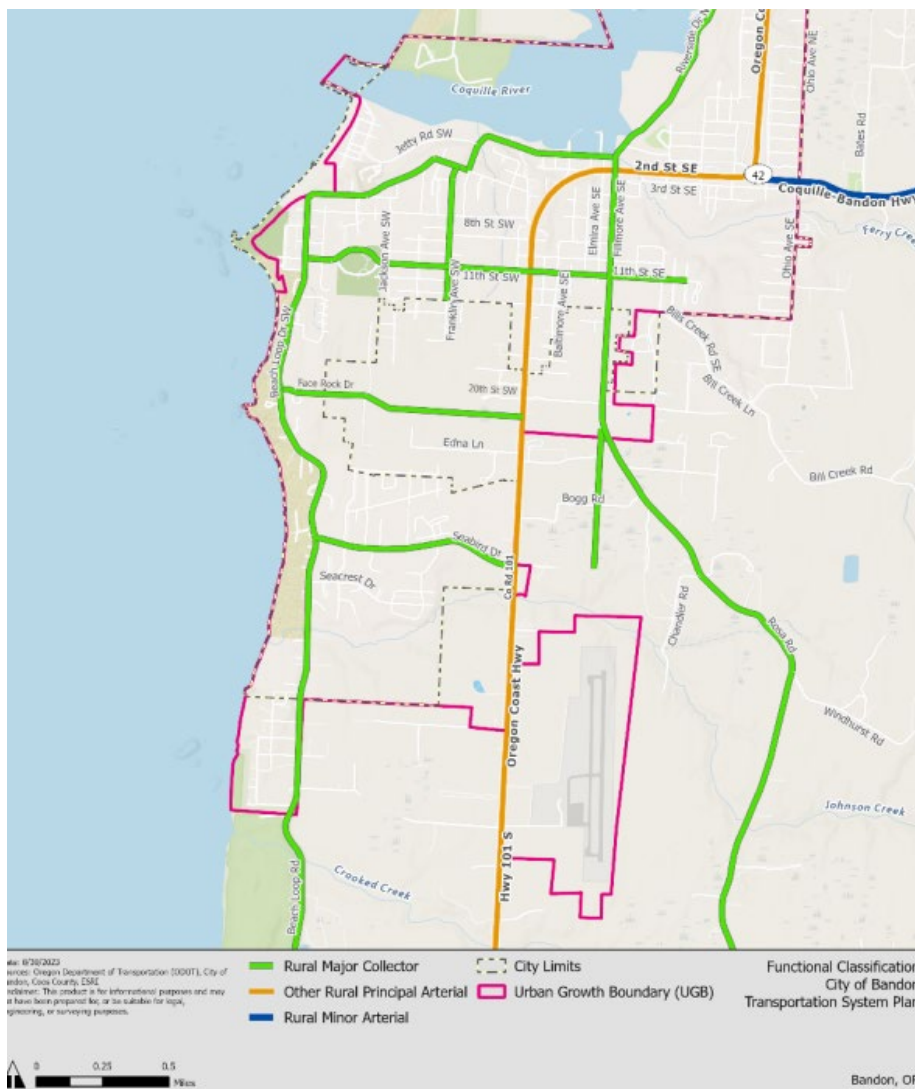


Figure 3. Functional Classification Map
(Source: Bandon TSP Update - Updated Existing Conditions Report (2023))

Descriptions of the roadways supporting the proposed development are included below:

- Highway 101, also known as the Oregon Coast Highway, connects the northern border of Washington with the southern border of California. Highway 101 is under the jurisdictional responsibility of the Oregon Department of Transportation (ODOT). Except for Highway 101, streets located within the city limits of Bandon are the responsibility of the city and streets located outside the city limits are the responsibility of Coos County. Highway 101 is a two-way three-lane facility with two through lanes and one center lane. It is classified as an arterial and has a posted speed of 45 mph.
- Seabird Drive is a two-way, two-lane roadway classified as a major collector. Seabird Drive has a posted speed limit of 30 mph.
- Beach Loop Drive is a two-way, two-lane roadway classified as a major collector. Beach Loop Drive has a posted speed limit of 25 mph.
- 11th Street SW is two-way, two-lane roadway classified as a major collector. 11th Street SW has a posted speed limit of 25 mph.

Multimodal Network

There are no continuous pedestrian and bicyclist facilities on Seabird Drive or Beach Loop Drive to connect the existing multimodal facilities on Highway 101 with Beach Loop Drive. The only currently funded future bicycle and pedestrian project planned by the city is the Jetty Park Trail.

