



## TRANSPORTATION IMPACT ANALYSIS

**To**  
City of Hermiston

**For**  
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**Prepared**  
July 22, 2019

**C&A Project Number**  
20190407.00

## TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	1
II.	INTRODUCTION	2
	Property Description and Proposed Land Use Actions	2
	Transportation Analysis Description	2
	Study Area	2
	Analysis Scenarios	2
III.	EXISTING CONDITIONS	3
	Existing Site Conditions	3
	Roadway Facilities	3
	Safety Analysis	3
	Existing Traffic Volumes	4
IV.	reasonable worst-case development Scenarios	5
	Current Future Urban (FU-10) Zone Designation	5
	Proposed Outlying Commercial (C-2) Zone Designation	5
	Proposed Neighborhood Commercial Overlay (NCO) Zone Designation	6
	Proposed Multi-Family Residential (R-3) Zone Designation	6
	Development Trip Generation	7
V.	Plan Year Conditions	9
	Background Growth	9
	Plan Year Traffic Volumes – Current Zone Designation	9
	Trip Distribution and Traffic Assignment	9
	Plan Year Traffic Volumes – Proposed Zone Designations	9
VI.	INTERSECTION ANALYSIS	10
	Analysis Scope	10
	Analysis Description	10
	Operations Analysis	11
	Site Access Analysis	11
VII.	Conclusion	12
VIII.	APPENDICES	13
	A. Figures	
	B. Crash Data	
	C. Traffic Count Summaries	
	D. Operation Analyses	

## LIST OF TABLES

Table 1 – Existing Roadway Characteristics	3
Table 2 – Intersection Crash Rates	4
Table 3 – Reasonable Worst- Case Development Trip Generation	8
Table 4 – Intersection Operations Analysis	11

## LIST OF FIGURES

1. Study Area
2. 2019 Existing Conditions – PM Peak Hour
3. 2039 Current Zone Designation – PM Peak Hour
4. C-2 Zone Designation Development – Primary (Net New) Trips
5. C-2 Zone Designation Development – Pass-By/Diverted-Link Trips
6. NCO and R-3 Zone Designation Development – Primary (Net New) Trips
7. NCO and R-3 Zone Designation Development – Pass-By/Diverted-Link Trips
8. 2039 Proposed Zone Designation – PM Peak Hour

## I. EXECUTIVE SUMMARY

The following summarizes the analysis and findings contained in this Transportation Impact Analysis (TIA).

1. Proposed land use actions include: 1) A Comprehensive Plan Amendment and Zone Change from Future Urban 10-acre minimum (FU-10) to Commercial (C-2), Neighborhood Commercial Overlay (NCO) and Multi-Family Residential (R-3).
2. Because specific development is unknown, the TIA evaluates impacts resulting from reasonable worst-case development scenarios. Specifically, the C-2 zone scenario assumes 21,780 square feet of retail space, the NCO zone scenario assumes 32,670 square feet of retail space, the R-3 zone scenario assumes 123 single-family residences and 158 apartments. The resulting proposed zone designation development scenarios generate an additional 306 PM peak hour trips over the current zone designation.
3. All study area intersection crash rates are less than the 90<sup>th</sup> percentile crash rates of the reference intersections. As such, the intersections are considered relatively safe and no further evaluation of safety deficiencies is necessary.
4. All study intersections are anticipated to operate within agency mobility standards in the 2039 Current and Proposed Zone Designation scenarios. As such, no improvements are specifically necessary to mitigate the Proposed Zone Designation transportation impacts.
5. This land use action is specifically for a Comprehensive Plan Amendment and Zone Change and not a specific development application; therefore, additional transportation analysis may be necessary to support a specific development application.



