

TECHNICAL MEMORANDUM #4

Pendleton IAMPs: Exit 207

Future Baseline Conditions: Transportation System Operations

Date: January 28, 2020 Project #: 24043

To: Technical Advisory Committee, Citizen Advisory Committee

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This memorandum describes future land-use and traffic growth projections and future traffic operations within the vicinity of the I-84 Exit 207 interchange. The information in this memorandum provides a basis for the development and analysis of potential project alternatives. It will inform the identification of various opportunities and constraints for meeting the goals and objectives of the interchange area management plan (IAMP).

FUTURE LAND USE ANALYSIS

The analysis of potential future land use in the Interchange Management Study Area (IMSA) builds off the analysis of vacant and re-developable land presented in the *Existing Conditions: System Inventory* memorandum (Reference 1). Most vacant and re-developable land within the IMSA is located north of the Exit 207 interchange near the Eastern Oregon Regional Airport. This land is primarily zoned for industrial uses (i.e., AA - Airport or M-1 - Light Industrial Zones). Vacant and re-developable land south of the interchange is zoned for a mix of industrial (i.e., M-1 – Light Industrial and M-2 – Heavy Industrial) and commercial (i.e., C-2 – Tourist Commercial) uses; though most vacant properties are zoned M-1.

The project team evaluated the development potential of the vacant and re-developable lands under their current zoning designations. Table 1 summarizes the results of this analysis by zone. Note that this analysis assumes full build-out of the vacant and re-developable properties and does not necessarily reflect 20-year development projections.

Table 1 – Estimated Development Potential

Zoning Designation	Development Potential ¹
Airport Activities (AA)	275,000
Light Industrial (M-1)	1,590,000
Heavy Industrial (M-2)	107,000
Tourist Commercial (C-2)	164,000

¹sq. ft. of gross leasable area

The land-use analysis is further described in Attachment “A.”

FUTURE TRAFFIC VOLUME GROWTH PROJECTIONS

The project team obtained the Pendleton Travel Demand Model for year 2015 and year 2040 from the Oregon Department of Transportation (ODOT) and used it to develop future traffic volumes within the Exit 207 Operations and Access Study Area (OASA). This process included manually redistributing some volumes and then post-processing the volumes using National Cooperative Highway Research Program (NCHRP) Report 765 methodology to develop intersection turning movement and link volumes for the AM and PM peak hours.

Modifications to Travel Demand Model Projections

An initial review of the future travel demand model revealed several roadway links within the Exit 207 OASA that experienced a decline in traffic volumes between year 2015 and year 2040. These declines were inconsistent with the projected growth in employment in the area. Further inspection revealed that the model was routing large amounts of traffic along US 30 to the Barnhart Road interchange with I-84 via a new connection along Old Airport Road (i.e., shifting demand from I-84 to this northerly route). To address this unrealistic shift in volumes, the project team redistributed some traffic volume from the US 30-Old Airport Road-Barnhart Road route to I-84. The project team also redistributed traffic volumes from Old Airport Road onto Airport Road to analyze conditions without this additional connection to the airport area.

Developing Final Projected Volumes

The project team post-processed the redistributed model volumes using the NCHRP Report 765 methodology, as recommended by the ODOT *Analysis Procedures Manual* (Reference 2). This analysis produced year 2040 intersection turning movements and I-84 link volumes for the AM and PM peak hours. These volumes were then balanced between study intersections. The resulting year 2040 traffic volumes are shown in Figures 1 and 2 for the AM and PM peak hour, respectively.

FUTURE BASELINE TRANSPORTATION SYSTEM OPERATIONS

The project team analyzed year 2040 AM and PM peak hour transportation operations for all study intersections within the Exit 207 OASA and for all I-84 merge, diverge, and mainline segments within the vicinity of the Exit 207 interchange. The traffic operations analysis was performed in accordance with the same methodologies used for the existing conditions operations analysis, presented in the *Existing Conditions: Transportation System Operations* memorandum (Reference 3).

ODOT uses volume-to-capacity (V/C) ratios to assess highway segment and intersection operations. The applicable mobility targets at each of the Exit 207 OASA study intersections, intersections along the US 30 corridor, I-84 interchange terminals, and highway segments are summarized in Table 2.

