Exhibit E

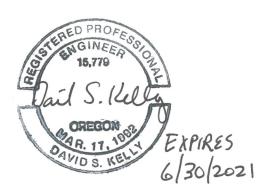
TRANSPORTATION IMPACT STUDY

FOR

SANDY WOODS PHASE 2

SOUTH OF KELSO ROAD AND WEST OF JEWELBERRY AVENUE

CITY OF SANDY, OREGON



PREPARED BY
KELLY ENGINEERING

March 2021

TRANSPORTATION IMPACT STUDY

Sandy Woods Phase 2

City of Sandy, Oregon

March 3, 2021

Prepared for:

Rosemont Development Attn: Rob Venema 10117 SE Sunnyside Rd., Suite F1178 Clackamas, OR 97015

Prepared by:

Kelly Engineering 1805 NE 94th St. No. 19 Vancouver, WA 98665 Phone: 360-433-7530

e-mail: Kellyengineer@comcast.net

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TRANSPORTATION IMPACT STUDY

Sandy Woods Phase 2

March 3, 2021

INTRODUCTION

A transportation impact study (TIS) for the Sandy Woods Phase 2 development was conducted to determine the potential traffic related impacts of the development to the surrounding roadway system. The site is located on the south side of SE Kelso Road and west of SE Jewelberry Avenue in the City of Sandy. Phase 1 of the development is located to the south. A tract of land and the Bonneville Power Administration (BPA) power lines separates the two phases. There will be no roadway connection between the two phases.

The development will consist of 43 single-family detached homes. The Sandy Crest Phase 2 development was based on discussions with staff from the City of Sandy and Clackamas County. SE Kelso Road is within the jurisdiction of Clackamas County.

Land uses in the vicinity of the site consist of single family homes and undeveloped land. A vicinity map, aerial photograph and site plan are shown in Figures 1a, 1b and 1c.

Roadway Characteristics

The site will have access onto SE Kelso Road. SE Kelso Road is a two lane paved roadway with a posted speed limit of 45 mph. The roadway is classified as a Minor Arterial.

The Bluff Road/SE Kelso Road intersection is controlled by stop signs on the SE Kelso Road approaches. The SE Orient Drive/SE Kelso Road intersection was recently converted to all way stop sign control. The lane configurations for the intersections are shown in Figure 2.

Traffic Volumes

The traffic counts in this report were obtained from the Sandy Bluff Annex 6 Subdivision & Future Development Transportation Impact Study. The study was prepared by Lancaster Engineering in 2017 and included an analysis of several intersections in the area. The Sandy Bluff development is located south of the Sandy Woods Phase 2 development.

The traffic counts in the Sandy Bluff Annex 6 Subdivision & Future Development transportation impact study were conducted from 7:00 to 9:00 am and 4:00 to 6:00 pm during October 2017. The AM peak hour occurred between approximately 7:00 to 8:00 am and the PM peak hour occurred between approximately 4:00 to 5:00 pm at the SE Orient Drive/SE Kelso Road intersection and 4:45 to 5:45 pm at the Bluff Road/SE Kelso Road intersection. The peak hour at the intersections is the one hour time period when traffic on the adjacent streets are the highest and congestion is most likely to occur. The existing traffic volumes for 2017 are shown in Figure 3. The raw traffic count data is shown in Appendix A.

As a result of the current service oriented facility and other required closures there has been a noticeable decline in traffic volumes on the roadway systems. Therefore, the traffic counts used in this report for 2017 were assumed to have an adjustment factor of 2.5% per year to current year. The adjustment factor was based on historical traffic counts obtained from Clackamas County. The historical traffic counts at two locations on SE Kelso Road are included in Appendix B. Data from the permanent count stations on SE Kelso Road were used to evaluate the decline in traffic volumes due to the "Stay Home, Stay Safe" orders associated with the COVID-19 pandemic. The adjusted traffic volumes are shown in Figure 4.

Trip Generation/Distribution

The Sandy Woods Phase 2 development could generate approximately 406 trips per day, ITE <u>Trip Generation Manual</u>, 10th edition. A trip is a one directional vehicle movement. 32 trips could occur during the AM peak hour and 43 trips could occur during the PM peak hour. The trip generation rates are shown in Table 1.

Table 1
Site Traffic Generation
Sandy Woods Phase 2

	ITE	Dwell	Daily	AM Peak Hour	PM Peak Hour
Land Use	code	units	Trips	Trips	Trips
Proposed Single Family Homes	210	43	406	32 (in-8, out-24)	43 (in-27, out-16)

The directional distribution of traffic generated by the development was assigned to the study area intersections. Based on the existing traffic volumes and a survey conducted along the site frontage it was assumed that 55% of the site trips will travel to and from the west on SE Kelso Road and 45% will travel to and from the east towards Bluff Road. At the SE Kelso Road/SE Orient Drive intersection 20% will travel to and from the north on SE Orient Drive and 5% will travel to and from the south. 30% will continue towards the west on SE Kelso Road towards US-26. The site traffic distribution and assignment diagram is shown in Figure 6.

Year 2023 Traffic Volumes

The assumption was made in this report that build out of the Sandy Woods Phase 2 development will occur within two years. A 2.5 percent per year compounded growth rate was used at the study area intersections for the year 2023 planning horizon.

In addition to the traffic growth rate in-process traffic from the Jewelberry Meadows Subdivision was included. In-process traffic is traffic from developments that have been approved, but are not generating full build out traffic volumes. The Jewelberry Meadows Subdivision is a 20 lot subdivision located east of SE Jewelberry Avenue and north of the Penny Street intersection. The in-process traffic was obtained from the City of Sandy's Development Activity Map and correspondence with staff from the City of Sandy.

Peak Hour Traffic Operations

The scope of the transportation impact study was based on discussions with staff from the City of Sandy and Clackamas County. Based on the discussions an analysis was conducted at the following intersections during the weekday AM and PM peak hours:

- (1) SE Kelso Road & SE Orient Drive
- (2) SE Kelso Road. & Bluff Road
- (3) SE Kelso Road & site access

The study area intersections and were analyzed to determine existing, year 2023 without project and year 2023 with project conditions. The year 2023 traffic volumes without and with the project are shown in Figures 5 and 7.

The intersection operational analysis was conducted using the procedures in the 2010 <u>Highway Capacity Manual</u>. These procedures describe the operation of an intersection in terms of its level of service (LOS). The LOS criteria ranges from "A", which indicates little, if any, delay to "F", which indicates that vehicles experience very long delays. The LOS criteria with the corresponding delay in seconds per vehicle is shown in Table 2. The capacity analysis summary is shown in Table 3.

Table 2
Level of Service Criteria

Level of Service (LOS)	A	В	С	D	Е	F
Unsignalized intersections						
Average Delay (seconds per vehicle)	≤10	>10 - 15	>15 - 25	>25 - 35	>35 - 50	>50

Table 3
Capacity Analysis Summary

	AM Po	eak Hour	PM P	eak Hour
	LOS	Delay	LOS	Delay
		(sec/veh)		(sec/veh)
SE Orient Drive & SE Kelso Road	!			
Existing	В	11.0	В	10.8
Year 2022 w/o Project	В	11.5	В	11.4
Year 2022 with Project	В	11.8	В	11.7
Bluff Road & SE Kelso Road				
Existing	В	13.5	В	12.6
Year 2023 w/o Project	В	14.0	В	12.9
Year 2023 with Project	В	14.3	В	13.3
SE Kelso Road & site access				
Existing	n/a			
Year 2022 w/o Project	n/a			
Year 2022 with Project	В	11.2	В	11.3

Based on the findings of this TIS the study area intersections will operate at acceptable levels with build out of the Sandy Woods Phase 2 development. The LOS computer printouts are included in Appendix E.

Pedestrian/Bicycle/Transit Considerations

No pedestrian or bicycle activities were observed within the vicinity of the site along SE Kelso Road during field observations. The site is not served by public transit service.

Sight Distance

Sight distance was measured at the proposed site access onto SE Kelso Road. The measured corner sight distance was over 500 feet when looking towards the east and west. Based on the posted speed limit of 45 mph on SE Kelso Road and the criteria in AASHTO, <u>A Policy on Geometric</u> Design of Highways and Streets, 2011 the sight distance requirement is met.

Turn Lanes

A left turn lane improves safety and increases the capacity of the roadway by reducing the speed differential between the through and left turn vehicles. The requirement for a left turn lane was evaluated at the study area intersections as based on ODOT guidelines (ODOT Highway Design Manual, 2012). Based on the findings a southbound left turn at the SE Orient Drive/SE Kelso Road intersection is justified as based on volumes during the PM peak hour under existing conditions. The left turn lane criterion for southbound traffic at the intersection is shown in Appendix D. However, the SE Orient Drive/SE Kelso Road intersection was recently converted to all way stop sign control and a left turn lane is no longer necessary. This issue was also addressed in the Sandy Bluff Annex 6 Subdivision & Future Development Transportation Impact Study prepared by Lancaster Engineering.

Traffic Signal Warrant Analysis

The need for a traffic signal was examined at the study area intersections. Due to the low volume of traffic on the minor and major street approaches traffic signals are not justified.

Transportation Improvements

The City of Sandy and the Oregon State Department of Transportation are currently updating the Transportation System Plan (TSP). The TSP will review community, business, visitor and stakeholder input to identify and prioritize future transportation projects and investments. The current TSP was last completed in 2011. The 2011 TSP and Transportation Capital Project List identifies no motor vehicle system projects within the vicinity of the Sandy Woods Phase 2 development.

Collision Data

Collision data was obtained from ODOT for the most recent five years of available data. The collision data is shown in Table 4 and Appendix C.

Table 4
Collision Data

				Collision Type			
Intersection	Number of Collisions	Angle	Backing	Rear End	Turning Movements	Fixed Object	Rate MEV*
SE Orient Drive/							7
SE Kelso Road	25	14	1	4	6		1.8
Bluff Road/ SE Kelso Road	3			1	1	1	0.4

Based on the available data 25 accidents have been reported to ODOT at the SE Orient Drive/SE Kelso Road intersection during the previous five years. The 25 accidents equate to an accident rate of 1.8 accidents per million entering vehicles (MEV). This is above the threshold of 1.0 accidents per MEV that usually identifies an intersection with a high accident rate. The majority of accidents at the intersection were angle type collisions. Angle type collisions can be caused by restricted sight distance, a large total intersection volume or a high approach speed. The sight distance at the intersection is adequate and the total entering volumes is also not excessive given the acceptable level of service. The appropriate countermeasure would be to install all way stop sign control at the intersection and this was recently done. Therefore, the accident rate should be significantly reduced.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this transportation impact study the surrounding roadway system can adequately accommodate traffic from the Sandy Woods Phase 2 development. No off site transportation improvements or traffic control devices were identified to accommodate the development.

Adequate sight distance should be maintained at the site access onto SE Kelso Road. Obstructions by landscaping, signs or other objects should not be allowed.