## II. INTRODUCTION

### Property Description and Proposed Land Use Actions

The subject property is located south of E Elm Avenue (OR 207), north of Diagonal Road, and east of NE 10<sup>th</sup> Street. The subject property is 36.3 acres in size and is described as tax lot 300 on Umatilla County Assessors Map 4N-28-12B. The property is currently undeveloped and has access to all abutting roadways. The study area is illustrated in the attached Figure 1 in Appendix A.

The property is currently planned Future Commercial and zoned Future Urban 10-acre minimum (FU-10). Proposed land use actions include a Comprehensive Plan Amendment and Zone Change for 2 acres to Commercial (C-2), 3 acres to Neighborhood Commercial Overlay (NCO) and 31.3 acres to Multi-Family Residential (R-3). It is further noted the Applicant intends to pursue a specific development application at a later date via a separate land use application. As such, the subject land use action is only for a Comprehensive Plan Map Amendment and Zone Change and specific development is not contemplated. The proposed zone areas and conceptual development plan are illustrated in the attached Exhibit 1 in Appendix A.

### Transportation Analysis Description

Subject land use actions include a Comprehensive Plan Amendment and Zone Change request; therefore, the TIA addresses criteria identified in the following:

- Transportation Planning Rule (TPR) criteria outlined in Oregon Administrative Rule (OAR) 660-012-0060
- City of Hermiston Municipal Code requirements outlined in Chapter 156.09.

### Study Area

Based on development trip generation and distribution described later in this analysis, the following project area intersections and development accesses are evaluated and are illustrated in the attached Figure 2 in Appendix A.

- |   |  |
|---|--|
| ▪ E Elm Avenue (OR 207)/NE 4 <sup>th</sup> Street       | ▪ Diagonal Road/NE 10 <sup>th</sup> Street |
| ▪ E Elm Avenue (OR 207)/NE 10 <sup>th</sup> Street      | ▪ Diagonal Road/South Site Access          |
| ▪ E Elm Avenue (OR 207)/ North Site Access              | ▪ Diagonal Road/E Hooker Road              |
| ▪ E Elm Avenue (OR 207)/Diagonal Road                   | ▪ E Hooker Road/East Site Access           |
| ▪ Diagonal Road/NE 7 <sup>th</sup> Street/E Main Street |  |

### Analysis Scenarios

The subject land use action does not contemplate specific development. Rather, it contemplates a Comprehensive Plan Amendment and Zone Change request addressing both TPR and City requirements. As such, weekday PM peak hour conditions are evaluated for the 2019 existing “base” year and the 2039 planning horizon year. Analysis scenarios include:

- 2019 Existing Conditions
- 2039 Current Zone Designation
- 2039 Proposed Zone Designations

### III. EXISTING CONDITIONS

#### Existing Site Conditions

The subject property is located south of E Elm Avenue (OR 207), north of Diagonal Road, and east of NE 10<sup>th</sup> Street. The subject property is 36.3 acres in size and is described as tax lot 300 on Umatilla County Assessors Map 4N-28-12B. The site area is illustrated in the attached Figure 1.

The property is currently undeveloped and has access to all abutting roadways.

#### Roadway Facilities

The following table summarizes existing roadway classifications and characteristics in the study area.

TABLE 1 – EXISTING ROADWAY CHARACTERISTICS						
Roadway	Functional Classification	Lanes	Posted Speed (MPH)	Sidewalks	Bicycle Lanes	On-Street Parking
E Elm Avenue (OR 207)	Urban Minor Arterial – Hermiston Regional Highway - ODOT	2	40	No	No	No
Diagonal Road	Urban Major Collector	2	35	No	Yes	No
E Main Street	Urban Major Collector – W/O NE 7 <sup>th</sup> Street Local – E/O NE 7 <sup>th</sup> Street	2	25	Yes	No	Yes
NE 4 <sup>th</sup> Street	Urban Minor Arterial	2	25	Yes	No	No
NE 7 <sup>th</sup> Street	Local	2	Not Posted	Yes	No	Yes
NE 10 <sup>th</sup> Street	Urban Major Collector	2	Not Posted	No	No	No
E Hooker Road	Rural Collector	2	Not Posted	No	No	No