The City's 2000 *Transportation System Plan* identified Seabird Drive for planned sidewalks and bicycle lanes that would eventually connect to a future sidewalk and bicycle network on Beach Loop Drive to the west, a future north-south road from Seabird Drive, and extending across Highway 101 to the east to future roads. These would provide multimodal connections to the activity centers north of the site. Additionally, a future path is planned and shown on the Pedestrian Plan that would connect to Seabird Drive just west of the site and continue north connecting to another path and potentially the schools and the City Park and Community Center. However, these projects are not funded.

The project team is proposing to incorporate a trail system on the project site that will help address pedestrian circulation in the area. The trail system will allow public accessibility to scenic views on site, in accordance with the *City of Bandon Scenic Resource Inventory*.

Transit Service

Bandon's only local public transit service is the Bandon Dial-a-Bus service. There is no fixed route transit service within Bandon. For transportation between other towns on the South Coast, Curry Public Transit's Coastal Express operates on weekdays between North Bend and Smith River, California with stops in Bandon and other coastal towns along the way.

Roadway Safety

Crash Summary

Analysis of recent crash data procured from ODOT shows two reported crashes at the study area intersections between 2016 and 2020. Both crashes occurred at the intersection of Beach Loop Drive and Seabird Drive. Both crashes involved property damage only - one was a crash with a fixed object, and one involved two passenger cars. Neither crash had reported injuries. Crash data is included in Attachment A.

Intersection Sight Distance

The main site driveway connecting to Beach Loop Drive on the inside of a horizontal curve. Sight distance information and requirements are based on the standard reference *A Policy on Geometric Design of Highways and Streets*, 7th Edition published by the American Association of State Highway and Transportation Officials (AASHTO) in 2018, commonly referred to as the Green Book.

For minor-street stop-control intersections, intersection sight triangles are based on guidance cited within Conditions B1 (left-turn from minor road) and B2 (right-turn from minor road) of the Green Book. All distances are measured from a vertex point located 14.5 feet from the major-road travel way along the center of the approaching travel lane, accounting for comfortable positioning distance from the travel way (6.5 feet) and the distance from the front of the vehicle to the driver eye (8.0 feet). The assumed eye height is 3.5 feet above the departing road for passenger vehicles. The object height is also 3.5 feet above the major road, providing enough space on the approaching vehicle to recognize it.

Based on a posted speed of 25 mph and level terrain, the intersection site distance for left-turns from the main site driveway onto Beach Loop Drive is 280 feet and 240 feet for right-turns. **Figure 4** illustrates the recommended intersection sight distance measurements required at the access. Based on field observations, the available sight distance at the proposed access on Beach Loop Drive will meet or exceed the minimum requirements.

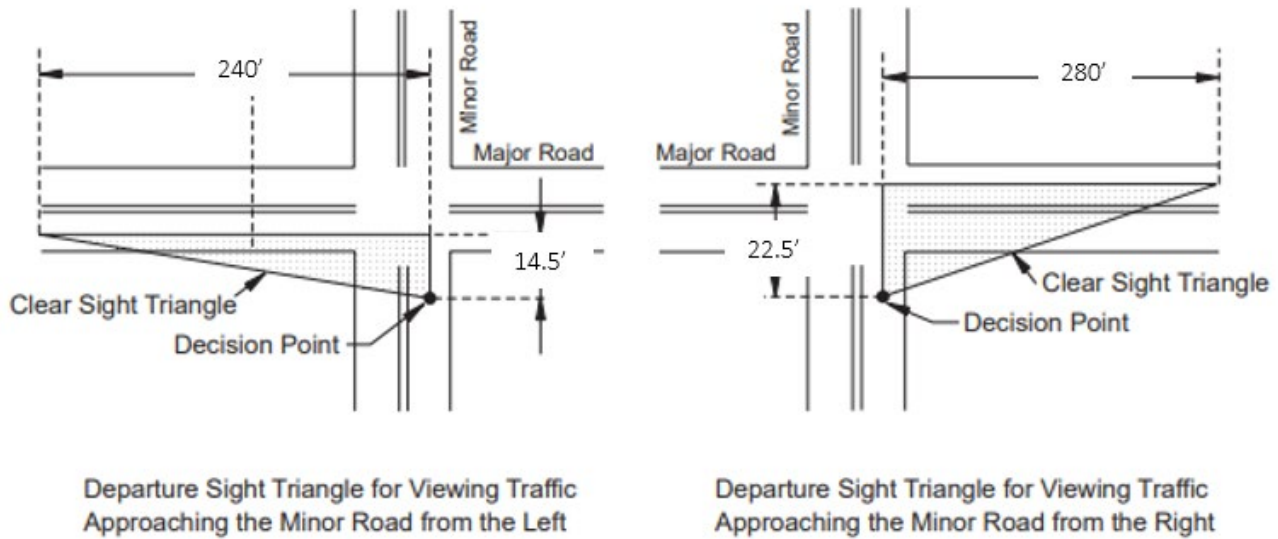


Figure 4. Recommended Intersection Sight Distance Dimensions for Access on Beach Loop Drive