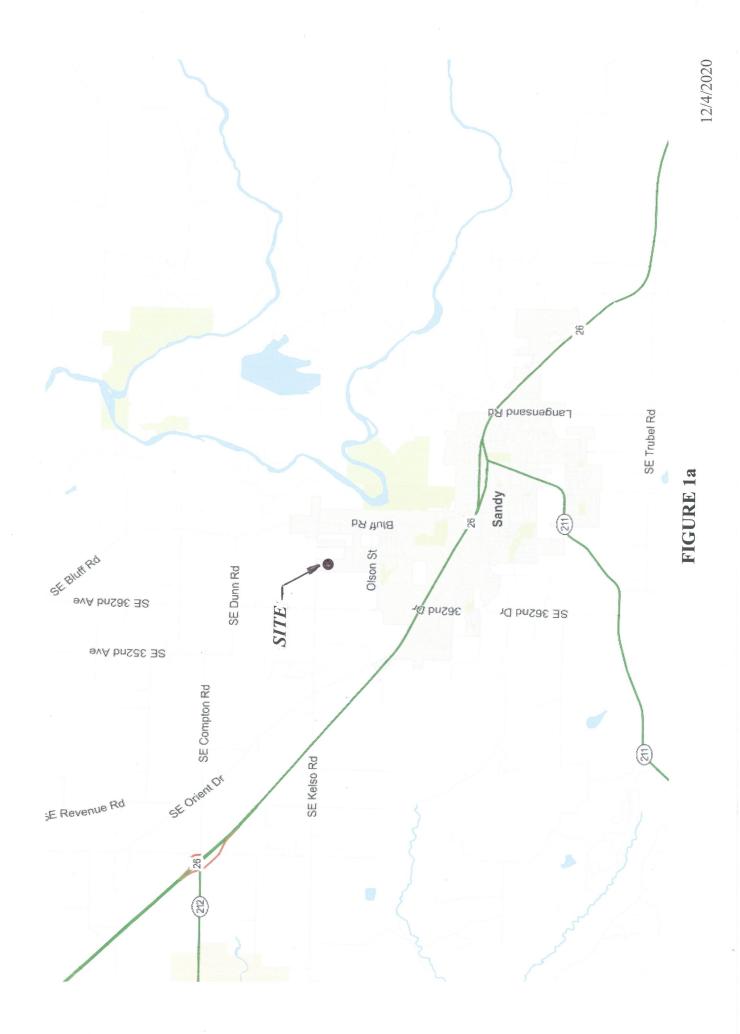
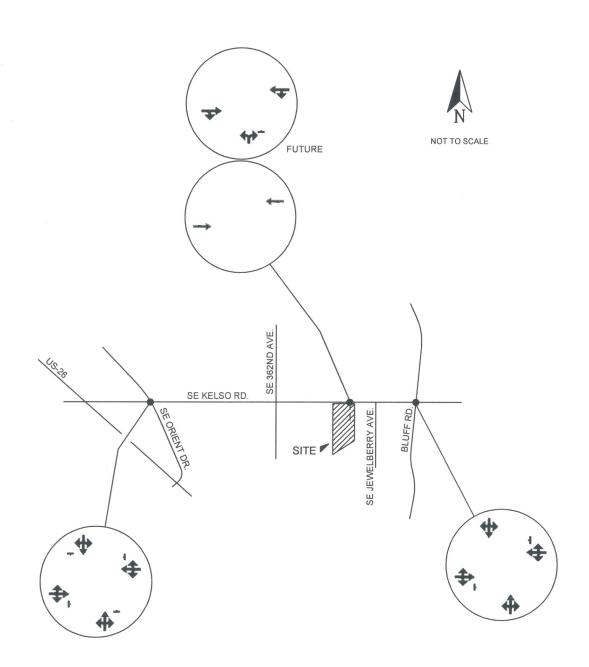