#### Safety Analysis

When evaluating intersection safety, consideration is given to the total number and types of crashes occurring and the number of vehicles entering the intersection. This leads to the concept known as “crash rate,” typically expressed in terms of the number of crashes occurring per one million vehicles entering the intersection (crashes/mev). A critical crash rate analysis is then performed by comparing the subject intersection to the published statewide 90<sup>th</sup> percentile intersection crash rates at comparable/reference intersections. Crash rates close to or exceeding the 90<sup>th</sup> percentile rates require further analysis.

Crash data for the study area intersections were obtained from the Oregon Department of Transportation (ODOT) for a five-year period from January 1, 2012 through December 31, 2016. The following table presents the study intersection crash rates and critical crash analysis. All crash data and crash rate calculations are provided in Appendix B.



TABLE 2 – INTERSECTION CRASH RATES										
Intersection	2012	2013	2014	2015	2016	2017	Total	Observed Crash Rate (crashes/mev)	Reference Population	
									Description <sup>1</sup>	90 <sup>th</sup> ile Crash Rate
E Elm Avenue (OR 207) / NE 4 <sup>th</sup> Street	—	3	2	4	0	3	12	0.567	Urban 4SG	0.860
E Elm Avenue (OR 207) / NE 10 <sup>th</sup> Street	0	1	1	0	1	—	3	0.219	Urban 4ST	0.408
E Elm Avenue (OR 207) / Diagonal Road	0	0	0	1	0	—	1	0.082	Rural 4ST	1.080
Diagonal Road / NE 7 <sup>th</sup> Street / E Main Street	—	1	1	0	0	0	2	0.206	Urban 4ST	0.408
Diagonal Road / NE 10 <sup>th</sup> Street	0	0	0	1	0	—	1	0.113	Rural 4ST	1.080
Diagonal Road / E Hooker Road	1	0	1	1	0	—	3	0.419	Rural 3ST	0.475

<sup>1</sup> 4SG (Four-Led Signalized), 4ST (Four-Leg Minor Stop-Control), 3ST (Three-Leg Minor Stop-Control)

All study area intersection crash rates are less than the 90<sup>th</sup> percentile crash rates of the reference intersections. As such, the intersections are considered relatively safe and no further evaluation of safety deficiencies is necessary.

### Existing Traffic Volumes

Existing mid-week PM peak hour intersection turning movement traffic counts were obtained in June 2019, except for the E Elm Avenue (OR 207)/NE 10<sup>th</sup> Street intersection which were obtained in January 2018. All intersection counts meet ODOT guidelines of being three years old or less.

2019 Existing Conditions traffic volumes on the ODOT roadway system are adjusted to the 30<sup>th</sup> highest hour (30HV) consistent with procedures identified in the ODOT Analysis Procedures Manual Version 2 Chapter 5. The on-site ATR method was used to calculate a seasonal adjustment factor of 1.03 which was applied to the three study intersections and one site access on the ODOT roadway system. Seasonal adjustment calculations are included in Appendix C.

2019 Existing Conditions traffic volumes are illustrated in the attached Figure 2. Traffic counts are included in Appendix C.

#### **IV. REASONABLE WORST-CASE DEVELOPMENT SCENARIOS**

The subject property is currently undeveloped and specific development is unknown; however, the Applicant anticipates the development will include both commercial and residential uses. As such, the following reasonable worst-case development scenarios for the Current and Proposed Zone Designations were developed based on permitted uses identified in the Umatilla County and Hermiston Development Codes and are more specifically described as follows:

##### **Current Future Urban (FU-10) Zone Designation**

###### ***Description***

The FU-10 zone designation is designed to implement the growth management policies around the Hermiston Urban Growth Boundary; to provide for interim uses consistent with the plan policies until conversion to urban uses; to retain the land suitable for future urban development in large parcels which will enable more cost-effective urban redevelopment of the land.