TRAFFIC VOLUMES

Existing conditions traffic operations were analyzed for the study intersections using the 2022 PM Peak hour traffic volumes collected as part of the City’s TSP 2023 update. Traffic counts in the TSP update were collected in July 2022 and adjusted to reflect the 30th highest annual hour of traffic (30 HV conditions).

Per the *TSP Update – Existing Conditions Report* “Because the traffic counts may have been collected during a period when traffic volumes were lower than the 30 HV conditions, a seasonal adjustment factor was calculated as outlined in the ODOT Analysis Procedures Manual (APM; ODOT 2023a). ODOT maintains automatic traffic recorder (ATR) location 06-004 near the study area along U.S. 101, 1,500 feet south of Seabird Drive, so an on-site ATR method was used to determine the seasonal adjustment factor. The percentages of weekday average daily traffic (ADT) for the count months and peak months between 2017 and 2021 were both 132 percent, so no seasonal adjustment factor was applied to the July 2022 counts when developing the 2022 30 HV intersection volumes.”

The *Year 2026 No Build* traffic volumes were estimated by applying a background annual growth of 1.38% to the 2022 traffic volumes. The annual growth rate of 1.38% is the higher of the two growth rates reported in the City’s *Bandon TSP Update - Updated Future Transportation Conditions Report* (2023). Traffic volumes are included in **Attachment A**.

TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

The proposed project includes a resort hotel that includes 110 rooms, 32 suites and a 258-seat restaurant and bar. Trip generation estimates were prepared for the proposed hospitality development based on trip rates identified using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition (2021).

Table 1 summarizes weekday PM peak hour trip generation estimates. The net new total trips do not include project traffic that would be internal to the site (linked trips between the hotel and restaurant uses). To be conservative, trips for the restaurant were calculated as if the use was stand-alone. However, it is anticipated that hotel guests will make up a large majority of the people patronizing the restaurant and bar and the PM peak hour trips generated by the restaurant will be lower than what is shown in Table 1. See **Attachment B** for detailed trip generation calculations.

As shown in Table 1, the development is estimated to generate approximately 121 net new PM peak hour trips (69 in/52 out). Trip distribution patterns are consistent with trip distribution estimates in the *Bandon TSP Update - Updated Future Transportation Conditions Report*, with 75% coming to/from the north on Highway 101, 10% coming from the south on Highway 101, and the remaining 15% coming to/from the north on Beach Loop Drive.

Table 1: Weekday PM Peak Project Trip Generation

Land Use ¹	Unit	Size	Gross Trips Total (in/out) ²	Internal Trips Total (in/out) ³	Net New Trips Total (in/out) ⁴
Resort Hotel (LU 330)	Room	110	45 (19/26)	4 (2/2)	41 (17/24)
Suite Hotel (LU 311)	Room	32	12 (6/6)	0	12 (6/6)
Restaurant (LU 931)	Seats	258	72 (48/24)	4 (2/2)	68 (46/22)
Total			129 (73/56)	8 (4/4)	121 (69/52)

1) Land use from ITE Trip Generation Manual (11th edition)

2) Total vehicle trips based on rates/equations from ITE Trip Generation Manual (11th edition)

3) Trips that would remain internal to the project site and would not use external roads, based on rates from Trip Generation Handbook and NCHRP report 685.

4) Overall new trips that would travel externally to/from the proposed project.

Site Access and Trip Distribution

The main access to the site will be via the driveway on Beach Loop Drive. Additional access will be available via an extension of Carter Street.

It is assumed that all site trips will use the driveway on Beach Loop Drive. Hotel guests using mapping applications such as Google Maps and Wave, etc., will be directed to the site via the Beach Loop Drive access point. Mapping applications gather relevant metadata, including details like roadway classification, capacity, and traffic conditions to determine suggested routes. Roads with higher classifications, such as collector roadways, receive preference over smaller, local streets, especially when congestion is minimal or absent. The city classifies Beach Loop Drive as a collector roadway and Carter Street as a local road, which justifies the assumption that mapping software will logically direct hotel guests to access the Gravel Point development via Beach Loop Drive.

