PLEASANT VALLEY

TRANSPORTATION REFINEMENTS

CITY OF GRESHAM OREGON

PLEASANT VALLEY TSP REFINEMENT

>>> Existing and Future Planned Conditions

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TRANSPORTATION CONDITIONS OVERVIEW

This memorandum evaluates the existing and future planned conditions for the Pleasant Valley Transportation System Plan (TSP), without the inclusion of the 174th Avenue Extension.

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- *Existing facilities, operations, and safety performance*
- *Planned improvements and future operations*

Key findings of this memorandum are as follows:

- Under existing conditions, all study intersections operate at LOS "D" or better during both weekday AM and PM peak hours, except for the following:
  - SE Foster Road/SE 172nd Avenue operates at LOS "F" during both weekday AM and PM peak hours, and
  - Powell Boulevard/SE 174th Avenue operates at LOS "F" during the weekday PM peak hour.
- Average crash rates exceeded critical crash rates at Powell Boulevard/SE 174th Avenue, SE Jenne Road/SE Foster Road, and SE 172nd Avenue/SE Foster Road.
- Planned improvements in the Pleasant Valley TSP include:
  - Sidewalks and bicycle lanes on all study roadways.
  - Potential transit service corridors on 172nd Avenue, Giese Road, 182nd Avenue, 190th Avenue, Clatsop Street/Cheldelin Road, and/or the new east-west collector south of Giese Road.
  - New east-west and north-south connections, including extensions to SE Giese Road, SE 174th Avenue, and SE Knapp Street within the study area.
  - Signalization of SE Giese Road/SE Foster Road, SE Giese Road/SE 174th Avenue, SE Giese Road/SE 190th Avenue, and SE Foster Road/SE 172nd Avenue and a signal modification to SE Jenne Road/SE Foster Road.
- The Happy Valley TSP references and implements the 172nd/190th Corridor Management plan, which includes the 172nd-190th Connector
- The City of Portland TSP includes widening of Powell Boulevard from SE 162nd Avenue to SE 174th Avenue to a four-lane cross-section.
- Under future planned conditions, all study intersections operate at LOS "D" or better during both weekday AM and PM peak hours, except for the following:
  - Powell Boulevard/SE 182nd Avenue operates at LOS "F" during the weekday PM peak hour, and
  - Powell Boulevard/SE 174th Avenue operates at LOS "F" during both weekday AM and PM peak hours.

PROJECT BACKGROUND

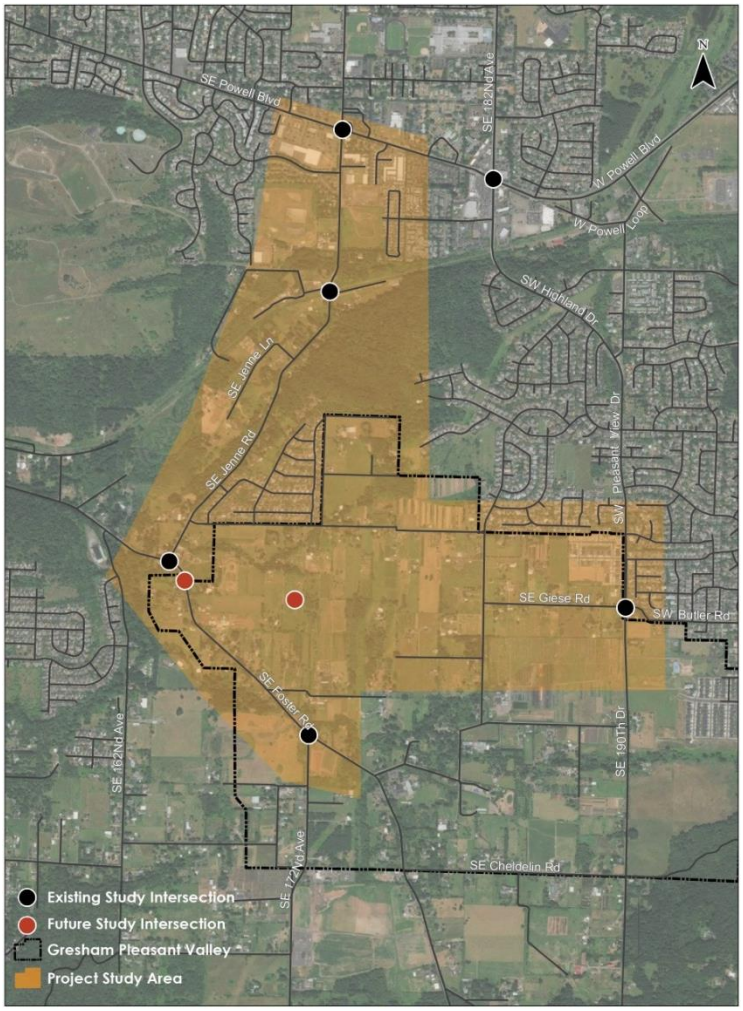
The City of Gresham is beginning a process to review the transportation facilities in the Pleasant Valley Transportation System Plan (TSP) with primary focus on determining how the system can function adequately in the future. Alternatives that include and exclude a potential new arterial extension of SE 174th Avenue to connect between SE Giese Road and SE Jenne Road will be analyzed to understand the impacts of that connection on the overall function of the Pleasant Valley street network. The SE 174th Avenue extension was originally identified in the planning for the Powell-Foster corridors and is included in the current Metro Regional Transportation Plan (RTP) project list. A preferred alternative will be incorporated into an updated Pleasant Valley TSP and identify the long-term vision for the area as well as near-term

solutions to address community concerns and support growth of the area. In addition, it will identify how improvements can be phased and their costs, right-of-way needs, and impacts.