Table 2 – Study Intersection Performance Targets

Intersection	OHP Mobility Target
I-84 Westbound Off Ramp/US 30/Airport Road Connector	0.85 ¹
I-84 Westbound On Ramp/US 30	0.90 ²
I-84 Eastbound Off Ramp/US 30	0.85 ¹
I-84 Eastbound On Ramp/US 30	0.90 ²
US 30/Airport Road	0.90 US 30 approach / 0.90 Airport Road approach
Rieth Road/NW Pioneer Place ³	0.90 ³

¹ The I-84 westbound and eastbound off ramps were evaluated with a more conservative v/c of 0.85 per Action 1F.1 of the Oregon Highway Plan.

² There are no conflicting movements at the I-84 westbound and eastbound on ramp intersections. As such, the US 30 eastbound and westbound major street through movements were evaluated under the US 30 District Highway mobility target of 0.90.

³ The City of Pendleton does not have intersection or roadway performance targets – target v/c of 0.90 assumed.

⁴ The highway segment mobility target for I-84 is 0.80.

Study Intersections

The results of the year 2040 traffic operations analysis for the study intersections are shown in Figures 1 and 2 for the AM and PM peak hours, respectively. The critical movements at each intersection are forecast to operate below the applicable mobility targets outlined in Table 2. The critical movements are also forecast to operate at level of service (LOS) C or better during the AM and PM peak hours. *Intersection operations worksheets are shown in Attachment “B.”*