Concerns have been raised within the community regarding the potential for hotel guests to use Carter Street for access. To address these concerns, the proposed secondary access could be closed to through traffic or limited to emergency access and City maintenance. In the event this is not an option, a reasonable assumption of trips to/from the neighborhood were considered that might use the secondary access, consistent with trip distribution used for project trips. These trips were included in the year 2026 Build scenario and evaluated as a worst-case condition. Results show there is adequate capacity on Beach Loop Drive at the proposed site access for local trips from Carter Street.

TRAFFIC OPERATIONS

Traffic operations are often measured by an approach called intersection level of service (LOS). LOS is a scale ranging from A to F in which rankings are based on the delay at a given intersection. LOS A represents the best conditions with minimal amount of delay, and LOS F represents the worst conditions with severe congestion and delay. **Table 2** lists the intersection LOS delay thresholds for signalized intersections and unsignalized intersections.

At signalized and all-way stop-control intersections, LOS is calculated based on the delay of all vehicles entering the intersection. At two-way or one-way stop-control intersections, LOS is calculated and reported based on the worst movement at the intersection.

Table 2. Highway Capacity Manual LOS Ratings

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

Source: *Highway Capacity Manual* (6th Edition), Transportation Research Board, 2022.

Another measure of intersection operations is the volume to capacity (v/c) ratio. V/C is a measure of the adequacy of an intersection geometry and capacity. The v/c ratio is a measure of the capacity sufficiency of the overall intersection and is a good indication of whether the physical geometry design features provide sufficient capacity for the intersection. A v/c ratio of 1.0 indicates that an intersection is operating at capacity.

Traffic analysis was performed to identify intersection operations conditions for comparison to adopted mobility standards. Mobility standards for the study intersections differ, depending on the jurisdiction. The intersection of US 101/Seabird Drive is under ODOT jurisdiction, and the other three intersections are City of Bandon facilities.

Per the *Bandon TSP Update - Updated Existing Conditions Report*, the City does not have adopted LOS standards. However, the City’s *2000 Transportation System Plan*, Volume 6, Section 1 includes Policy 17 on page 339 that the collector street network shall be maintained at Level of Service (LOS) “D” during the peak hour. For this memo, LOS D was used as the measure to assess the mobility at city intersections.

ODOT’s mobility targets are typically based on the intersection location, its classification, and speed. The ODOT mobility standard for the US 101/Seabird Drive intersection is a v/c ratio of 0.80 for Seabird Drive. It should be noted that at unsignalized ODOT intersections, these standards are applicable only to minor street movements.

Study intersections, traffic control, roadway jurisdiction, and operational standards/mobility targets at the study intersections are summarized in **Table 3**.

Table 3: Study Area Intersection Operational Standards and Mobility Targets

Intersection	Traffic Control	Jurisdiction	Performance / Mobility Standard
Highway 101 / Seabird Drive	Minor-Street Stop-Control	ODOT	Seabird Dr v/c ≤ 0.80
Beach Loop Drive / 11 th Street	All-Way Stop-Control	City of Bandon	LOS D
Beach Loop Drive / Seabird Drive	Minor-Street Stop-Control	City of Bandon	LOS D
Beach Loop Drive / Site Access	Driveway Stop-Control	City of Bandon	LOS D

Operations Results

Analysis was performed using Synchro 11 software and implementing the Highway Capacity Manual 6th Edition operations methods for stop-controlled intersections. Operational measures—including LOS, delay, and v/c ratios—of existing year 2023, future year 2026 *No Build*, and future year 2026 *Build* conditions are summarized in **Table 4**. Synchro reports are included in **Attachment C**.

As shown in Table 4, all the study intersections are forecasted to operate well within ODOT and City standards through project buildout in the year 2026.