Lots are kept large as urban services are not yet available to these areas and development is limited to the land capability of accepting septic tanks and drain fields while still providing safe drinking water.

###### ***Reasonable Worst-Case Development Assumptions***

- 10-acre minimum parcel size, resulting in three potential development lots.
- Given the limited number of permitted land uses and no urban services, it is assumed each lot is developed with a single-family residence.

##### **Proposed Outlying Commercial (C-2) Zone Designation**

###### ***Description***

The C-2 zone allows all uses permitted in the C-1 zone (which includes a wide range of commercial uses), and an additional, limited number of commercial uses that are generally auto-dependent.

###### ***Reasonable Worst-Case Development Assumptions***

- Gross site area is 2 acres (87,120 square feet).
- 25% building area coverage accounting for parking, site circulation, and landscaping.
- Development is a collection of small neighborhood-oriented retail spaces totaling 21,780 square feet.
- A review of ITE *Trip Generation Manual*, 10<sup>th</sup> Edition data finds a Shopping Center (Land Use Code 820), which contains a large number of commercial land uses, including neighborhood centers, to have the highest trip generation.



## Proposed Neighborhood Commercial Overlay (NCO) Zone Designation

### *Description*

The NCO zone designation creates a commercial environment providing a broad range of commercial services to dense residential users within walking distance. The goal is to take advantage of opportunities for infill, redevelopment, and new development in outlying commercial areas; and to allow different types of compatible land uses close together to shorten traffic trips and facilitate all modes of transportation such as vehicles, pedestrians, and bicycles.

### *Reasonable Worst-Case Development Assumptions*

- Gross site area is 3 acres (130,680 square feet).
- 25% building area coverage accounting for parking, site circulation, and landscaping.
- Development is a collection of small neighborhood-oriented retail spaces totaling 32,670 square feet.
- A review of ITE *Trip Generation Manual*, 10<sup>th</sup> Edition data finds a Shopping Center (Land Use Code 820), which contains a large number of commercial land uses including neighborhood centers to have the highest trip generation.

## Proposed Multi-Family Residential (R-3) Zone Designation

### *Description*

The R-3 zone allows all uses permitted in the R-1 and R-2 zones; bed and breakfast, boarding, lodging, or rooming houses; multiple-family dwellings; and residential care facilities.

### *Reasonable Worst-Case Development Assumptions*

- 20% of the site area used for right-of-way and other infrastructure.
- The net developable area is 25.04 acres.
- Based on projected City development trends, approximately 70% of the site (17.53 acres) will develop as single-family residential at a density of 7 dwelling units per acre and 30% (7.51 acres) will develop as multi-family residential at a density of 21 dwelling units per acre.
- The development includes 123 single-family residences and 158 apartments.
- A review of ITE *Trip Generation Manual*, 10<sup>th</sup> Edition data finds Multifamily Housing (Low-Rise) (Land Use Code 220) to have the highest trip generation for the apartments.



## Development Trip Generation

Because specific development is unknown, trip generation is based on the reasonable worst-case development scenarios described in the previous section which includes commercial and residential uses.

The intensity, proximity, and variety of proposed land uses suggests it is likely some trips will travel between proposed uses in the development. This characteristic is referred to as internal (or shared) trip capture which is the portion of trips generated by a mixed-use development having both an origin and destination in the development. The importance of identifying internal trip capture is these trips satisfy a portion of the total development trip generation without using the external roadway system. As a result, a mixed-use development with internal trip capture has less impact on the external road system than does a single-use development generating the same number of total trips. Internal capture trips were calculated using practices from the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition and which is based on the Transportation Research Board's National Cooperative Highway Research Program (NCHRP) Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Detailed internal capture calculations are attached for reference in Appendix C.

It is noted no internal trip capture is assumed for the portion of the property with the proposed C-2 zone designation because the property is separate from; i.e., not immediately adjacent to, the property with the proposed residential zone designations.