FIGURE 1b



FIGURE 1c



LEGEND

STOP SIGN

EXISTING CONDITIONS UNLESS NOTED

SANDY WOODS PHASE 2

FIGURE 2 LANE CONFIGURATIONS

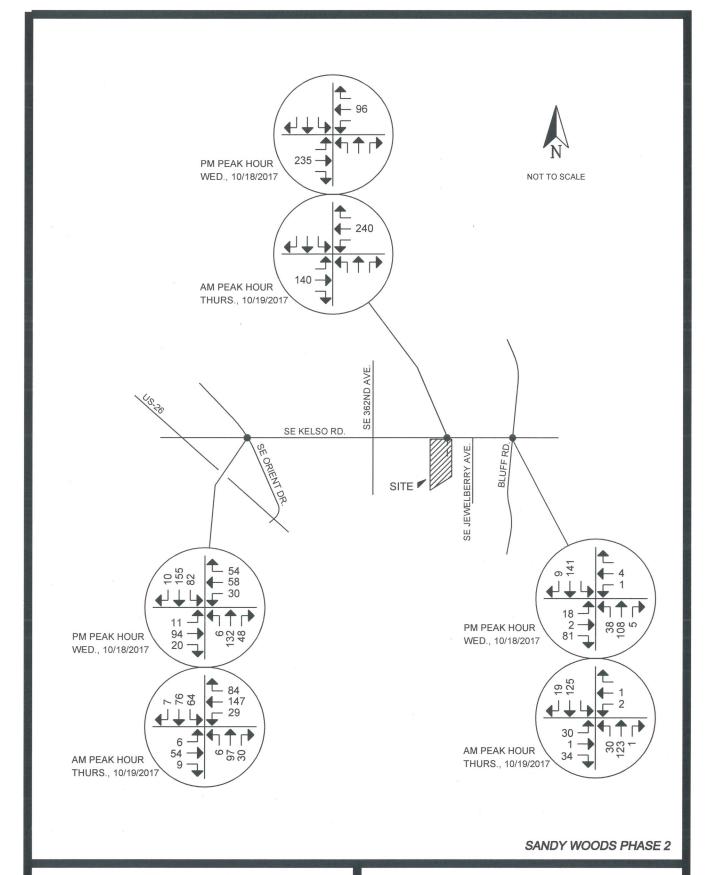


FIGURE 3 EXISTING TRAFFIC VOLUMES YEAR 2017

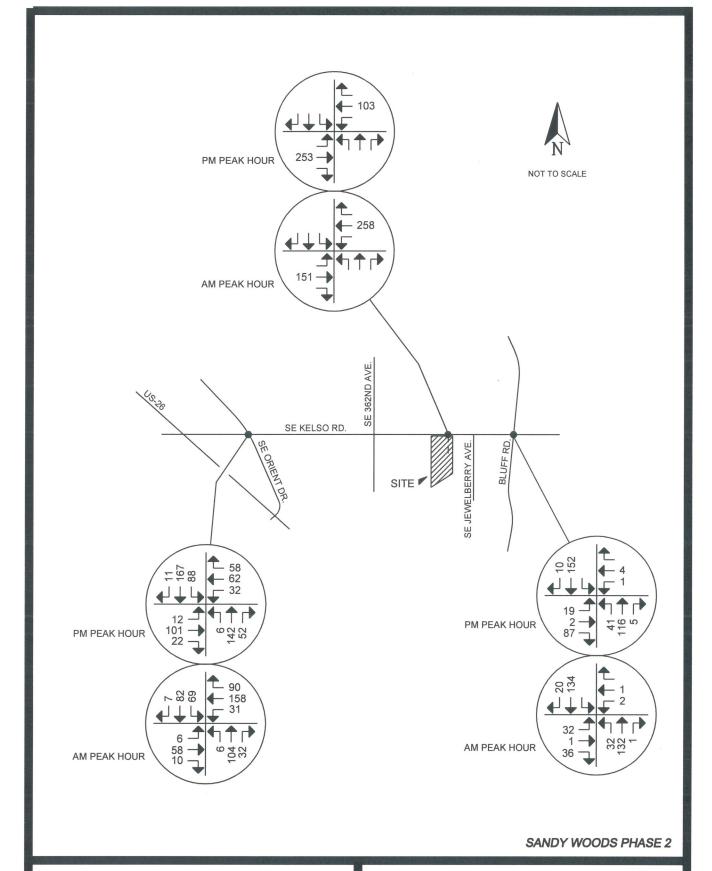


FIGURE 4 ADJUSTED TRAFFIC VOLUMES YEAR 2021

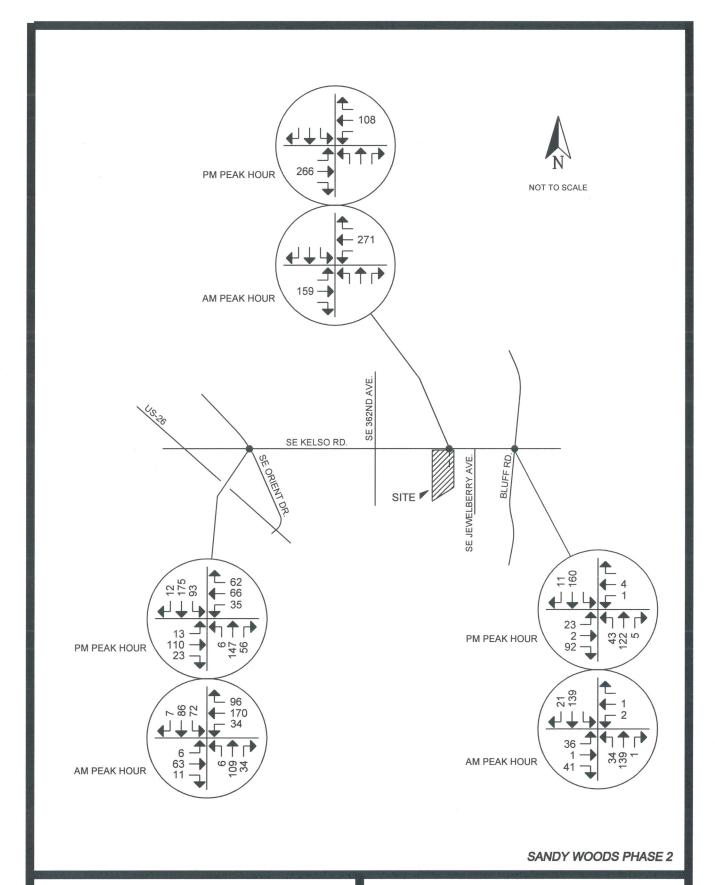


FIGURE 5 YEAR 2023 TRAFFIC VOLUMES W/O PROJECT

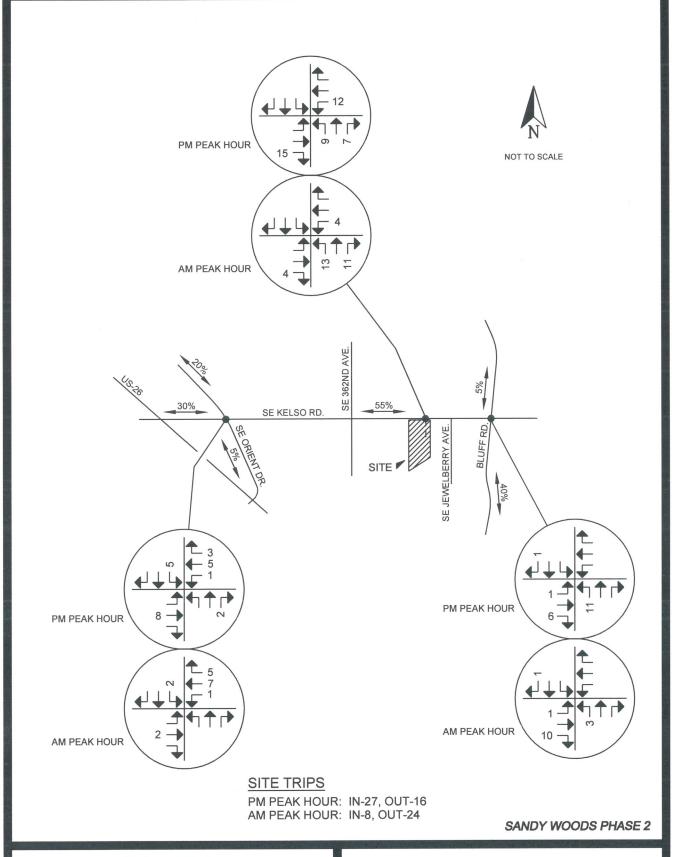


FIGURE 6 SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT

KELLY ENGINEERING

1805 NE 94th St., No. 19, Vancouver, WA 98665

Phone: 360-433-7530

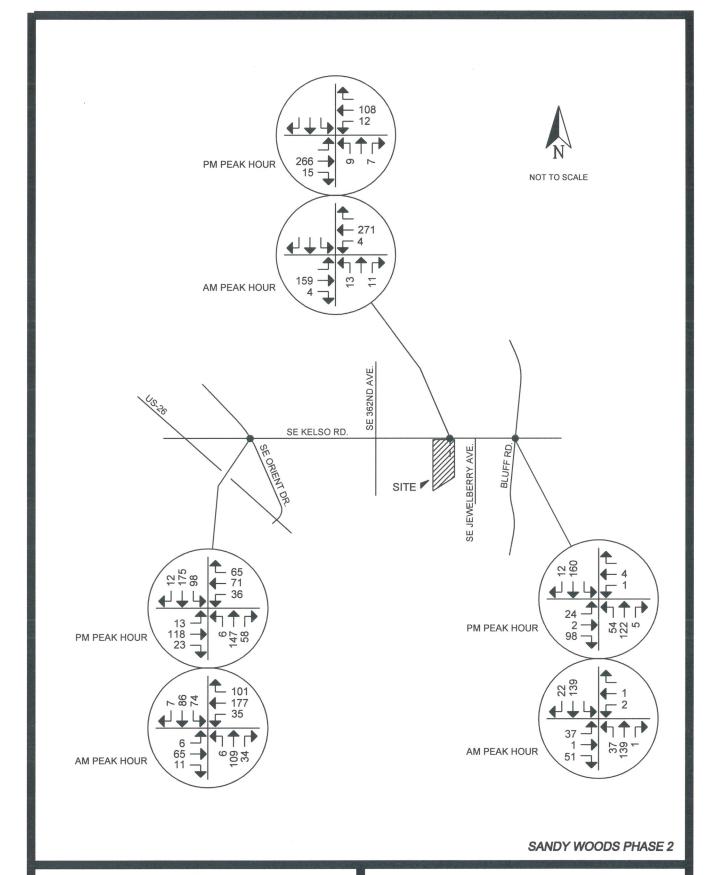
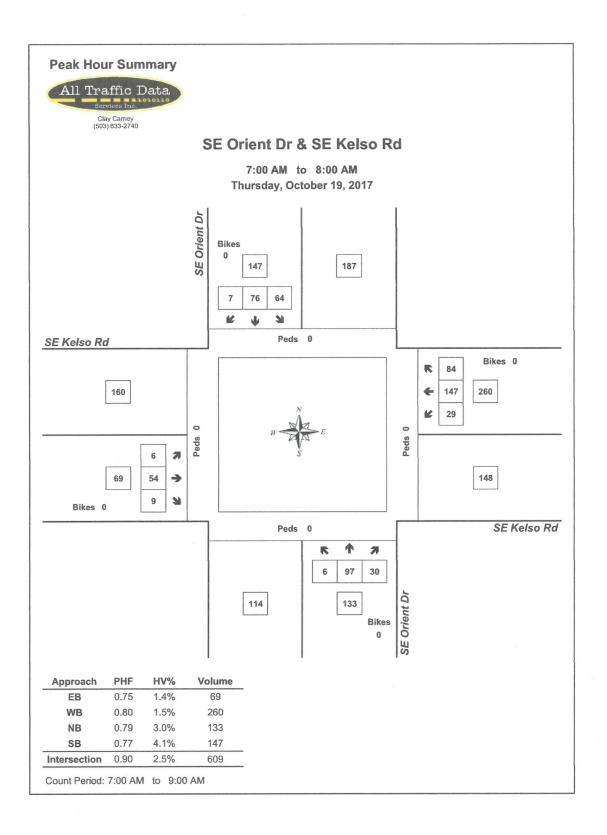
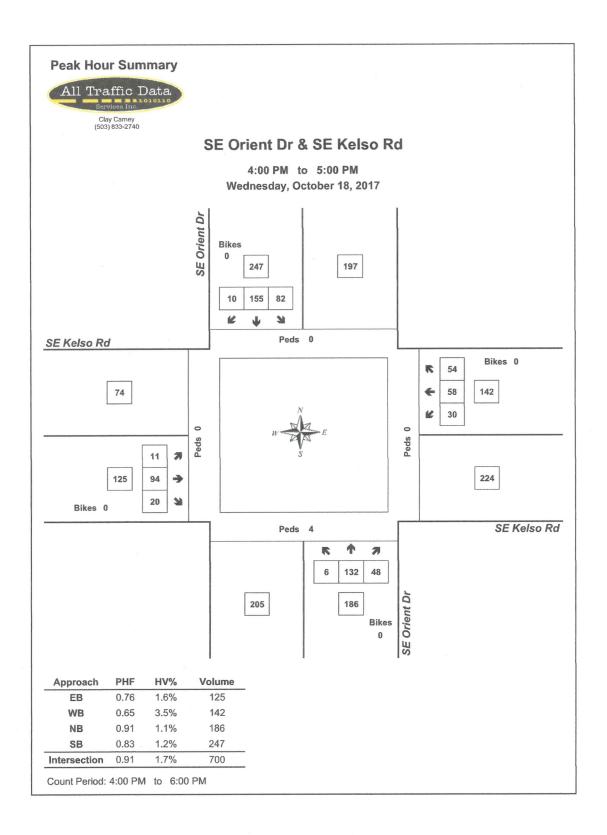