Table 4: PM Peak Hour Intersection Operations Summary

Intersection	Mobility Standard	2023 Existing			2026 No Build			2026 Build		
		LOS ¹	Delay (sec/veh) ²	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio
Highway 101 / Seabird Drive	Seabird Dr v/c ≤ 0.80	-	-	0.22	-	-	0.28	-	-	0.49
Beach Loop Drive / 11 th Street	LOS D	A	7.6	-	A	7.6	-	A	7.7	-
Beach Loop Drive / Seabird Drive	LOS D	A	9.3	-	A	9.3	-	A	9.7	-
Beach Loop Drive/ Site Access	LOS D	-	-	-	-	-	-	B	10	-

1. LOS is for worst movement; EB = eastbound; WB = westbound
 2. Sec/veh = seconds per vehicle

FINDINGS AND CONCLUSIONS

This technical memorandum summarizes the traffic assessment conducted for the proposed Gravel Point development in the City of Bandon, Oregon. General findings include:

- The project would construct a 110-room hotel and 32 associated suites on a 24.8-acre site along Beach Loop Drive in the City of Bandon, Oregon. The hotel will have amenities that include a spa, meeting rooms and a 258-seat restaurant and bar.
- The proposed project is anticipated to be constructed by 2026.
- The development is estimated to generate approximately 121 new PM peak hour trips.
- With the addition of the project trips, the off-site study intersections are forecast to continue to meet ODOT and City LOS and mobility standards.

REFERENCES

- American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 7th Edition. 2018
- City of Bandon. 2023. UPDATED Existing Conditions – Bandon TSP Update. Prepared by: Parametrix. https://www.cityofbandon.org/sites/default/files/fileattachments/general/page/11333/tm4_updated_existing_conditions_bandon_tsp_2023.pdf Accessed February 2024.
- City of Bandon. 2023. UPDATED Future Transportation Conditions – Bandon TSP Update. Prepared by: Parametrix. https://www.cityofbandon.org/sites/default/files/fileattachments/general/page/11333/tm5_updated_future_conditions_bandon_tsp.pdf Accessed February 2024.
- City of Bandon. 2010. Bandon Transportation Refinement Plan. Prepared by: Davis Evans and Associates, Inc. https://www.cityofbandon.org/sites/default/files/fileattachments/general/page/10146/bandon_transplan_.pdf Accessed August 2023.
- ITE (Institute of Transportation Engineers). 2021. Trip Generation Manual, 11th edition.
- National Research Council (U.S.). Transportation Research Board. (2016). Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Washington. D.C.
- ODOT. 2023. Analysis Procedures Manual, Version 2. <https://www.oregon.gov/odot/Planning/Pages/APM.aspx>. Accessed August 2023.
- Seabird Drive Multifamily Transportation Impact Analysis. 2021. Prepared by Transight Consulting.