I-84 Merge, Diverge, and Mainline Segments

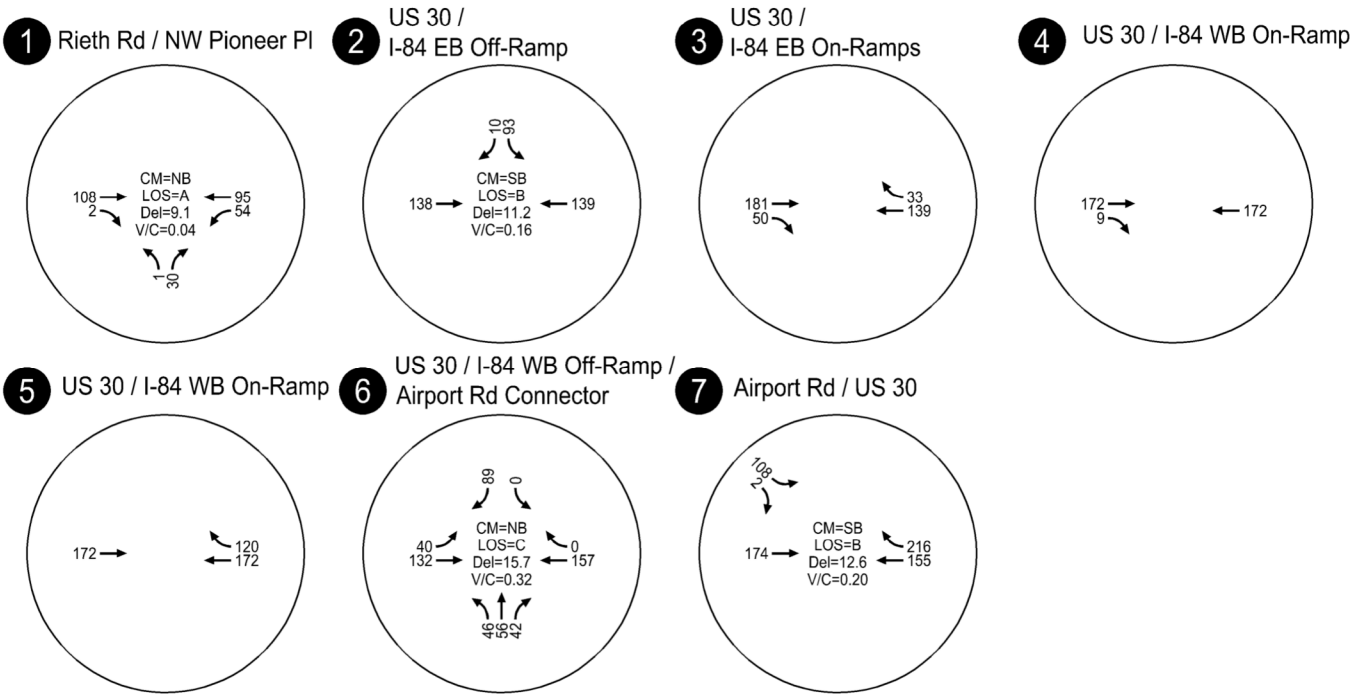
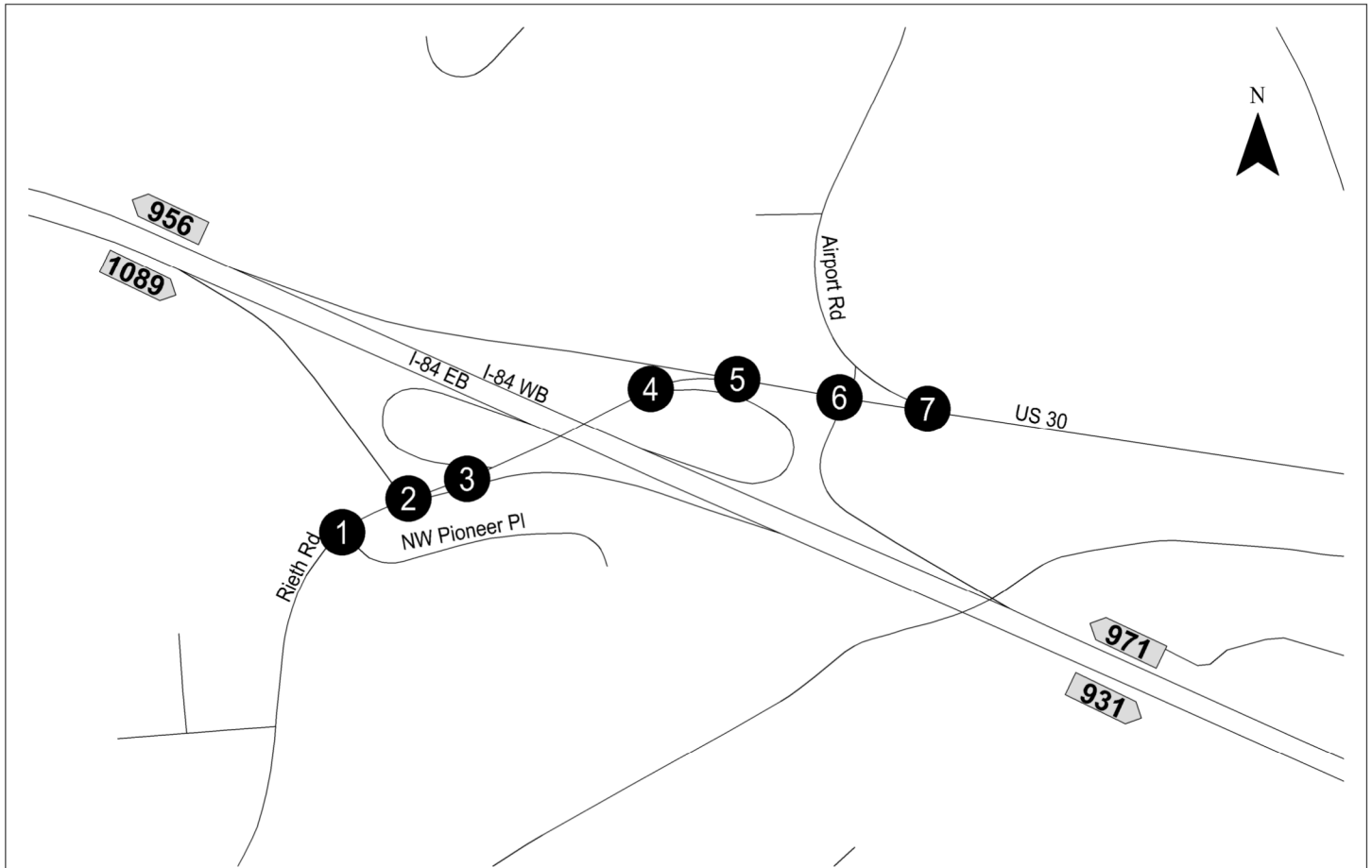
The results of the year 2040 traffic operations analysis for I-84 merge, diverge, and mainline segments are shown in Table 3. As shown in Table 3, all segment v/c ratios are forecast to operate below the target v/c ratio of 0.80 during the AM and PM peak hours. *Freeway operations worksheets are shown in Attachment “C.”*

Table 3 I-84 AM and PM Peak Hour Operations

Segment #	Direction	Type	Location	LOS ¹		V/C ²	
				AM	PM	AM	PM
1	EB	Diverge	W of EB Off-Ramp	B	B	0.34	0.32
2	EB	Main	EB Off-Ramp to EB On-Ramp #1	B	B	0.39	0.34
3	EB	Merge	EB On-Ramp #1	B	B	0.41	0.41
4	EB	Merge	EB On-Ramp #2	B	B	0.31	0.34
5	WB	Diverge	E of WB Off-Ramp	B	B	0.31	0.32
6	WB	Main	WB Off-Ramp to WB On-Ramp #1	A	A	0.27	0.28
7	WB	Merge	WB On-Ramp #1	A	A	0.27	0.29
8	WB	Merge	WB On-Ramp #2	B	B	0.35	0.40

¹Level-of-service – defined in terms of vehicle density (passenger car/mile/lane).