FIGURE 7
YEAR 2023 TRAFFIC VOLUMES
WITH PROJECT

APPENDIX A RAW TRAFFIC COUNT DATA





Peak Hour Summary

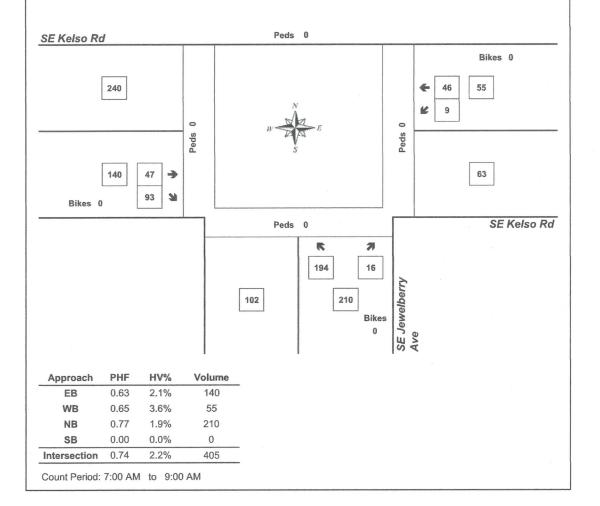


Clay Carney (503) 833-2740

SE Jewelberry Ave & SE Kelso Rd

7:00 AM to 8:00 AM Thursday, October 19, 2017

Bikes



Peak Hour Summary

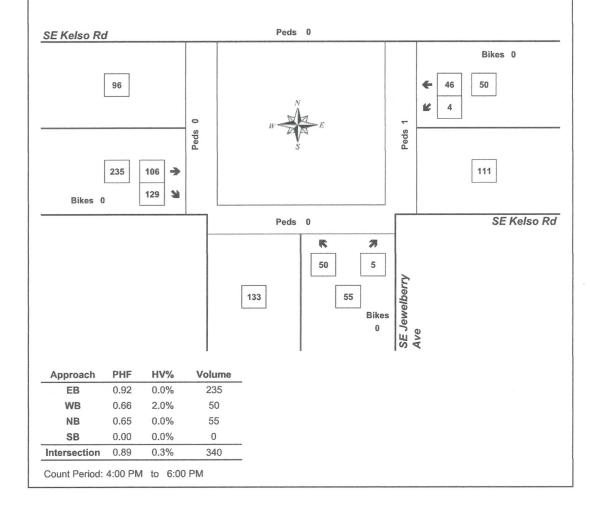


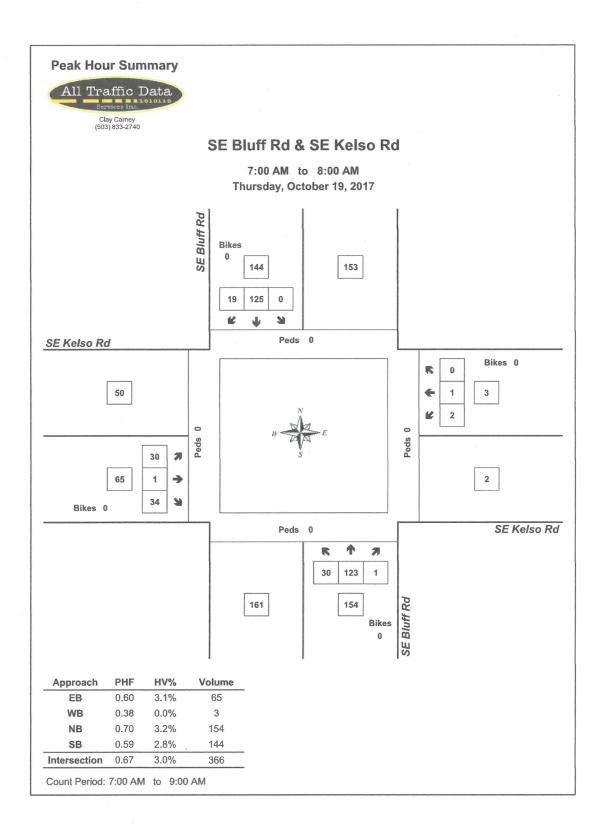
Clay Carney (503) 833-2740

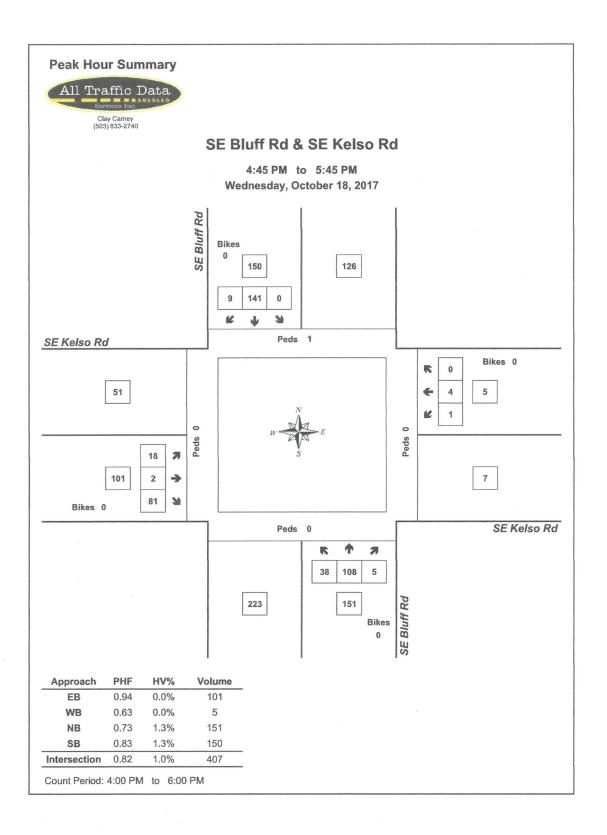
SE Jewelberry Ave & SE Kelso Rd

4:55 PM to 5:55 PM Wednesday, October 18, 2017

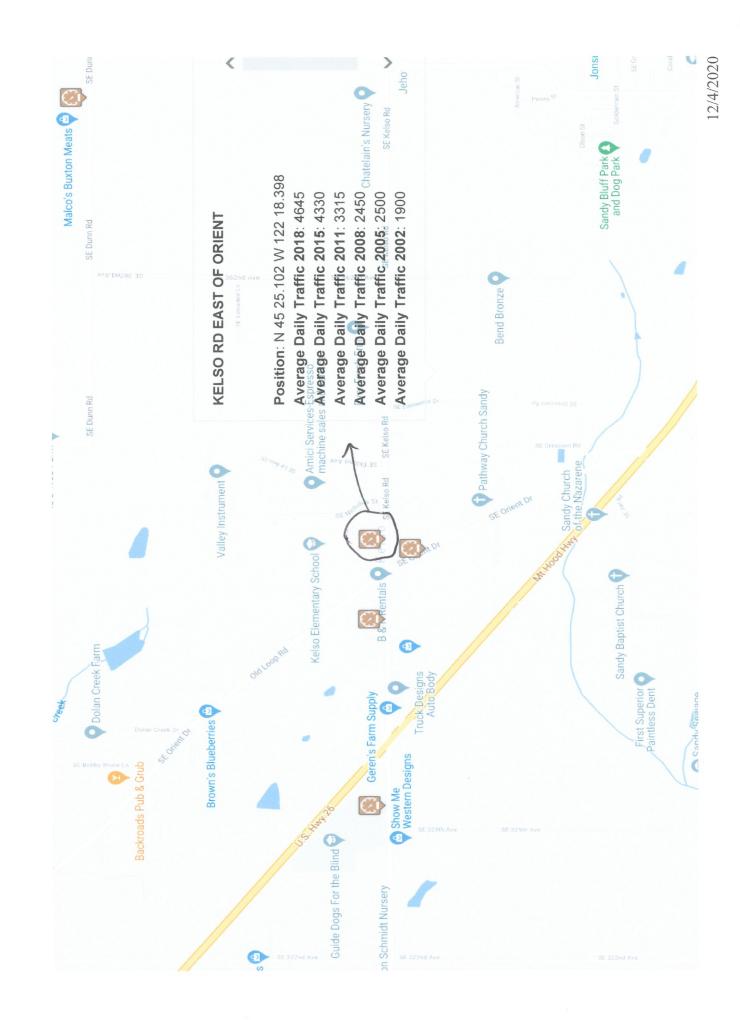
Bikes 0

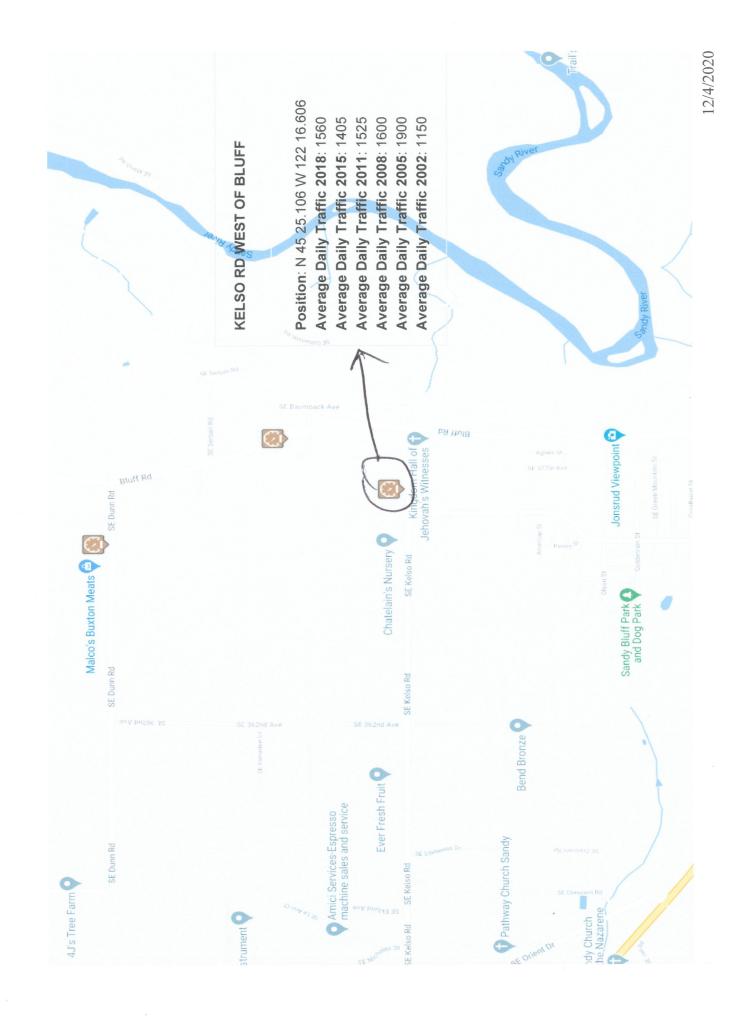


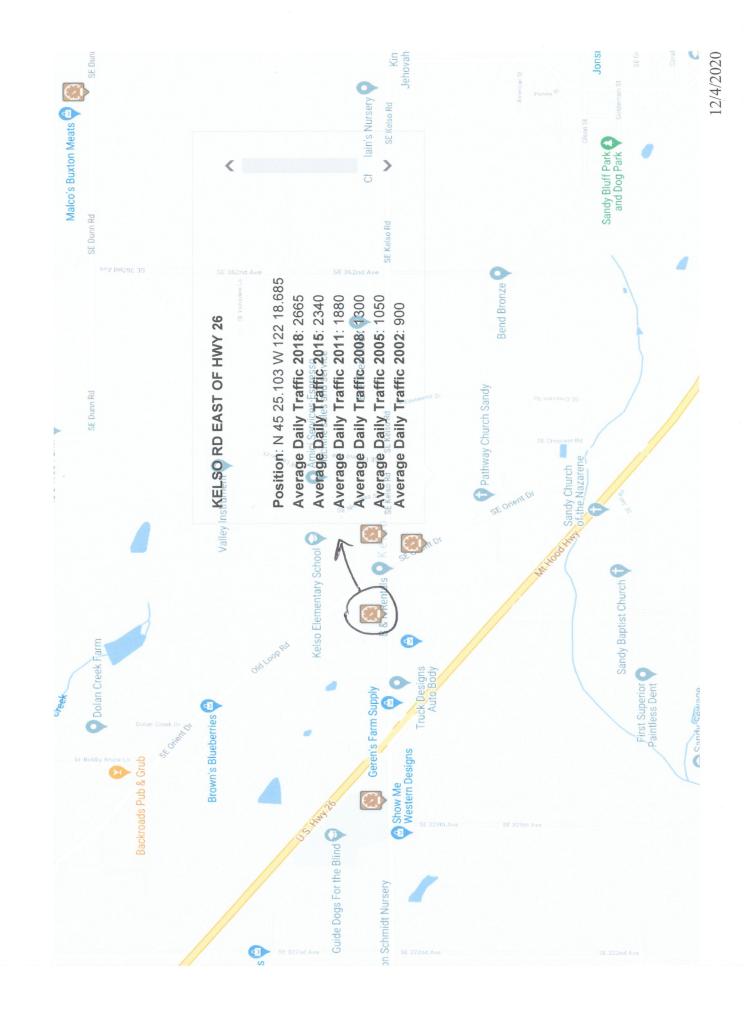




APPENDIX B HISTORICAL TRAFFIC COUNTS







APPENDIX C COLLISION DATA

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT CRASH SUMMARIES BY YEAR BY COLLISION TYPE

CDS150 12/09/2020

Intersectional Crashes at SE Kelso Rd & SE Orient Dr January 1, 2014 through December 31, 2018

				1.)									
	FATAL	NON- FATAL	PROPERTY DAMAGE	TOTAL	PEOPLE	PEOPLE		DRY	WET	;		INTER-	SECTION	OFF.
COLLISION TYPE	CRASHES	CRASHES	ONLY	CRASHES	KILLED	INJURED	TRUCKS	SUR	SURF	DAY	DARK	SECTION	KELAIED	KOAD
YEAR: 2017														
ANGLE	0	8	~	4	0	4	0	2	2	က	$\overline{}$	4	0	0
BACKING	0	0	~	_	0	0	0	~	0	0	~	~	0	0
REAR-END	0	~	0	_	0	~	0	0	~	~	0	_	0	0
TURNING MOVEMENTS	0	2	Υ-	က	0	3	0	2	_	2	~	ෆ	0	0
2017 TOTAL	0	9	က	6	0	ω	0	2	4	9	က	0	0	0
YEAR: 2016														
ANGLE	0	_	2	က	0	2	0	2	~	2	~	ന	0	0
REAR-END	0	~	0	~	0	2	0		0	<u>_</u>	0	_	0	0
TURNING MOVEMENTS	0	0	_	~	0	0	0	~	0		0	1	0	0
2016 TOTAL	0	2	က	2	0	4	0	4	~	4	_	5	0	0
YEAR: 2015														
ANGLE	0	2	_	က	0	5	0	2	~	2	~	ო	0	0
REAR-END	0	0	_	~	0	0	0	0	0	←	0	_	0	0
TURNING MOVEMENTS	0	_	0	_	0	0	0	0	←	~	0	_	0	0
2015 TOTAL	0	ന	2	2	0	∞	0	2	7	4	_	2	0	0
YEAR: 2014														
ANGLE	0	n	_	4	0	9	0	က	~	4	0	4	0	0
REAR-END	0	_	0	_	0	τ-	0	0	0	-	0	_	0	0
TURNING MOVEMENTS	0	_	0	~	0	~	0	~	0	~	0	_	0	0
2014 TOTAL	0	2	_	9	0	00	0	4	~	9	0	9	0	0
FINAL TOTAL	0	16	0	25	0	28	0	15	ω	20	2	25	0	0

Disclaimers: Effective 2016, collection of "Property Damage Only" (PDO) crash data elements was reduced for vehicles and participants. Age, Gender, License, Error and other elements are no longer available for PDO crash reporting. Please keep this in mind when comparing 2016 PDO crash data to prior years.

numbers may result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal A higher number of crashes may be reported as of 2011 compared to prior years. This does not necessarily reflect an increase in annual crashes. The higher crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics. For all disclaimers, see https://www.oregon.gov/ODOT/Data/documents/Crash_Data_Disclaimers.pdf. OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT COUNTY ROAD CRASH LISTING Intersectional Crashes at SE Kelso Rd & SE Orient Dr January 1, 2014 through December 31, 2018 12/9/2020 CLACKAMAS COUNTY
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D
R
R S U SER# E A / INVEST E L M UNLOC? D C J CDS380

OEX	n 00	n o	20 F	17 M	7 E	33	70 F	00 F	38 M	38 M
A INJ G SVRTY E	NONE 0	ONE 00			INJC 17	INJB 3	INJB 7			
PRIC	DRVR	DRVR NONE	DRVR NONE	DRVR NONE	PSNG	DRVR	DRVR	01 DRVR NONE	01 DRVR INJC	L DRVR NONE
MOVE FROM TO P#	BACK E W 01	STOP W E	STRGHT S N 01	TURN-L E S 01	02	STRGHT N S 01	STRGHT W E 01	STRGHT UN UN	STOP UN UN	STRGHT SE NW
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WTHR SURF LIGHT	CLR DRY DLIT		RAIN WET DUSK			CLR DRY DAY		UNK UNK DAY		UNK UNK DAY
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INT-TYP (MEDIAN) LEGS :	CROSS 1		CROSS			CROSS		CROSS		CROSS
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COUNTY ROADS FIRST STREET SECOND STREET INTERSECTION SEQ #	SE KELSO RD-OLD 23006		SE KELSO RD-OLD 23006			SE KELSO RD-OLD 23006		SE ORIENT DR		SE ORIENT DR
MILEPNT DIST FROM INTERSECT	3.38		3,38			3.38		30.46		30.46
S W C O DATE H R DAY/TIME L K LAT/LONG	10/4/2017 Wed 6F 6.17 -122 18		12/18/2017 Mon 4F 6.17 -122 18			12/11/2017 Mon 11A 6.17 -122 18		5/22/2014 0.74 Thu 7A 6.17 -122 18 30.46		12/1/2015 Tue 9A 6.17 -122 18
S C C C C C C C C C C C C C C C C C C C	N N N N N N N A 45 25		N N N N N N A S 25			N N N N N N A 45 25		N N N N N N A S 25		N N N N N N A A 5 25
SER# E INVEST E UNLOC? I	04136 N NONE		NO RPT			NONE NO		01954 NONE		NONE NO

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT COUNTY ROAD CRASH LISTING Intersectional Crashes at SE Kelso Rd & SE Orient Dr January 1, 2014 through December 31, 2018 12/9/2020 CDS380

E G A	38 M	18 M	35 F	09 E	16 M	41 E	77 E	36 M	05 M 09 F 03 M
INJ SVRTY			INJC	INJC NO<5	NONE	INJC	INJC	NONE	INJB INJB NO<5
PRTC II	DRVR NONE	DRVR NONE	DRVR II	PSNG II	DRVR NG	DRVR II	DRVR II	DRVR NO	PSNG II PSNG II
PR P# TY	01 DR	01 DR	01 DR	02 PS 03 PS	01 DR	01 DR	01 DR	01 DR	02 PS 03 PS 04 PS
MOVE FROM TO	STOP SE NW	STRGHT NW SE	STOP NW SE		STRGHT NW SE	STOP NW SE	STRGHT NW SE	STRGHT E W	
QTY	CAR	O CAR	O CAR		CAR	O CAR	O CAR	O CAR	
SPCL USE TRLR (NONE 0 PRVTE PSNGR CAR	01 NONE PRVTE PSNGR	02 NONE 0 PRVTE PSNGR CAR		01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	
#Λ	02 E	01 E	02 E		01 E	02 E	01 E	02	
CRASH TYP COLL TYP SVRTY		S-1STOP REAR INJ			S-1STOP REAR INJ		ANGL-OTH ANGL INJ		
		S-1ST REAR INJ					ANGL- ANGL INJ		
OFF-RD WTHR RNDBT SURF DRVWY LIGHT		CLR DRY DAY			RAIN WET DAY		CLR DRY DAY		
OFF-RI RNDBT DRVWY		ZZZ			ZZZ		ZZZ		
INT-REL TRAF- CONTL		N STOP SIGN			N STOP SIGN		N STOP SIGN		
INT-TYP (MEDIAN) LEGS (#LANES)		CROSS			CROSS		CROSS		
H (M I		O			0		O		
RD CHAR DIRECT LOCIN		INTER NW 06			INTER NW 06		INTER CN 01		
#									
COUNTY ROADS FIRST STREET SECOND STREET INTERSECTION SEQ		DR			DR		DR		
Y ROF STF D STF SECTI		TENT			IENT		IENT		
COUNTY ROADS FIRST STREET SECOND STREET INTERSECTION		SE ORIENT DR			SE ORIENT DR		SE ORIENT DR		
	19	4 2					4 2		
MILEPNT DIST FROM INTERSECT		30.46			30.46		30.46		
	,	16 1P ? 18			117 7A 2 18		111A 11A 22 18		
W DATE O DATE R DAY/TIME K LAI/LONG		122			122		-12		
W O DAT R DAY K LAI		6/21 Tue 6.17 -			2/15 Wed 6.17		9/2(Sat 6.17		
		9			0		0		