ATTACHMENT A – TRAFFIC VOLUMES &
CRASH DATA

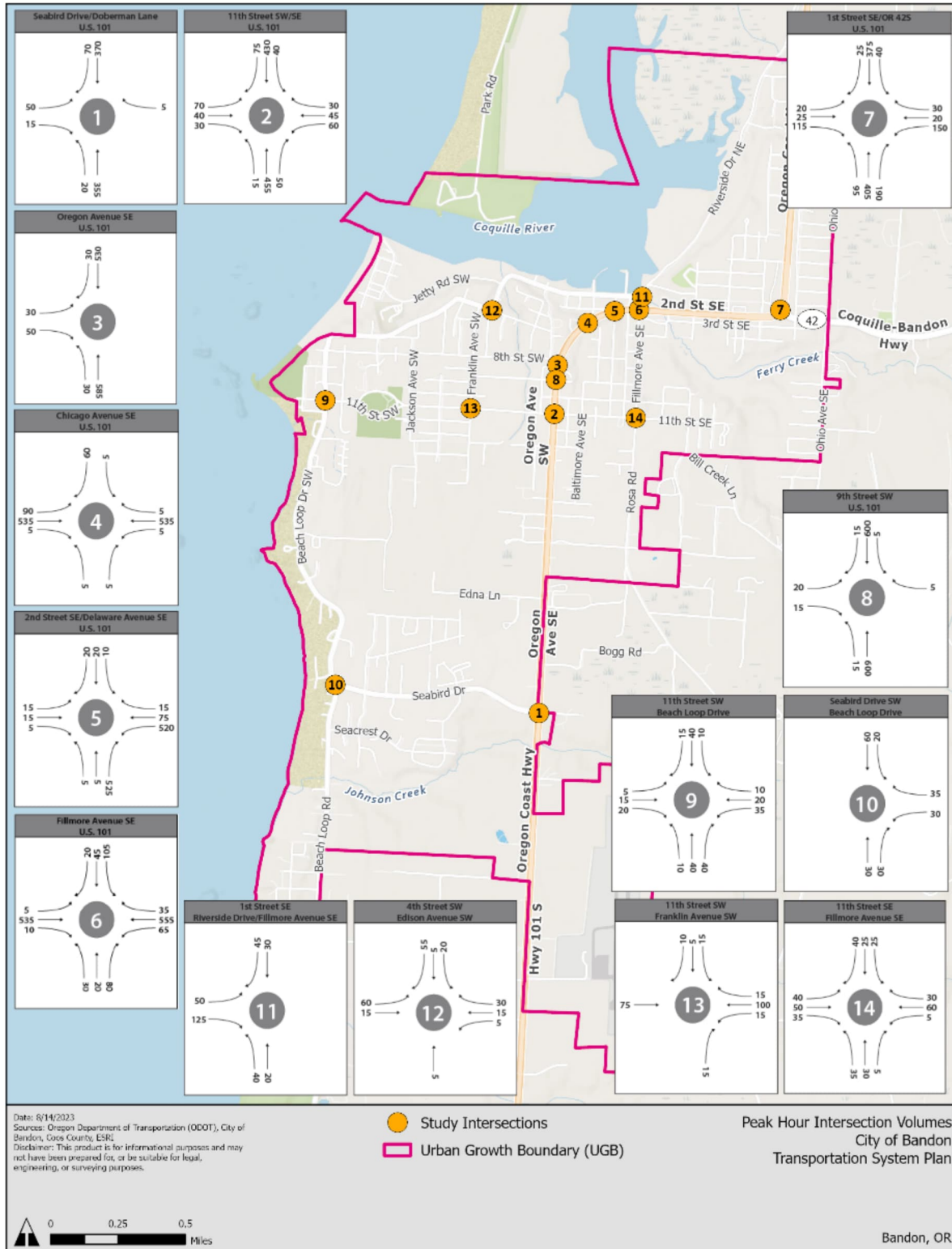


Figure 5-1. Peak Hour Intersection Volumes

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

CITY OF BANDON, COOS COUNTY

BEACH LP DR at SEABIRD DR, City of Bandon, Coos County, 01/01/2013 to 12/31/2022

1 - 2 of 2 Crash records shown.

SER#	S	D	M	P	R	J	S	W	DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE																						
INVEST	E	A	U	I	C	O	DAY			DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE								A	S							
RD DPT	E	L	G	N	H	R	TIME			FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED										
UNLOC?	D	C	S	V	L	K	LAT			LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P#	TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE				
00804	N	N	N	N			09/09/2018			07	BEACH LP DR	INTER	3-LEG	N	Y	CLR	FIX OBJ	01	NONE	9	BACK												100	10	
NONE							SU			0	SEABIRD DR	N		STOP SIGN	N	DRY	FIX	N/A		W	-E											000	00		
N							4P					05	0		N	DAY	PDO		PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK		000	000		000	00		
N							43 5 53.42			-124 25 48.11																									
00172	N	N	N	N	N	N	03/14/2016			07	BEACH LP DR	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE	9	TURN-L														02
NO RPT							MO			0	SEABIRD DR	CN		STOP SIGN	N	DRY	TURN	N/A		E	-S											015	00		
N							2P					03	0		N	DAY	PDO		PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK		000	000		000	00		
N							43 5 53.42			-124 25 48.11																									
																			02	NONE	9	STRGHT											000	00	
																			N/A		N	-S									000	000	00		
																			PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK		000	000		000	00		

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

ATTACHMENT B – TRIP GENERATION

Land Use					Gross Trips ²				Internal Trips ³			Net New Trips ⁵		
	ITE LU	Size	Units	PM Peak Trip Rate	Total Trips	% Inbound	In	Out	Total	In	Out	Total	In	Out
Resort Hotel	330	110	room	0.41	45	43%	19	26	4	2	2	41	17	24
Suite Hotel	311	32	room	0.36	12	49%	6	6	0	0	0	12	6	6
Resturant	931	258	seats	0.28	72	67%	48	24	4	2	2	68	46	22
					129		73	55	8	4	4	121	69	52

PM PEAK HOUR - TRIP GENERATION

- 1) Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition (2021)
- 2) Total vehicle trips based on rates/equations from ITE Trip Generation Manual (11th edition)
- 3) Trips that would remain internal to the project site and would not use external roads, based on rates from Trip Generation Handbook and NCHRP report 685
- 4) Trips already on the adjacent street system that make a stop at the proeject site before continuing to final destination; rate based on ITE Trip Generation Manual (2021 rates); included as turning movements at project access points
- 5) Overall new trips that would travel externally to the proposed project

ATTACHMENT C – SYNCHRO REPORTS

HCM 6th TWSC
1: Highway 101 & Seabird Drive

02/07/2024

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	50	0	15	0	0	5	20	355	0	0	370	70
Future Vol, veh/h	50	0	15	0	0	5	20	355	0	0	370	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	0	16	0	0	5	21	378	0	0	394	74