Further, for all commercial uses, a portion of the trips generated are primary (new trips on the roadway system traveling specifically to/from the proposed development), and a portion are pass-by (existing trips on the roadway system that 'divert' to the subject development before continuing on their original trip path to their destination.)

Trip generation was estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition and practices from the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition for the assumed reasonable worst-case development scenarios. The following table presents development trip generation estimates.

TABLE 3 – REASONABLE WORST- CASE DEVELOPMENT TRIP GENERATION					
Land Use	ITE Code	Size	PM Peak Hour		
			Enter	Exit	Total
Proposed C-2 Zone Designation					
Total Trips – Shopping Center <sup>1</sup>	820	21,780 SF	40	43	83
Pass-By/Diverted-Link Trips – Shopping Center (34% Enter / 34% Exit) <sup>2</sup>			(14)	(15)	(29)
Primary (Net New) Trips – C-2 Zone Designation			26	28	54
Proposed NCO Zone Designation					
Total Trips – Shopping Center <sup>1</sup>	820	32,670 SF	59	65	124
Internal Capture Trips – Retail (8% Enter / 26% Exit) <sup>3</sup>			(5)	(17)	(22)
External Trips			54	48	102
Pass-By/Diverted-Link Trips – Shopping Center (34% Enter / 34% Exit) <sup>2</sup>			(18)	(16)	(34)
Primary (Net New) Trips – NCO			36	32	68
Proposed R-3 Zone Designation					
Total Trips - Single-Family Detached Housing <sup>4</sup>	210	123 DU	78	46	124
Total Trips - Multifamily Housing (Low-Rise) <sup>4</sup>	220	158 DU	56	33	89
Total Trips – All Residential Uses			134	79	213
Internal Capture Trips – Residential (16% Enter / 8% Exit) <sup>3</sup>			(20)	(6)	(26)
Primary (Net New) Trips – R-3 Zone Designation			114	73	187
Primary (Net New) Trip Generation – All Proposed Zone Designations			176	133	309
Current FU-10 Zone Designation					
Primary Trips – Single-Family Detached Housing	210	3 DU	2	1	3
Change in Trip Generation (Proposed – Existing)			174	132	306

<sup>1</sup> Trip generation estimated using the Average Rate per recommended practice in the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition.

<sup>2</sup> Pass-By trip percentages based on ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition recommended practice.

<sup>3</sup> Internal Capture trip percentages based on NCHRP 684 methodologies contained in the attached worksheet in Appendix C.

<sup>4</sup> Trip generation estimated using the Fitted Curve per recommended practice in the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition.

As identified in the table above, the reasonable worst-case development scenario in the Proposed Zone Designations generates an additional 306 PM peak hour trips over the Current FU-10 Zone Designation.

## **V. PLAN YEAR CONDITIONS**

### **Background Growth**

Based on a review of the Hermiston Transportation System Plan and discussions with City staff, background traffic growth for the planning period duration is assumed to be 1.5% per year on the local and regional roadways.

### **Plan Year Traffic Volumes – Current Zone Designation**

2039 Current Zone Designation traffic volumes are the sum of the 2019 Existing traffic volumes and background traffic growth over the planning period and are illustrated in the attached Figure 3 in Appendix A.

### **Trip Distribution and Traffic Assignment**

Based on anticipated property development patterns, the future internal roadway system on the subject property will access the external public roadway in three locations as illustrated in the attached Figure 3, including:

- North to E Elm Avenue (OR 207)
- South to Diagonal Road
- East to E Hooker Road

The resulting reasonable worst-case development trip generation identified in the previous section of this TIA was distributed onto the roadway system based on existing intersection volumes, surrounding land uses, and engineering judgment. Resulting trip distribution and development traffic assignment are illustrated in the attached Figures 4 and 5 in Appendix A for the site area with the Proposed C-2 Zone Designation and Figures 6 and 7 for the site area with the proposed NCO and R-3 zone designations.