00613 N N N N N NONE NO 45 25

02786 NONE No 03693 N N N NO RPT N NO 45 25 01 DRVR INJB 58 M

03 NONE 0 STOP
PRVTE W E
PSNGR CAR

/2020
12/9/
CDS380

CLACKAMAS COUNTY D

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT COUNTY ROAD CRASH LISTING

Intersectional Crashes at SE Kelso Rd & SE Orient Dr January 1, 2014 through December 31, 2018

17 M	19 F	26 F	29 M	n 00	n 00	17 E	15 F	26 F	19 F
01 DRVR	02 PSNG 03 PSNG	01 DRVR	01 DRVR 1	01 DRVR 1	01 DRVR 1	01 DRVR	02 PSNG 01 DRVR 1	01 DRVR	01 DRVR INJC
STRGHT NW SE		STRGHT E W	STOP W E	STRGHT NW SE	STRGHT E W	STRGHT	TURN-L S W	STRGHT SE NW	STRGHT E W
01 NONE 0 PRVTE PSNGR CAR		02 NONE 0 PRVTE PSNGR CAR	03 NONE 0 PRVTE PSNGR CAR	01 NONE 9 N/A PSNGR CAR	02 NONE 9 N/A PSNGR CAR	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR
ANGL-OTH ANGL INJ				ANGL-OTH ANGL PDO		O-1 L-TURN TURN INJ		ANGL-OTH ANGL INJ	
CLR DRY DAY				CLD DRY DAY		CLR DRY DAY		CLD WET DAY	
zzz				ZZZ		ZZZ		ZZZ	
N STOP SIGN				N FLASHBCN-		N FLASHBCN-		N STOP SIGN	
CROSS 0				CROSS		CROSS		CROSS	
INTER CN 01				INTER CN 01		INTER CN 01		INTER CN 02	
SE ORIENT DR				SE ORIENT DR		SE ORIENT DR		SE ORIENT DR	
0.74				0.74		0.74		0.74	
04630 N N N N N 11/6/2015 COUNTY N Eri 4P No 45 25 6.17 -122 18				04871 N N N N 10/21/2016 COUNTY N Fri 1P No 45 25 6.17 -122 18		04490 N N N N 10/27/2017 COUNTY N Fri 2P No 45 25 6.17 -122 11		00182 N N N N 1/14/2014 COUNTY N Tue 7A No 45 25 6.17 -122 1	
	1	1 INTER CROSS N N CLR ANGL-OTH 01 NONE 0 STRGHT ON N N N 11/6/2015 0.74 SE ORIENT DR CROSS N N CLR ANGL-OTH 01 NONE 0 STRGHT ON SECOND N N DAY INJ PSNGR CAR 01 DRVR INJR 17 ON DAY INJ PSNGR CAR 01 DRVR INJR 17 ON DAY INJ PSNGR CAR 01 DRVR INJR 18 ON PSNG INJR 13 ON PSNG INJR 13	330 N N N N 11/6/2015 0.74 SE ORIENT DR CROSS N N CLR ANGL-OTH 01 NONE 0 STRGHT ONTY N Fri 4P A5 25 6.17 -122 18 30.46 O1 02 PSNG INJB 19 O2 PSNG INJB 19 O3 PSNG INJB 19 PSNGR CAR 01 DRVR INJR 17 O2 PSNG INJB 19 PSNGR CAR 01 DRVR INJR 18 O2 PSNG INJB 19 PSNGR CAR 01 DRVR INJR 26	1 1 1 1 1 1 2 1 2 2	Name Name	NNTY N N 11/6/2015 0.74 SE ONIENT DR CROSS N N CIR ANGL-OTH OI NONE O STROPT N DAY ANGL-OTH N DAY N	NIT N N N N N N N N N	No. No.	1

	N H X	60 F	25 M	65 FI	51 F	n 00	n 00	22 M	45 F	47 F	47 F
	PRTC INJ P# TYPE SVRTY	01 DRVR INJC	01 DRVR NONE	01 DRVR NONE	01 DRVR INJC	01 DRVR NONE	01 DRVR NONE	01 DRVR NONE	01 DRVR NONE	01 DRVR NONE	01 DRVR INJC
UNIT	MOVE FROM TO	STRGHT NW SE	STRGHT W E	STRGHT N S	STRGHT W E	STRGHT NW SE	TURN-R W SE	STRGHT S N	STRGHT W E	TURN-R E N	STRGHT S N
- POLICY, DATA AND ANALYSIS DIVISION CRASH ANALYSIS AND REPORTING UNIT CRASH LISTING SE Kelso Rd & SE Orient Dr ugh December 31, 2018	SPCL USE TRLR QTY V# OWNER	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	01 NONE 9 N/A PSNGR CAR	02 NONE 9 N/A PSNGR CAR	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR
ANSPORTATION - POLICY, DATA A TA SECTION - CRASH ANALYSIS A COUNTY ROAD CRASH LISTING 1 Crashes at SE Kelso Rd & SE 1, 2014 through December 31,	CRASH TYP COLL TYP SVRTY	ANGL-OTH ANGL INJ		ANGL-OTH ANGL INJ		ANGL-OTH TURN PDO		ANGL-OTH ANGL PDO		ANGL-OTH TURN INJ	
	NTHR SURF LIGHT	CLR DRY DAY		RAIN WET DUSK		CLR DRY DAY		CLR DRY DAY		CLD DRY DAY	
ORTATI ECTION WTY ROZ ashes	OFF-RD RNDBT DRVWY	ZZZ		zzz		a N N N		ZZZ		Z Z Z	
OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DA TRANSPORTATION DATA SECTION - CRASH ANALYS COUNTY ROAD CRASH LISTING Intersectional Crashes at SE Kelso Rd January 1, 2014 through December	INT-REL TRAF- CONTL	N STOP SIGN		N STOP SIGN		N FLASHBCN-R		N STOP SIGN		N STOP SIGN	
DEPARTMENT RANSPORTAT Interse	INT-TYP (MEDIAN) LEGS (#LANES)	CROSS		CROSS 0		CROSS 0		CROSS		CROSS	
OREGON	RD CHAR DIRECT LOCTN	INTER CN 03		INTER CN 03		INTER CN 03		INTER CN 04		INTER CN 04	
	COUNTY ROADS FIRST STREET SECOND STREET INTERSECTION SEQ #	SE ORIENT DR		SE ORIENT DR		SE ORIENT DR		SE ORIENT DR		SE ORIENT DR	
CDS380 12/9/2020 CLACKAMAS COUNTY B	S U P G S W SER# E A / C O DATE MILEPNT INVEST E L M H R DAY/TIME DIST FROM UNLOC? D C J L K LAT/LONG INTERSECT	01930 N N 5/20/2014 0.74 NONE N Tue 11A No 45 25 6.17 -122 18 30.46		00871 N N N N 3/5/2017 0.74 COUNTY N Sun 5P No 45 25 6.17 -122 18 30.46		04869 N N N 11/18/2017 0.74 NONE N Sat 4P No 45 25 6.17 -122 18 30.46		02383 N N N N 6/21/2014 0.74 COUNTY N SAt 1P No 45 25 6.17 -122 18 30.46		02416 N N N N 6/24/2014 0.74 COUNTY N TUE 11A No 45 25 6.17 -122 18 30.46	

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT CRASH SUMMARIES BY YEAR BY COLLISION TYPE

CDS150 12/09/2020

Intersectional Crashes at Kelso Rd & Bluff Rd January 1, 2014 through December 31, 2018

				Jaildaly 1,	2014 till 00g	allualy 1, zo 14 tillough Decellibel 31, zo 18	31, 2010							
		NON	PROPERTY										INTER-	
	FATAL	FATAL	DAMAGE	TOTAL	PEOPLE	PEOPLE		DRY	WET			INTER-	SECTION	OFF-
COLLISION TYPE	CRASHES	CRASHES CRASHES	ONLY	S	KILLED	INJURED TRUCKS	TRUCKS	SURF	SURF	DAY	DARK	SECTION	RELATED	ROAD
YEAR: 2016														
TURNING MOVEMENTS	0	_	0	1	0	2	0	-	0	0	~	~	0	0
2016 TOTAL	0	~	0	_	0	2	0	_	0	0	~	←	0	0
YEAR: 2014														
FIXED / OTHER OBJECT	0	_	0	_	0	_	0	0	~	~	0	~	0	~
REAR-END	0	0	~	~	0	0	0	0	~	0	_	~	0	0
2014 TOTAL	0	~	~	2	0	_	0	0	7	-	~	2	0	~
FINAL TOTAL	0	2	~	ю	0	8	0	~	2	~	2	ო	0	~

Disclaimers: Effective 2016, collection of "Property Damage Only" (PDO) crash data elements was reduced for vehicles and participants. Age, Gender, License, Error and other elements are no longer available for PDO crash reporting. Please keep this in mind when comparing 2016 PDO crash data to prior years.

numbers may result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal A higher number of crashes may be reported as of 2011 compared to prior years. This does not necessarily reflect an increase in annual crashes. The higher crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics. For all disclaimers, see https://www.oregon.gov/ODOT/Data/documents/Crash_Data_Disclaimers.pdf.

CITY OF SANDY, CLACKAMAS COUNTY

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT URBAN NON-SYSTEM CRASH LISTING Intersectional Crashes at Kelso Rd & Bluff Rd

	A S PRTC INJ G E LIC TYPE SVRTY E X REE	DRVR INJC 29 M	, NO.	DRVR NONE 23 F	ORV NONE 26 F OR-	DRVR NONE 20 M OR-
., 2018	MOVE FROM TO P#	STRGHT S N 01	O PRKD-P W E	STRGHT W E 01	STOP W E	STRGHT N S 01
h December 31	SPCL USE TRLR QIY V# OWNER	01 NONE 0 PRVTE PSNGR CAR	02 NONE C PRVTE PSNGR CAR.	01 NONE 0 PRVTE PSNGR CAR	02 NONE 0 PRVTE PSNGR CAR	01 NONE 0 UNKN PSNGR CAR
January 1, 2014 through December 31, 2018	CRASH TYP COLL TYP SVRTY	FIX OBJ FIX INJ		S-1STOP REAR PDO		O-1 L-TURN TURN INJ
January 1	OFF-RD WTHR RNDBT SURF DRVWY LIGHT	Y CLD N WET N DAY		N UNK N WET N DARK		N CLR N DRY N DLIT
	INT-REL OFF-RI TRAF- RNDBT CONTL DRVWY	N STOP SIGN		N STOP SIGN		STOP SIGN
	INT-TYP (MEDIAN) LEGS (#LANES)	CROSS		CROSS		CROSS 0
	RD CHAR DIRECT LOCTN	INTER S 05		INTER W 06		INTER CN 01
	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	BLUFF RD KELSO RD 1		BLUFF RD KELSO RD 1		BLUFF RD KELSO RD 1
	SER# E A / C O DATE INVEST E L M H R DAY/TIME FC UNLOC? D C J L K LAT/LONG DISTINC	01794 Y N N N 05/10/2014 16 CITY N Sat 12P 0 No 45 25 5.93 -122 16 23.21		04081 N N N 10/14/2014 16 NONE N Tue 11P 0 NO 45 25 5.93 -122 16 23.21		04061 N N N 09/05/2016 16 NONE N MON 8P 0 NO 45 25 5.93 -122 16 23.21
	8 H B	CIT		NON NO		NON NO