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	854	851	431	859	888	378	468	0	0	378	0	0
Stage 1	431	431	-	420	420	-	-	-	-	-	-	-
Stage 2	423	420	-	439	468	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	279	297	624	277	283	669	1094	-	-	1180	-	-
Stage 1	603	583	-	611	589	-	-	-	-	-	-	-
Stage 2	609	589	-	597	561	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	273	291	624	266	278	669	1094	-	-	1180	-	-
Mov Cap-2 Maneuver	273	291	-	266	278	-	-	-	-	-	-	-
Stage 1	592	583	-	599	578	-	-	-	-	-	-	-
Stage 2	593	578	-	582	561	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	10.4	0.4	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	314	669	1180	-	-
HCM Lane V/C Ratio	0.019	-	-	0.22	0.008	-	-	-
HCM Control Delay (s)	8.4	-	-	19.7	10.4	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0	0	-	-

HCM 6th TWSC
 2: Beach Loop Road & Seabird Lane SW

02/07/2024

Intersection						
Int Delay, s/veh	3.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	35	30	30	20	60
Future Vol, veh/h	30	35	30	30	20	60
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	40	34	34	23	68

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	165	51	0	0	68	0
Stage 1	51	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	826	1017	-	-	1533	-
Stage 1	971	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	813	1017	-	-	1533	-
Mov Cap-2 Maneuver	813	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	896	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	911	1533
HCM Lane V/C Ratio	-	-	0.081	0.015
HCM Control Delay (s)	-	-	9.3	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	15	20	35	20	10	10	45	45	10	45	15
Future Vol, veh/h	5	15	20	35	20	10	10	45	45	10	45	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	17	22	39	22	11	11	51	51	11	51	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.8	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	12%	54%	14%
Vol Thru, %	45%	38%	31%	64%
Vol Right, %	45%	50%	15%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	40	65	70
LT Vol	10	5	35	10
Through Vol	45	15	20	45
RT Vol	45	20	10	15
Lane Flow Rate	112	45	73	79
Geometry Grp	1	1	1	1
Degree of Util (X)	0.123	0.052	0.088	0.09
Departure Headway (Hd)	3.949	4.15	4.314	4.126
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	894	868	818	855
Service Time	2.035	2.15	2.408	2.215
HCM Lane V/C Ratio	0.125	0.052	0.089	0.092
HCM Control Delay	7.6	7.4	7.8	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

HCM 6th TWSC
1: Highway 101 & Seabird Drive

02/07/2024

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	60	0	15	0	0	5	25	375	0	0	390	85
Future Vol, veh/h	60	0	15	0	0	5	25	375	0	0	390	85
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	0	16	0	0	5	27	399	0	0	415	90

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	916	913	460	921	958	399	505	0	0	399	0	0
Stage 1	460	460	-	453	453	-	-	-	-	-	-	-
Stage 2	456	453	-	468	505	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	253	273	601	251	257	651	1060	-	-	1160	-	-
Stage 1	581	566	-	586	570	-	-	-	-	-	-	-
Stage 2	584	570	-	575	540	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	246	266	601	240	251	651	1060	-	-	1160	-	-
Mov Cap-2 Maneuver	246	266	-	240	251	-	-	-	-	-	-	-
Stage 1	566	566	-	571	556	-	-	-	-	-	-	-
Stage 2	564	556	-	560	540	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	23		10.6		0.5		0	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1060	-	-	279	651	1160	-	-
HCM Lane V/C Ratio	0.025	-	-	0.286	0.008	-	-	-
HCM Control Delay (s)	8.5	-	-	23	10.6	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0	0	-	-

HCM 6th TWSC
2: Beach Loop Road & Seabird Lane SW

02/07/2024

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	40	30	30	25	60
Future Vol, veh/h	30	40	30	30	25	60
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	45	34	34	28	68

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	175	51	0	0	68	0
Stage 1	51	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	815	1017	-	-	1533	-
Stage 1	971	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	800	1017	-	-	1533	-
Mov Cap-2 Maneuver	800	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	885	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	2.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	911	1533
HCM Lane V/C Ratio	-	-	0.087	0.019
HCM Control Delay (s)	-	-	9.3	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	15	20	40	20	10	10	40	45	10	40	15
Future Vol, veh/h	5	15	20	40	20	10	10	40	45	10	40	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	17	22	45	22	11	11	45	51	11	45	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.9	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	12%	57%	15%
Vol Thru, %	42%	38%	29%	62%
Vol Right, %	47%	50%	14%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	40	70	65
LT Vol	10	5	40	10
Through Vol	40	15	20	40
RT Vol	45	20	10	15
Lane Flow Rate	107	45	79	73
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.052	0.094	0.084
Departure Headway (Hd)	3.941	4.132	4.308	4.124
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	896	872	820	855
Service Time	2.029	2.132	2.398	2.214
HCM Lane V/C Ratio	0.119	0.052	0.096	0.085
HCM Control Delay	7.6	7.4	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