### **Plan Year Traffic Volumes – Proposed Zone Designations**

2039 Proposed Zone Designation traffic volumes are the sum of the 2039 Current Zone designation traffic volumes and traffic from the reasonable worst-case development scenario and are illustrated in the attached Figure 8 in Appendix A.



## VI. INTERSECTION ANALYSIS

### Analysis Scope

Based on City recommendations, the following intersections are analyzed:

- E Elm Avenue (OR 207)/NE 4<sup>th</sup> Street
- E Elm Avenue (OR 207)/NE 10<sup>th</sup> Street
- E Elm Avenue (OR 207)/ North Site Access
- E Elm Avenue (OR 207)/Diagonal Road
- Diagonal Road/NE 7<sup>th</sup> Street/E Main Street
- Diagonal Road/NE 10<sup>th</sup> Street
- Diagonal Road/South Site Access
- Diagonal Road/E Hooker Road
- E Hooker Road/ East Site Access

### Analysis Description

Plan year intersection peak hour factors (PHFs) are based on the ODOT *Analysis Procedures Manual* Version 2, Section 5.8.3. Specifically, the following plan year intersection PHFs are assumed:

- 0.95 for major arterial-major arterial
- 0.90 for minor arterial-minor arterial
- 0.85 for collector-collector or lower classification

Further, if the existing intersection PHF is higher than the assumed PHFs described above, the existing intersection PHF is used.

Intersection operation characteristics are generally defined by two mobility standards: volume-to-capacity (v/c) ratio and level-of-service (LOS). At signalized intersections, the v/c ratio is a measurement of an intersection's ability to accommodate the critical movements, while LOS is based on the average control delay per vehicle for the entire intersection. At unsignalized intersections, the v/c ratio and LOS are calculated for intersection approach movements yielding right-of-way.

The City of Hermiston mobility standard for signalized and unsignalized intersections is LOS D or better.

Table 6 of Policy 1F in the *Oregon Highway Plan* (OHP), as updated through November 21, 2014, provides ODOT mobility targets for state roadways. In the study area, E Elm Street (OR 207) is defined as a Regional Highway, inside the urban growth boundary of a non-metropolitan planning organization (MPO), and with a posted speed between 35 and 45 MPH. The intersection mobility target along this roadway is a v/c ratio  $\leq 0.85$ . It is further noted that the two-way stop-controlled (TWSC) intersections under ODOT jurisdiction are evaluated using two mobility targets; one for the major roadway (State Highway) approaches and one for the minor roadway approaches. The mobility target v/c ratio  $\leq 0.85$  is applied to the major roadway approaches and the target v/c ratio  $\leq 0.90$  is applied to the minor roadway approaches.

## Operations Analysis

Unsignalized (stop-controlled) intersection operations analyses were performed in accordance with the Transportation Research Board's *Highway Capacity Manual 2010* (HCM 2010) methodologies using Trafficware's *Synchro* software (Version 9). Signalized intersection operations analysis was performed implementing *HCM 2000* methodologies.

The proposed land use action is for a Comprehensive Plan Amendment and Zone Change and not a specific development application. As such, the TIA evaluates PM peak hour operating conditions in the 2019 Existing "base" year and the 2039 planning horizon year. Analysis scenarios include:

- 2019 Existing Conditions
- 2039 Current Zone Designation
- 2039 Proposed Zone Designation

The following table summarizes weekday PM peak hour analysis results. Data output sheets from all operations calculations are attached in Appendix D.