38 M OR-OR< 70 M 38 F

DRVR NONE

01

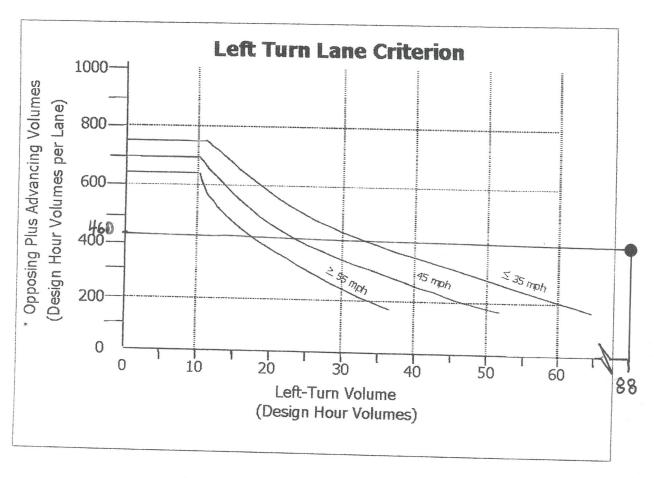
PSNGR CAR

02 NONE 0 TURN-L PRVTE S W

PSNG INJC

02

APPENDIX D LEFT TURN LANE CRITERION



SE ORIENT DRIVE & SE KELSO ROAD EXISTING CONDITIONS PM PEAK HOUR, SB TRAFFIC

LEFT TURN LANE JUSTIFIED

APPENDIX E LEVEL OF SERVICE COMPUTER PRINTOUTS

General Information				Site Inform	nation				
Analyst Agency/Co. Date Performed Analysis Time Period	DSK 3/2/20: AM Pe	21 ak Hour		Intersection Kelso Road & Orient Dr. Jurisdiction City of Sandy Analysis Year 2021					
Project ID Existing								gergggetowerend Arfredbelle der department (Anathre	
East/West Street: Kelso Road				North/South St	treet: Orient Dr.				
Volume Adjustments	and Site Ch								
Approach Movement	L		astbound T	R		VVe	stbound T	R	
Volume (veh/h)	6		58	10	31		158	90	
%Thrus Left Lane									
Approach		N	orthbound			Sou	thbound		
Movement	L		T	R	L		T	R	
Volume (veh/h)	6		104	32	69		82	7	
%Thrus Left Lane									
	Eas	bound	We	stbound	North	bound	South	bound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	0.90		0.90	1	0.90		0.90		
Flow Rate (veh/h)	81		309		156		174		
% Heavy Vehicles	1		15		3		41		
No. Lanes		1		1		1		1	
Geometry Group		1		1		1		1	
Duration, T				0.	.25				
Saturation Headway A	djustment '	Norksheet							
Prop. Left-Turns	0.1		0.1		0.0		0.4	1	
Prop. Right-Turns	0.1		0.3		0.2		0.0		
Prop. Heavy Vehicle	0.0		0.1		0.0		0.4	1	
nLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
nadj, computed	-0.0	1	0.1	 '''	-0.1	1	0.8	1	
Departure Headway a		Timo	0.7		1 0.7		1 0.0		
	3.20	IIIIE	3.20	T	3.20	T	3.20	T	
hd, initial value (s) x, initial	0.07		0.27		0.14		0.15	 	
hd, final value (s)	5.29	1	5.07		5.19		5.96	 	
x, final value	0.12	1	0.43		0.22		0.29	1	
Move-up time, m (s)	THE PERSON NAMED OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLU	.0		2.0		.0		.0	
Service Time, t _s (s)	3.3		3.1		3.2	T	4.0	Ť T	
		1			1 4.5		1		
Capacity and Level of	1		T		T		T		
		bound	-	stbound		nbound	~	bound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	331		559		406		424		
Delay (s/veh)	9.00		11.91		9.68		11.35		
LOS	A		В		A		В		
Approach: Delay (s/veh)		9.00		1.91	9.	68		35	
LOS	† · · · · · ·	A	1	В		4	E		
Intersection Delay (s/veh)		/1			0.96				
Intersection LOS	-				B				

General Information				Site Inforn	nation				
Analyst Agency/Co. Date Performed Analysis Time Period	3/2/202 AM Pe	ngineering 21 ak Hour		Intersection Kelso Road & Orient Dr. Jurisdiction City of Sandy Analysis Year 2023					
Project ID Year 2023 w/o Project									
East/West Street: Kelso Road				North/South St	treet: Orient Dr.				
Volume Adjustments a	and Site Ch								
Approach Movement			astbound T	R		We	stbound T	R	
Volume (veh/h)	6		63	11	34		170	96	
%Thrus Left Lane									
Approach		N N	orthbound			Sou	ithbound		
Movement	L		Т	R	L		T	R	
Volume (veh/h)	6		109	34	72		86	7	
%Thrus Left Lane									
	East	bound	We	stbound	North	bound	South	nbound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR	-	LTR		LTR	Par fin	LTR		
PHF	0.90	 	0.90		0.90		0.90	1	
Flow Rate (veh/h)	88	 	331		164		182	T	
% Heavy Vehicles	1		15		3		41	 	
No. Lanes		1	1	1		1		1	
Geometry Group		1		1		1		1	
Duration, T	1				.25				
Saturation Headway A	diustment \	Norksheet							
Prop. Left-Turns	0.1	Tornonout	0.1	T	0.0		0.4	T	
	0.1	 	0.3		0.2		0.0	-	
Prop. Right-Turns		 						-	
Prop. Heavy Vehicle	0.0		0.1		0.0		0.4		
nLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.1		0.1		-0.1		0.8	<u></u>	
Departure Headway ar	nd Service	Time							
nd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.08		0.29		0.15		0.16		
nd, final value (s)	5.40		5.15		5.31		6.08		
x, final value	0.13	<u></u>	0.47		0.24		0.31		
Move-up time, m (s)	2	.0		2.0	2.	.0		.0	
Service Time, t _s (s)	3.4		3.2		3.3		4.1		
Capacity and Level of	Service								
	1	bound	We	stbound	North	bound	South	nbound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	338		581		414		432		
		-					11.76	1	
Delay (s/veh)	9.23	-	12.70		9.99	 		-	
LOS	A		В		A		В		
Approach: Delay (s/veh)		9.23	1:	2.70	9.5	99		76	
LOS		A		В	A	A	E	3	
						_			

Conoral Information				Site Inform	nation			
General Information Analyst Agency/Co. Date Performed Analysis Time Period	3/2/20 AM Pe	ingineering 21 ak Hour		Intersection Jurisdiction Analysis Year			Road & Orient Di f Sandy	r.
Project ID Year 2023 with Project								
East/West Street: Kelso Road				North/South S	treet: Orient Dr.			
Volume Adjustments	and Site Ch							
Approach Movement		E	Eastbound	R	L	We	stbound T	R
Volume (veh/h)	6		65	11	35		177	101
%Thrus Left Lane								
Approach			lorthbound			Sou	ıthbound	
Movement	L		T	R	L		т	R
Volume (veh/h)	6		109	34	74		86	7
%Thrus Left Lane								
	Eas	bound	Wes	stbound	North	bound	South	nbound
	L1	L2	L1	T L2	L1	L2	L1	L2
Configuration	LTR	- Inde	LTR	-	LTR		LTR	-
PHF	0.90		0.90		0.90		0.90	-
Flow Rate (veh/h)	90	-	346	1	164		184	
% Heavy Vehicles	1		15		3		41	
No. Lanes		1	1	1	1			1
Geometry Group		<u>.</u> 1		1	1 1			1
Duration, T		er uurspaanskuuspunduuroolduutsajardydtikasa-kitskasia		0	.25	efensaketa ulppompun jamususing garmanuseum disusketja ethiopise		
Saturation Headway A	Adjustment	Vorksheet						
Prop. Left-Turns	0.1		0.1	1	0.0		0.4	T
Prop. Right-Turns	0.1	-	0.3	1	0.2		0.0	-
Prop. Heavy Vehicle	0.0	-	0.1	-	0.0		0.4	+
	0.0	0.2	0.7	0.2	0.0	0.2	0.4	0.2
hLT-adj		0.2						-
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.1		-0.1		0.8	
Departure Headway a	nd Service	Time						,
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.08		0.31	-	0.15		0.16	-
hd, final value (s)	5.45	-	5.17	1	5.37		6.14	-
x, final value	0.14		0.50		0.24	^	0.31	
Move-up time, m (s)		.0		2.0	2.	U	-	.0
Service Time, t _s (s)	3.5		3.2		3.4		4.1	<u></u>
Capacity and Level of	f Service							
	Eas	tbound	Wes	stbound	North	bound	South	nbound
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	340		596		414		434	
Delay (s/veh)	9.31	-	13.17		10.10		11.92	1
LOS	A A	-	B		10.10 B	and we complete shift in his first residence in the same state of the shift in the same state of the s	B	-
				1		40		
Approach: Delay (s/veh)	-	9.31		3.17	10.			.92
LOS		Α		В	<u> </u>			B
Intersection Delay (s/veh)					1.79	ungtonjanov vojeni rovo opristi o sprišti kontroloki rivinavaje i		
Intersection LOS	1				В			

General Information				Site Inform	nation				
Analyst Agency/Co. Date Performed Analysis Time Period	3/2/20	ingineering 21 ak Hour		Intersection Kelso Road & Orient Dr. Jurisdiction City of Sandy Analysis Year 2021					
Project ID Existing									
East/West Street: Kelso Road			×	North/South S	treet: Orient Dr.				
Volume Adjustments	and Site Ch								
Approach		E	astbound T	R		We	stbound T	R	
Movement Volume (veh/h)	12	,	101	22	32		62	58	
%Thrus Left Lane		-		Eq. Eq.	- 02		02		
Approach			lorthbound			Sou	ıthbound		
Movement	L		T	R	L		T	R	
Volume (veh/h)	6		142	52	88		167	11	
%Thrus Left Lane									
	Eas	tbound	T Wes	stbound	North	bound	South	bound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR	L-E	LTR		
PHF	0.91	+	0.91	1	0.91		0.91	<u> </u>	
Flow Rate (veh/h)	147	 	166	+	219		291		
% Heavy Vehicles	2		4		1		2		
No. Lanes		1	1	1	1	1	-	1	
Geometry Group		1	***	1	1			1	
Duration, T	-	1			.25				
Saturation Headway /	Adjustment	Worksheet							
Prop. Left-Turns	0.1	TO RSHEEL	0.2	T	0.0	I	0.3	1	
	0.7	-	0.4	-	0.0		0.0	1	
Prop. Right-Turns		 		-				 	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
nHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.0		-0.1		-0.1		0.1		
Departure Headway a		Гime							
nd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.13		0.15		0.19		0.26		
hd, final value (s)	5.50		5.40		5.10		5.20		
x, final value	0.22		0.25		0.31		0.42	<u></u>	
Move-up time, m (s)		.0		2.0	2.	0		.0	
Service Time, t _s (s)	3.5		3.4		3.1		3.2		
Capacity and Level of	Service								
	1	tbound	Wes	stbound	North	bound	South	bound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	397		416	1	469		541		
	10.09	1		1			11.90	 	
Delay (s/veh)		-	10.18	1	10.39			 	
LOS	В	1	В		В		В		
Approach: Delay (s/veh)	1	0.09		0.18		39		90	
LOS		В		В	E	3	<u> </u>	3	
Intersection Delay (s/veh)				10).83				
ntersection LOS					В				

				ONTROL				
General Information				Site Inform	nation			
Analyst Agency/Co. Date Performed Analysis Time Period	3/2/20	Ingineering 21 ak Hour		Intersection Jurisdiction Analysis Year			Road & Orient Di Sandy	r.
Project ID Year 2023 w/o Proje	ct							
East/West Street: Kelso Road	<u> </u>			North/South S	treet: Orient Dr.			
Volume Adjustments	and Site Ch	aracteristic	cs					
Approach			Eastbound			We	stbound	
Movement	L		T 110	R	L		T	R
Volume (veh/h)	13	3	110	23	35		66	62
%Thrus Left Lane								
Approach Movement	L		Northbound T	R	L	Sou	thbound T	R
Volume (veh/h)	6		147	56	93		175	12
%Thrus Left Lane					-			F Area
TO THE PARTY	T	thound	10/-	ethound	T North	bound	T 00.4	hbound
	-	tbound		stbound				T
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR	 	LTR		LTR		LTR	-
PHF	0.91	-	0.91		0.91		0.91	-
Flow Rate (veh/h)	159	-	178		228		307	-
% Heavy Vehicles	2		4		1		2	
No. Lanes		<u>1</u>		1	1 1			<u>1</u>
Geometry Group		1			.25			1
Duration, T		A/		U	.25			
Saturation Headway A		worksneet			T		T	Т
Prop. Left-Turns	0.1	<u> </u>	0.2		0.0		0.3	
Prop. Right-Turns	0.2		0.4		0.3		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		-0.1		0.1	
Departure Headway a	nd Service	Гime						
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.14		0.16		0.20		0.27	
hd, final value (s)	5.64		5.53		5.24		5.32	
x, final value	0.25		0.27		0.33		0.45	
Move-up time, m (s)	2	.0	1	2.0	2.	0	2	.0
Service Time, t _s (s)	3.6		3.5		3.2		3.3	
Capacity and Level of	Service						-1	
party and solver of	T	tbound	Ma	stbound	North	bound	South	nbound
	L1	L2	L1	L2	L1	L2	L1	L2
0	 			+		LZ		1 2
Capacity (veh/h)	409		428		478		557	-
Delay (s/veh)	10.50		10.60		10.82		12.65	
LOS	В		В		В		В	
Approach: Delay (s/veh)	1	0.50	10	0.60	10.	82	12	.65
LOS		В		В	В	}	l l	3
Intersection Delay (s/veh)				-	1.36	in and purpose of the designation of the property of the second of the s		
Intersection LOS				application of the second contraction of the	В			enadi dalman mendai telihara telah alan immendipyin