HCM 6th TWSC
1: Highway 101 & Seabird Drive

02/09/2024

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	100	0	20	0	0	5	30	375	0	0	390	135
Future Vol, veh/h	100	0	20	0	0	5	30	375	0	0	390	135
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	106	0	21	0	0	5	32	399	0	0	415	144

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	953	950	487	961	1022	399	559	0	0	399	0	0
Stage 1	487	487	-	463	463	-	-	-	-	-	-	-
Stage 2	466	463	-	498	559	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	239	260	581	236	236	651	1012	-	-	1160	-	-
Stage 1	562	550	-	579	564	-	-	-	-	-	-	-
Stage 2	577	564	-	554	511	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	231	252	581	222	228	651	1012	-	-	1160	-	-
Mov Cap-2 Maneuver	231	252	-	222	228	-	-	-	-	-	-	-
Stage 1	544	550	-	560	546	-	-	-	-	-	-	-
Stage 2	554	546	-	534	511	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	32.1		10.6		0.6		0	
HCM LOS	D		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1012	-	-	257	651	1160	-
HCM Lane V/C Ratio	0.032	-	-	0.497	0.008	-	-
HCM Control Delay (s)	8.7	-	-	32.1	10.6	0	-
HCM Lane LOS	A	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.6	0	0	-

HCM 6th TWSC
 2: Beach Loop Road & Seabird Lane SW

02/09/2024

Intersection						
Int Delay, s/veh	5.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	96	30	30	64	65
Future Vol, veh/h	30	96	30	30	64	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	109	34	34	73	74

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	271	51	0	0	68
Stage 1	51	-	-	-	-
Stage 2	220	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	718	1017	-	-	1533
Stage 1	971	-	-	-	-
Stage 2	817	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	682	1017	-	-	1533
Mov Cap-2 Maneuver	682	-	-	-	-
Stage 1	971	-	-	-	-
Stage 2	776	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	3.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	911	1533
HCM Lane V/C Ratio	-	-	0.157	0.047
HCM Control Delay (s)	-	-	9.7	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	15	20	50	20	10	10	45	53	10	45	15
Future Vol, veh/h	5	15	20	50	20	10	10	45	53	10	45	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	17	22	56	22	11	11	51	60	11	51	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	8	7.7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	12%	62%	14%
Vol Thru, %	42%	38%	25%	64%
Vol Right, %	49%	50%	12%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	40	80	70
LT Vol	10	5	50	10
Through Vol	45	15	20	45
RT Vol	53	20	10	15
Lane Flow Rate	121	45	90	79
Geometry Grp	1	1	1	1
Degree of Util (X)	0.137	0.052	0.112	0.093
Departure Headway (Hd)	4.053	4.191	4.468	4.264
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	888	857	805	843
Service Time	2.059	2.206	2.476	2.276
HCM Lane V/C Ratio	0.136	0.053	0.112	0.094
HCM Control Delay	7.7	7.4	8	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.4	0.3

HCM 6th TWSC
16: Beach Loop Road

02/09/2024

Intersection

Int Delay, s/veh 2.3

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	15	85	67	59	44	11
Future Vol, veh/h	15	85	67	59	44	11
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	92	73	64	48	12

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	137	0	0	229	105
Stage 1	-	-	-	105	-
Stage 2	-	-	-	124	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1447	-	-	759	949
Stage 1	-	-	-	919	-
Stage 2	-	-	-	902	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1447	-	-	750	949
Mov Cap-2 Maneuver	-	-	-	750	-
Stage 1	-	-	-	908	-
Stage 2	-	-	-	902	-

Approach	SE	NW	SW
HCM Control Delay, s	1.1	0	10
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1
Capacity (veh/h)	-	-	1447	- 783
HCM Lane V/C Ratio	-	-	0.011	- 0.076
HCM Control Delay (s)	-	-	7.5	0 10
HCM Lane LOS	-	-	A	A B
HCM 95th %tile Q(veh)	-	-	0	- 0.2