² Volume-to-capacity ratio. For merge/diverge segments, the reported v/c indicates worst-case for either the ramp or mainline facilities.

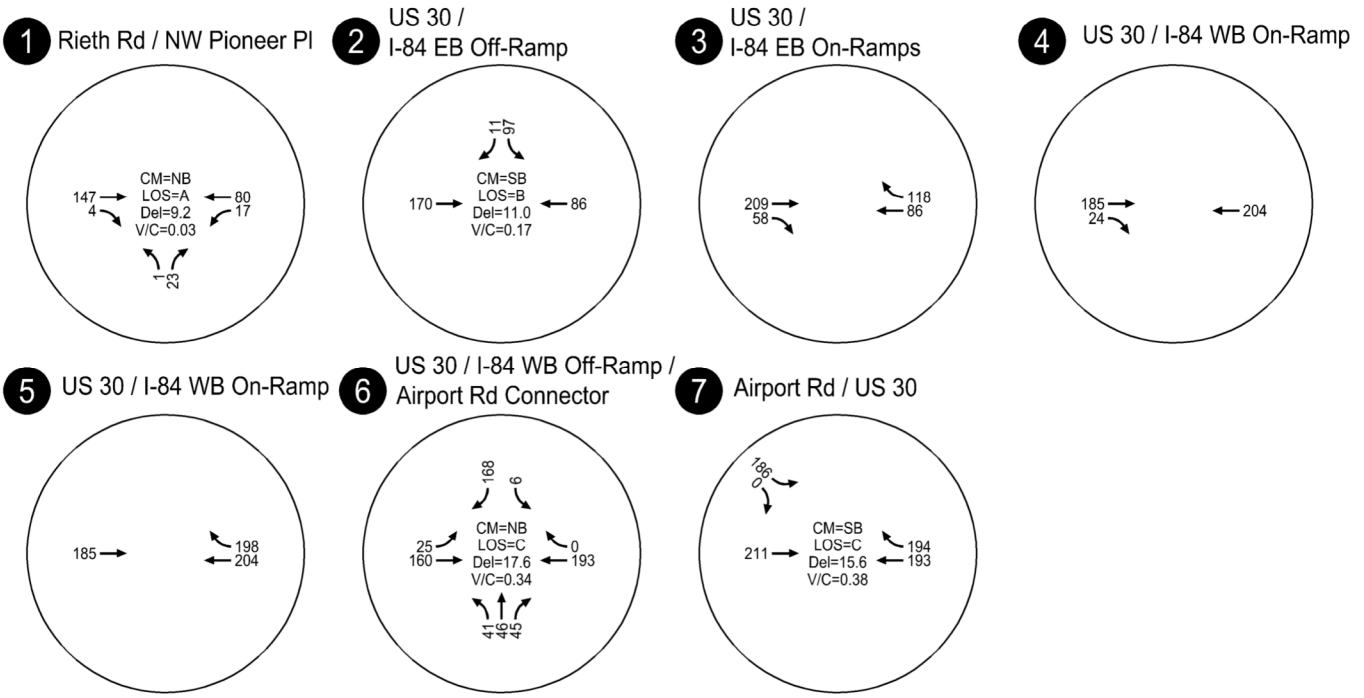
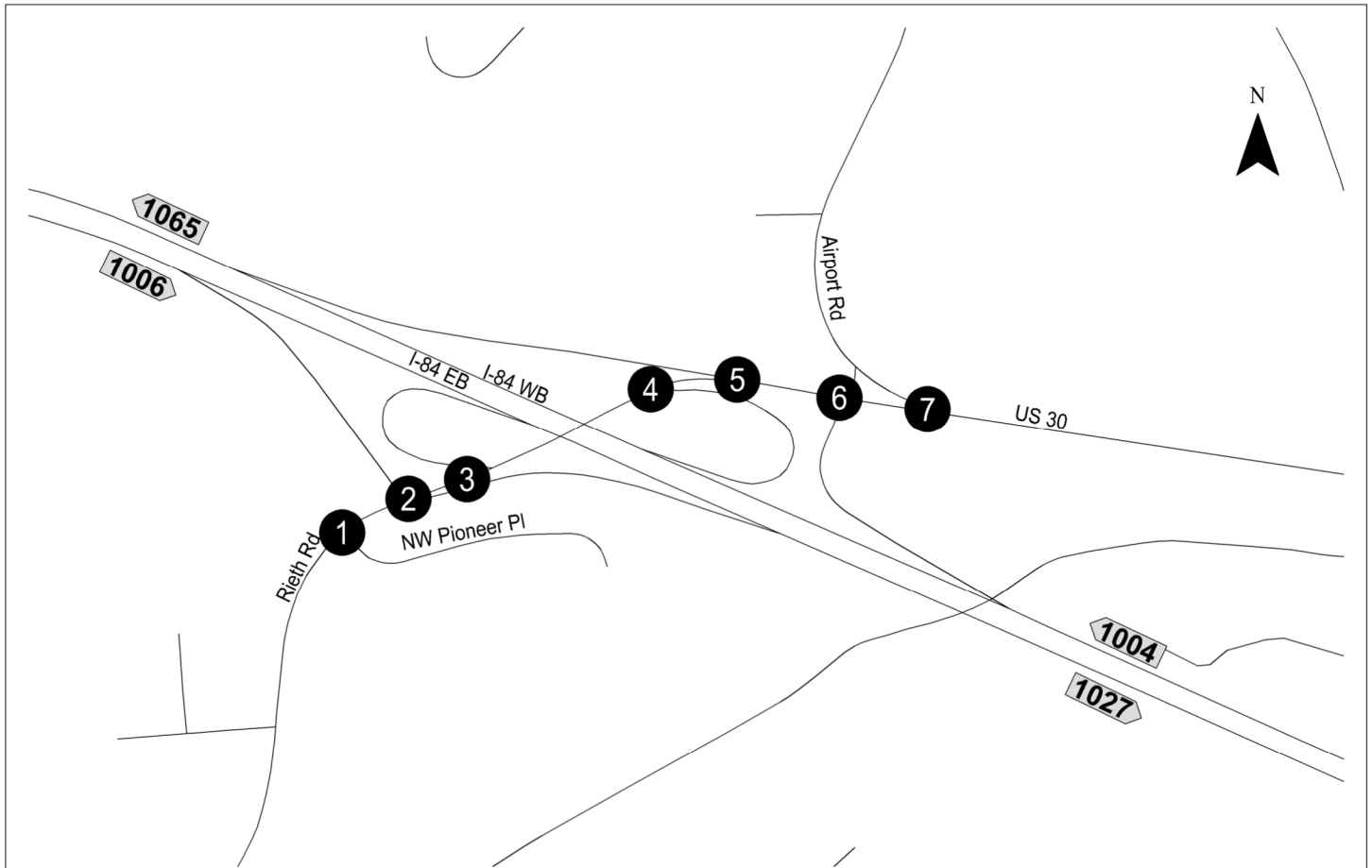