General Information				Site Inforn	nation			
Analyst Agency/Co. Date Performed Analysis Time Period	3/2/202 PM Pea			Intersection Jurisdiction Analysis Year		Kelso I City of 2023	Road & Orient Dr. Sandy	
Project ID Year 2023 with Project		Annapontustas palago and anti-order of the						
East/West Street: Kelso Road				North/South S	treet: Orient Dr.			
Volume Adjustments	and Site Cha							
Approach Movement			Eastbound T I	R	- L	Wes	stbound T	R
/olume (veh/h)	13		118	23	36		71	65
%Thrus Left Lane					1			
Approach			Northbound		1	Sou	thbound	
Movement	L		T	R	L		T	R
/olume (veh/h)	6		147	58	98		175	12
%Thrus Left Lane					and the second s			
	Fasti	oound	We	estbound	North	bound	South	bound
	L1	L2	L1	L2	L1	L2	L1	L2
Costa vation		l=6	LTR		LTR	L-2	LTR	
Configuration PHF	LTR		0.91		0.91	-	0.91	
Flow Rate (veh/h)	0.91		188		230	-	312	
% Heavy Vehicles	2	ļ	4		1		2	
% neavy venicies No. Lanes	1		4	1		1	1	1
Geometry Group	1	-		1		1	1	
Duration, T					.25	<u> </u>	1	
Saturation Headway A	divotment V	Vorkoboot		<u> </u>	.20			
	7	VOIKSHEEL		T	T 00	T	T 00	T T
Prop. Left-Turns	0.1		0.2		0.0		0.3	
Prop. Right-Turns	0.1		0.4		0.3		0.0	ļ
Prop. Heavy Vehicle	0.0		0.0		0.0	ļ	0.0	
nLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
nRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
nadj, computed	-0.0		-0.1		-0.1		0.1	
Departure Headway a	nd Service T	ime						
nd, initial value (s)	3.20		3.20		3.20	I	3.20	
x, initial	0.15		0.17		0.20		0.28	
nd, final value (s)	5.71		5.60		5.33		5.40	
x, final value	0.27		0.29		0.34		0.47	
Move-up time, m (s)	2.	0		2.0		.0	2.	0
Service Time, t _s (s)	3.7		3.6		3.3		3.4	
Capacity and Level of						<u> </u>		
Jupusity and Level Of	1	pound	1 144-	estbound	Made	abound	Court	bound
Мендайнатууний фасилийн үнүү картан айын тарын айын айын айын айын айын айын айын ай		bound				T		T
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	418		438		480		562	
Delay (s/veh)	10.78		10.90		11.05		13.07	
.os	В		В		В		В	
Approach: Delay (s/veh)	10	0.78	1	0.90	11	.05	13.	07
LOS		В		В		3	E	
Intersection Delay (s/veh)					1.67			
Intersection LOS	 				В			

	TW	O-WAY STOP	CONTR	OL SUMI	MARY				
General Information	1		Site I	nformati	on				
Analyst Agency/Co. Date Performed Analysis Time Period	DSK Kelly Eng 3/2/2021 AM Peak		Interse Jurisdi Analys			Kelso Ro City of Sa 2021	ad & Bluff i andy	Road	
Project Description Ex	isting								
East/West Street: Kelso	Road		North/S	South Stree	et: Bluff Ro	ad			
ntersection Orientation:	North-South		Study I	Period (hrs): 0.25	variani dan di minapangi kandi awan waqan may w			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Northbound			************	Southboo	ınd		
Movement	1	2	3		4	5		6	
	L	Т	R		L	Т		R	
/olume (veh/h)	32	132	1		0	134		20	
Peak-Hour Factor, PHF	0.67	0.67	0.67		0.67	0.67		0.67	
Hourly Flow Rate, HFR (veh/h)	47	197	1		0	199		29	
Percent Heavy Vehicles	3				3			April 20	
Median Type				Undivide	d	T			
RT Channelized			0					0	
Lanes	0	1	0		0	1		0	
Configuration	LTR		-		LTR				
Jpstream Signal		0				0			
Minor Street		Eastbound				Westbou	ind		
Movement	7	8	9		10	11		12	
	L	T	R		L	T		R	
/olume (veh/h)	32	1	36	-	2	1		0	
Peak-Hour Factor, PHF Hourly Flow Rate, HFR	0.67	0.67	0.67 53		0.67 2	0.67		0.67 0	
(veh/h)	-					-			
Percent Heavy Vehicles	3	0	0		0	0		0	
Percent Grade (%)		0	T			0			
Flared Approach		N	-			N			
Storage		0				0			
RT Channelized			0					0	
anes	0	1	0		0	1		0	
Configuration		LTR				LTR			
Delay, Queue Length, a						T			
Approach	Northbound	Southbound		Westbound			Eastbound		
Vovement	1	4	7	8	9	10	11	12	
ane Configuration	LTR	LTR		LTR			LTR		
/ (veh/h)	47	0		3			101		
C (m) (veh/h)	1334	1369		427			601		
//c	0.04	0.00		0.01			0.17		
95% queue length	0.11	0.00		0.02			0.60		
Control Delay (s/veh)	7.8	7.6		13.5			12.2	1	
OS	A A	A		B	 	 	B	1	
Approach Delay (s/veh)			·	13.5			12.2		
	49.49	the top				_			
Approach LOS	40000			В			В		

		O-WAY STOP	CONTRO	OL SUMI	WARY				
General Information	ı		Site Ir	nformatio	on				
Analyst	DSK		Interse	ction		Kelso Roa	ad & Bluff I	Road	
Agency/Co.	Kelly Eng	ineering	Jurisdi	ction		City of Sa	ndy		
Date Performed	3/2/2021		Analys	is Year		2023			
Analysis Time Period	AM Peak	Hour							
Project Description Year	ar 2023 w/o Pro	ject							
East/West Street: Kelso	Road		North/S	South Stree	t: Bluff Ro	ad			
ntersection Orientation:	North-South		Study F	Period (hrs)): 0.25				
Vehicle Volumes an	d Adjustme	nts							
Major Street		Northbound				Southbou	ind	managita and during the managita and	
Movement	1	2	3		4	5		6	
	L	Т	R		L	Т		R	
Volume (veh/h)	34	139	1		0	139		21	
Peak-Hour Factor, PHF	0.67	0.67	0.67		0.67	0.67		0.67	
Hourly Flow Rate, HFR (veh/h)	50	207	1		0	207		31	
Percent Heavy Vehicles	3	-			3			to the	
Median Type				Undivide	d	-			
RT Channelized			0					0	
anes	0	1	0		0	1		0	
Configuration	LTR				LTR				
Jpstream Signal		0				0			
Minor Street		Eastbound				Westbou	nd		
Vovement	7	8	9		10	11		12	
	L	T	R		L	T		R	
Volume (veh/h)	36	1	41		2	1		0	
Peak-Hour Factor, PHF	0.67	0.67	0.67	,	0.67	0.67		0.67	
Hourly Flow Rate, HFR (veh/h)	53	1	61		2	1		0	
Percent Heavy Vehicles	3	0	0		0	0		0	
Percent Grade (%)		0	nadilitary.comantorory.com/constructivativativa		elliggenh (alt grupnigthreitsphinistrika kertlingshig shally et thomas	0			
Flared Approach		N				N			
Storage		0	***		unter Égynéngan étőnyezentetének árrasparahanná ett megatjantakallatan	0			
RT Channelized			0		and drove push transition with a settle design from the foreign transition from you	 		0	
	0	1	0		0	1		0	
Lanes Configuration		LTR	1 0		U	LTR			
	nd lavel of Co					LIK			
Delay, Queue Length, a		Southbound	1	Westbound	1		Eastbound		
Approach	Northbound			r					
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	LTR	LTR		LTR	-	-	LTR	-	
v (veh/h)	50	0		3	1	1	115		
C (m) (veh/h)	1323	1357		405			586		
//c	0.04	0.00		0.01			0.20		
95% queue length	0.12	0.00		0.02			0.72	T	
Control Delay (s/veh)	7.8	7.7		14.0	1		12.6		
LOS	A	A		В	1	†	B	†	
			<u> </u>	14.0		-	L	L	
Approach Delay (s/veh)	alp, sale					-	12.6		
Approach LOS	edes	uni eta		В			В		

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			Tau.					
General Information			Site In	formati	on			
Analyst	DSK		Interse				ad & Bluff I	Road
Agency/Co.	Kelly Engil	neering	Jurisdio			City of Sa	ndy	
Date Performed	3/2/2021		Analysi	is Year		2023		
Analysis Time Period	AM Peak I							
	ar 2023 with Pro	ject		gångtor 6 notifisklynus var Öllmanklinestill systema				
East/West Street: Kelso				and the state of t	et: Bluff Ro	pad		
ntersection Orientation:	North-South		Study P	Period (hrs): 0.25			
Vehicle Volumes an	d Adjustmen							
Major Street		Northbound				Southbou	ind	
Vovement	1	2	3		4	5		6
	L	T	R		L	T		R
/olume (veh/h)	37	139	1		0	139		22
Peak-Hour Factor, PHF	0.67	0.67	0.67		0.67	0.67		0.67
lourly Flow Rate, HFR veh/h)	55	207	1		0	207		32
Percent Heavy Vehicles	3				3			noprob
Median Type				Undivide	d			
RT Channelized			0					0
anes	0	1	0		0	1		0
Configuration	LTR				LTR			
Jpstream Signal		0				0		
Minor Street		Eastbound				Westbou	nd	
Vlovement	7	8	9		10	11		12
	L	T	R		L	T		R
/olume (veh/h)	37	1	51		2	1		0
Peak-Hour Factor, PHF	0.67	0.67	0.67		0.67	0.67		0.67
Hourly Flow Rate, HFR veh/h)	55	1	76		2	1		0
Percent Heavy Vehicles	3	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
_anes	0	1	0		0	1		0
Configuration		LTR				LTR		
Delay, Queue Length, a	nd Level of Ser	vice						
Approach	Northbound	Southbound	1	Westboun	d		Eastbound	
Vovement	1	4	7	8	9	10	11	12
ane Configuration	LTR	LTR		LTR	1	1	LTR	 -
	55	0		3	-	1	132	+
/ (veh/h)					-	-		-
C (m) (veh/h)	1322	1357		389	-		595	-
//c	0.04	0.00		0.01			0.22	-
95% queue length	0.13	0.00		0.02			0.84	
Control Delay (s/veh)	7.8	7.7		14.3			12.8	
_OS	Α	Α		В			В	
Approach Delay (s/veh)			All provided by the second of the second through the second through the second	14.3			12.8	
11				В			12.8 B	