TABLE 4 – INTERSECTION OPERATIONS ANALYSIS				
Intersection	Critical Movement Lane Group	v/c Ratio or LOS		
		2019 Existing	2039 Current Zone Designation	2039 Proposed Zone Designation
E Elm Avenue (OR 207) / NE 4 <sup>th</sup> Street	Intersection	0.43	0.55	0.57
	NB L/T/R	0.31	0.62	0.73
E Elm Avenue (OR 207) / NE 10 <sup>th</sup> Street	SB L/T/R	0.21	0.40	0.51
	EB L	0.04	0.05	0.05
	WB L	0.00	0.00	0.00
E Elm Avenue (OR 207) / North Site Access	NB L/T/R	—	0.00	0.15
	WB L/T	—	0.00	0.03
	NB T/L	0.09	0.18	0.24
E Elm Avenue (OR 207) / Diagonal Road	NB R	0.18	0.27	0.30
	SB L/T/R	0.01	0.01	0.01
	WB L	0.11	0.16	0.18
Diagonal Road / NE 7 <sup>th</sup> Street / E Main Street <sup>1</sup>	NB L/T/R	B	C	D
	SB L/T/R	B	B	C
Diagonal Road / NE 10 <sup>th</sup> Street	NB L/T/R	B	B	C
	SB L/T/R	B	C	C
Diagonal Road / South Site Access	SB L/R	—	A	B
Diagonal Road / E Hooker Road	WB L/R	B	B	B
E Hooker Road / East Site Access	SB L/R	—	A	A

<sup>1</sup> Due to the limited ability of Synchro software to analyze 5-leg intersections, the stop-controlled volumes were reassigned to represent a 4-leg intersection. No volumes were removed, and all existing conflicting movements were maintained for an accurate operations analysis.

As identified in the table above, all study intersections are anticipated to operate within agency mobility standards in the 2039 Current and Proposed Zone Designation scenarios. As such, no improvements are specifically necessary to mitigate the Proposed Zone Designation transportation impacts.

## Site Access Analysis

This land use action is specifically for a Comprehensive Plan Amendment and Zone Change and not a specific development application; therefore, additional transportation analysis may be necessary to support a specific development application.



## VII. CONCLUSION

The following summary and recommendations are based on materials contained in this analysis.

1. The subject property is located south of E Elm Avenue (OR 207), north of Diagonal Road, and east of NE 10<sup>th</sup> Street. The subject property is 36.3 acres in size and is described as tax lot 300 on Umatilla County Assessors Map 4N-28-12B. The property is currently undeveloped and has access to all abutting roadways.
2. The property is currently planned Future Commercial and zoned Future Urban 10-acre minimum (FU-10). Proposed land use actions include a Comprehensive Plan Amendment and Zone Change for 2 acres to Commercial (C-2), 3 acres to Neighborhood Commercial Overlay (NCO), 31.3 acres to Multi-Family Residential (R-3).
3. The Applicant intends to pursue a specific development application at a later date via a separate land use application. As such, the subject land use action is only for a Comprehensive Plan Map Amendment and Zone Change and specific development is not contemplated.
4. All study area intersection crash rates are less than the 90<sup>th</sup> percentile crash rates of the reference intersections. As such, the intersections are considered relatively safe and no further evaluation of safety deficiencies is necessary.
5. Reasonable worst-case development in the proposed C-2 zone includes a collection of small neighborhood-oriented retail spaces totaling 21,780 square feet and, in the NCO zone, it includes a collection of small neighborhood-oriented retail spaces totaling 32,670 square feet.
6. Reasonable worst-case development in the proposed R-3 zone includes 123 single-family residences and 158 apartments.
7. The reasonable worst-case development scenario in the Proposed Zone Designations generates an additional 3065 PM peak hour trips over the Current FU-10 Zone Designation.
8. All study intersections are anticipated to operate within agency mobility standards in the 2039 Current and Proposed Zone Designation scenarios. As such, no improvements are specifically necessary to mitigate the Proposed Zone Designation transportation impacts.
9. This land use action is specifically for a Comprehensive Plan Amendment and Zone Change and not a specific development application; therefore, additional transportation analysis may be necessary to support a specific development application.