- Study Intersections
 CM - Critical Movement
 LOS - Level of Service
 Del - Vehicle Delay (s)
 V/C - Volume-To-Capacity Ratio
 ### - I-84 Peak Hour Volume

Future AM Peak Hour Traffic Operations
Exit 207
Pendleton, OR

Figure
1

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- Study Intersections
 CM - Critical Movement
 LOS - Level of Service
 Del - Vehicle Delay (s)
 V/C - Volume-To-Capacity Ratio
 ### - I-84 Peak Hour Volume

Future PM Peak Hour Traffic Operations
Exit 207
Pendleton, OR

Figure
2

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NEXT STEPS

The project team will review the findings of these analyses with the project Technical and Citizen Advisory Committees (TAC/CAC). The results of these findings will be used to create project alternatives for the Exit 207 interchange area. These alternatives may include modifications related to the Exit 207 interchange, local circulation and/or access, and/or land development requirements/guidelines.

REFERENCES

1. Kittelson and Associates, Inc. *Pendleton IAMPs: Exit 207 – Existing Conditions: System Inventory*. 2019.
2. Oregon Department of Transportation. *Analysis Procedures Manual – Version 2*. 2019.
3. Kittelson and Associates, Inc. *Pendleton IAMPs: Exit 207 – Existing Conditions: Transportation System Operations*. 2019.