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		O-WAY STOP	0011111	OE	****			Annie de la companya
General Information	1		Site I	nformati	on			
Analyst Agency/Co. Date Performed Analysis Time Period	DSK Kelly Eng 3/2/2021 PM Peak		Jurisdi Analys			Kelso Roo City of Sa 2021	ad & Bluff i andy	Road
Project Description Exi								-
East/West Street: Kelso					t: Bluff Ro	pad		
ntersection Orientation:	North-South		Study	Period (hrs): 0.25			
Vehicle Volumes an	d Adjustme	nts						
Major Street		Northbound				Southbou	ınd	
Movement	1	2	3		4	5		6
	L L	T	R		L	T		R
Volume (veh/h)	41	116	5		0	152		10
Peak-Hour Factor, PHF	0.82	0.82	0.82	<u></u>	0.82	0.82		0.82
Hourly Flow Rate, HFR (veh/h)	50	141	6		0	185		12
Percent Heavy Vehicles	1				1			
Median Type				Undivide	d			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LTR				LTR			
Jpstream Signal		0				0		
Vinor Street		Eastbound				Westbou	nd	
Vovement	7	8	9		10	11		12
	L	Т	R		L	T		R
Volume (veh/h)	19	2	87		1	4		0
Peak-Hour Factor, PHF	0.82	0.82	0.82	!	0.82	0.82		0.82
Hourly Flow Rate, HFR (veh/h)	23	2	106		1	4		0
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0			trace-uncomficient applyind College Stick-en-laten (Pu-Indoor-etf-Styree	0		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration		LTR			and which are high resolven and the second and the	LTR		
Delay, Queue Length, a	nd Level of Se							
Approach	Northbound	Southbound		Westbound	4	T	Eastbound	
Movement	1	4	7	8	9	10	11	12
	LTR	LTR		LTR	1	10	LTR	12
Lane Configuration					-	-		-
v (veh/h)	50	0		5	-	-	131	-
C (m) (veh/h)	1382	1441		476			759	-
v/c	0.04	0.00		0.01			0.17	-
95% queue length	0.11	0.00		0.03			0.62	
Control Delay (s/veh)	7.7	7.5		12.6			10.7	
LOS	Α	A		В			В	
Approach Delay (s/veh)	***	200,000		12.6	***************************************		10.7	
Approach LOS	Who pass	serve .		В		1	В	

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	TW	O-WAY STOP	CONTRO	OL SUM	MARY			
General Information	ı		Site Ir	nformati	on			
Analyst	DSK		Interse	ection		Kelso Ro	ad & Bluff	Road
Agency/Co.	Kelly Eng	ineering	Jurisdi	ction		City of Sa	andy	
Date Performed	3/2/2021	-	Analys	is Year		2023		
Analysis Time Period	PM Peak	Hour						
Project Description Ye	ar 2023 w/o Pro	ject	and the second s					
East/West Street: Kelso	Road		North/S	South Stre	et: Bluff Ro	oad		
ntersection Orientation:	North-South		Study F	Period (hrs	s): 0.25			
Vehicle Volumes ar	nd Adjustmer	nts						
Major Street		Northbound				Southbou	ınd	
Movement	1	2	3		4	5		6
	L	T	R		L	T		R
Volume (veh/h)	43	122	5		0	160		11
Peak-Hour Factor, PHF	0.82	0.82	0.82		0.82	0.82		0.82
Hourly Flow Rate, HFR (veh/h)	52	148	6		0	195		13
Percent Heavy Vehicles	1				1			
Median Type				Undivide	ed			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LTR				LTR			
Jpstream Signal		0				0		
Minor Street		Eastbound				Westbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	T		R
Volume (veh/h)	13	2	92		1	4		0
Peak-Hour Factor, PHF	0.82	0.82	0.82		0.82	0.82		0.82
Hourly Flow Rate, HFR (veh/h)	15	2	112		1	4		0
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0			nay timothach had o do color of survey open to asy and color posterior and	0		
Flared Approach		N	T			N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	1	0		0	1 1		0
Configuration		LTR	1		riittiganiinteendinan oosaasaahtajiiran ii-naveropyn divasan	LTR		
Delay, Queue Length, a	nd Level of Ser							
Approach	Northbound	Southbound	1	Westboun	d		Eastbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	-	LTR	1	1	LTR	+
v (veh/h)	52	0		5	1	 	129	
C (m) (veh/h)	1369	1433	***************************************	460	1		772	+
***************************************					+	-	0.17	+
//C	0.04	0.00		0.01	-	-	-	-
95% queue length	0.12	0.00		0.03	-		0.60	-
Control Delay (s/veh)	7.7	7.5		12.9		-	10.6	
LOS	Α	Α		В			В	
Approach Delay (s/veh)	strops			12.9			10.6	
						B		

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		O-WAY STOP	0011111	or com	INIT I				
General Information	Site Information								
Analyst DSK Agency/Co. Kelly Engineering Date Performed 3/2/2021 Analysis Time Period PM Peak Hour			Intersection Jurisdiction Analysis Year			Kelso Road & Bluff Road City of Sandy 2023			
Project Description Year	ar 2023 with Pro	ject	ana, ng manana Andre an mga ting ti na manasina an ang ang ang ang ang ang ang ang an		tapak dikadipun sharan tifaka aka a Indianah Pikarah unturuk propinsi binah Pi	aka Arabana da disaman rapid da malaman da Arapa di iliang rapin di ma			
East/West Street: Kelso		5	North/S	South Stre	et: Bluff Ro	ad			
ntersection Orientation:	North-South		Study F	Period (hrs	s): 0.25				
Vehicle Volumes an	d Adjustmer	nts							
Major Street	Northbound					Southbound			
Movement	1 2		3		4	5		6	
	L	Т	R		L	T		R	
Volume (veh/h)	54	122	5		0	160		12	
Peak-Hour Factor, PHF	0.82	0.82	0.82		0.82	0.82		0.82	
Hourly Flow Rate, HFR (veh/h)	65	148	6		0	195		14	
Percent Heavy Vehicles	1	sale site	aptenior		1				
Median Type			Undivided						
RT Channelized			0					0	
anes	0	1	0		0	1		0	
Configuration	LTR				LTR				
Jpstream Signal		0			Company of the Compan	0			
Minor Street		Eastbound				Westbound			
Movement	7	8	9		10	11	T	12	
	L	Т	R		L	T		R	
Volume (veh/h)	14	2	98		1	4		0	
Peak-Hour Factor, PHF	0.82	0.82	0.82		0.82	0.82		0.82	
Hourly Flow Rate, HFR (veh/h)	17	2	119		1	4		0	
Percent Heavy Vehicles	0	0	0		0	0		0	
Percent Grade (%)		0				0			
Flared Approach		N	T			N	T		
Storage		0			ubinosysty seessä elyven tuuritaasi tileet hittopissa elivatuuja esittiini	0			
RT Channelized			0		gyannan-an-aitu kain-an-aadi atalasin-anada atii-dassa-an-adai			0	
anes	0	1	0		0	1		0	
Configuration	<u> </u>	LTR	0			LTR			
Delay, Queue Length, a	nd Level of Ser								
Approach	Northbound	Southbound	Westbound		Eastbound				
Movement	1	4	7	8	9	10	11	12	
_ane Configuration	LTR	LTR		LTR	1 -	10	LTR	+	
					+	-		+	
v (veh/h)	65	0		5			138	-	
C (m) (veh/h)	1368	1433		437		-	761	-	
//c	0.05	0.00		0.01		-	0.18		
95% queue length	0.15	0.00	0.03			0.66			
Control Delay (s/veh)	7.8	7.5		13.3			10.8		
LOS	Α	Α		В			В		
Approach Delay (s/veh)		no de	13.3		an hara yan di di anta kanan da panaha da maka mana da ana panaha maka manan da hara ayan da hara ayan da hara aya	10.8		anne a Maria en una como que ante en en entre de la como de la com	
			B		В				

	I A/	O-WAY STOP	CONTRO	OF SOIM	WARI			
General Information			Site Information					
Analyst DSK			Interse	ection		Kelso Road & site access		
Agency/Co.	Kelly Engineering		Jurisdiction			City of Sandy		
Date Performed	3/2/2021		Analysis Year		2023			
Analysis Time Period AM Peak Hour								
Project Description Ye	ar 2023 with Pro	piect		nananaguminiya dhasayahidh hoyasahi bahisad				
East/West Street: Kelso			North/S	South Stre	et: site acc	eess		
Intersection Orientation: East-West			Study Period (hrs): 0.25					
Vehicle Volumes an	d Adjustme	nts						
Major Street		Eastbound			Westbound			
Movement	1				4	5		6
	L	T	R		L	T		R
/olume (veh/h)		159	4		4	271		
Peak-Hour Factor, PHF	0.82	0.80	0.80		0.80	0.80		0.82
lourly Flow Rate, HFR (veh/h)	0	198	4		4	338		0
Percent Heavy Vehicles	0	_	aparine .		0			
Median Type			Undivided					
RT Channelized			0				0	
anes	0	1	0		0	1		0
Configuration			TR		LT			
Jpstream Signal		0				0		
Minor Street		Northbound			Southbound			
Movement	7	8	9		10	11	T	12
	i	T	R		L	T		R
/olume (veh/h)	13		11			 		
Peak-Hour Factor, PHF	0.80	0.82	0.80		0.82	0.82		0.82
Hourly Flow Rate, HFR (veh/h)	16	0	13		0	0		0
Percent Heavy Vehicles	0	0	0		1	0		0
Percent Grade (%)		0				0		
Flared Approach		N			trajanomining nepulititi adi sulti ilian piching kyndrosit ni uni asitoinen et	N		oranickneuwenklarte-yeneiler-yeffeneile ve
Storage		0				0		
RT Channelized			0					0
	0	0	0		0	0		0
_anes Configuration		LR	-			+		
	gth, and Level of Service		Northbound			Southbound		
Approach	Eastbound	Westbound	7					
Movement	1	4	/	8	9	10	11	12
ane Configuration		LT		LR		-		
/ (veh/h)		4		29				
C (m) (veh/h)		1382		613				
//c	-	0.00		0.05				
95% queue length	temperatural teleproprior appropriate and southern to population and the contract telepropriate and telepropriate	0.01	0.15					
Control Delay (s/veh)		7.6		11.2	1	†		1
LOS		A	B B				1	
				L		+	L	1
Approach Delay (s/veh)	20 to	Manage		11.2		-		
Approach LOS				В				

		O-WAY STOP								
General Information				Site Information						
Analyst Agency/Co. Date Performed	DSK Kelly Eng 3/2/2021	Jurisdi	Intersection Jurisdiction Analysis Year			Kelso Road & site access City of Sandy 2023				
Analysis Time Period PM Peak Hour										
Project Description Yea	ar 2023 with Pr	oject								
East/West Street: Kelso	Road		North/S	South Stre	et: site acc	ess				
ntersection Orientation:	East-West		Study F	Period (hrs	s): 0.25					
Vehicle Volumes an	d Adjustme	nts								
Major Street		Eastbound				Westbound				
Movement	1 2		3		4	5		6		
	L	T	R		L	T		R		
Volume (veh/h)		266	15		12	108				
Peak-Hour Factor, PHF	0.82	0.80	0.80		0.80	0.80		0.82		
Hourly Flow Rate, HFR (veh/h)	0	332	18		14	134		0		
Percent Heavy Vehicles	0				0			-		
Median Type		Undivided								
RT Channelized			0		mentyaltomalisiphopitiseAnapamonikitää Arkikukuun järaasipavain			0		
Lanes	0	1	0		0	1		0		
Configuration			TR		LT					
Upstream Signal		0				0				
Minor Street		Northbound				Southbou	nd			
Movement	7	8	9		10	11				
	L	T	R		L	T		R		
Volume (veh/h)	9		7							
Peak-Hour Factor, PHF	0.80	0.82	0.80		0.82	0.82		0.82		
Hourly Flow Rate, HFR (veh/h)	11	0	8		0	0		0		
Percent Heavy Vehicles	0	0	0		1	0		0		
Percent Grade (%)		0				0				
Flared Approach		N				N				
Storage		0				0				
RT Channelized			0					0		
Lanes	0	0	0	0		0	0			
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbound		S	outhboun	bound		
Movement	1	4	7	8	9	10	11	12		
Lane Configuration		LT		LR				1		
v (veh/h)		14		19			*	1		
C (m) (veh/h)		1220		589	-	-		+		
		0.01			-			+		
V/C				0.03	-	+		+		
95% queue length		0.03		0.10	-	-		-		
Control Delay (s/veh)		8.0		11.3		-		-		
LOS		Α		В						
Approach Delay (s/veh)				11.3						
Approach LOS	and the	-	В							

APPPENDIX F REFERENCES

References

- 1. <u>Trip Generation Manual</u>, 10th Edition, 2017, Institute of Transportation Engineers.
- 2. <u>Highway Capacity Manual</u>, 2000 and 2010, Transportation Research Board, National Research Council.
- 3. Discussions with staff from Clackamas County.
- 4. Discussions with staff from the City of Sandy.
- 5. The City of Sandy, Pre-Application Conference Notes, Sandy Woods Phase 2, March 11, 2020.
- 6. Clackamas County Memorandum, Department of Transportation and Development, March 11, 2020.
- 7. Sandy Bluff Annex 6 Subdivision & Future Development, Transportation Impact Study, Lancaster Engineering, 321 SW 4th Ave., Suite 400, Portland, OR 97204.