The Pleasant Valley TSP was adopted in 2005. Since that time, planning has occurred by Clackamas County, Portland, and Metro. These plans are based on the Pleasant Valley TSP, which includes an extension of Giese Road between SE Foster Road and SE 182nd Avenue. In addition, it includes the downgrading of Foster Road into a local access street (i.e., retain current two-lane configuration), with the potential to disconnect or vacate the street in the confluence area of Kelley Creek. For example, in 2012, Happy Valley and Clackamas County jointly adopted the 172nd Avenue/190th Drive Corridor Management Plan, including a new arterial connection between SE 172nd Avenue and SE 190th Drive (the "172nd-190th Connector"). That plan considered the constraints of Jenne Road and the 174th Extension and the need to provide a more robust connection to SE 190th Avenue to supplement north/south connectivity.

The Pleasant Valley TSP (PVTSP) Refinement project is needed to reassess the PVTSP based on the most recent transportation plans for the surrounding areas. It will validate planned projects in the TSP and assesses the need and feasibility of the 174th extension north of Giese Road. Figure 1 illustrates the Pleasant Valley Boundary as well as the SE 174th Avenue extension, SE Giese Road extension, and 172nd-190th Connector. Figure 1 illustrates the Pleasant Valley Boundary as well as the project study area and study intersections.

Figure 1 – Project Study Area



EXISTING CONDITIONS

LAND USE & FACILITIES

The Pleasant Valley TSP Refinement study area is primarily focused on the Giese Road and 174th Avenue extensions. Under existing conditions, these areas primarily include low-density housing, agricultural uses, and recreational open areas. Surrounding this area, several commercial developments are located along Powell Boulevard. Pleasant Valley Elementary School is located at the SE Richey Road/SE Foster Road intersection. Currently, Powell Boulevard and SE Foster Road serve as key regional transportation routes.

Table 1 summarizes the attributes of the key transportation facilities in the study area.

Table 1. Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification	Cross Section	Posted Speed Limit	Sidewalks	Bike Lanes	On-Street Parking
Powell Boulevard	Standard Arterial[1]	3 lanes	35 mph	Yes	Yes	No
SE 174th Avenue	Neighborhood Collector[2]	2 lanes	35 mph	Partial	No	Yes
SE Jenne Road	Neighborhood Collector[2]	2 lanes	30 mph	No	No	No
SE Foster Road	District Collector[2]	2-3 lanes[3]	45 mph	No	No	No
SE 172nd Avenue	Standard Arterial[1]	2 lanes	45 mph	No	No	No
SE 182nd Avenue	Standard Arterial[1]	5 lanes	35 mph	Yes	Yes	No
SE 190th Drive	Standard Arterial[1]	2 lanes	40 mph	Partial	No	No
SE Giese Road	Minor Arterial[1]	2 lanes	40 mph	No	No	No

[1]*City of Gresham Transportation System Plan*
[2]*City of Portland Transportation System Plan*
[3]*SE Foster Road is 3 lanes to the west of SE Jenne Road and 2 lanes to the east of SE Jenne Road*

Pedestrian Facilities

Sidewalks are present on the south side of Powell Boulevard west of SE 174th Avenue, on the north side east of SE 174th Avenue, and on both sides near SE 182nd Avenue. Sidewalks are present on the west side of SE 174th Avenue from Powell Boulevard to 350 feet south of SE Naegeli Drive. Sidewalks are provided on both sides of SE 182nd Avenue near Powell Boulevard. Sidewalks are present on the east side of SE 190th Drive from SW 31st Street to just south of SE Giese Road. Sidewalks are not provided along the remaining study roadways.

An enhanced pedestrian crossing is present at the Springwater Corridor Trail's intersection with SE Jenne Road, providing a marked crossing and Rectangular Rapid Flashing Beacons (RRFBs). At the Powell Boulevard/SE 174th Avenue and SE Jenne Road/SE Foster Road intersections, marked and signalized pedestrian crossings are provided for each leg. At SE 190th Drive/SE Giese Road, curb cuts are provided on the northeast and southeast corners of the intersection. No other pedestrian crossing treatments are present in the study area.

Bicycle Facilities

Bike lanes are provided along both sides of Powell Boulevard and SE 182nd Avenue. The Springwater Corridor Trail provides bicycle connectivity between its termini in Boring and the Sellwood neighborhood in southeast Portland. No other bicycle facilities are present in the study area.

Transit Facilities

TriMet Route 9 currently operates along Powell Boulevard, providing service between Gresham Central Transit Center and Portland City Center. Service is provided from 4 AM to 2 AM on weekdays and 4:30 AM to 2 AM on weekends. TriMet's "LIFT" service provides fully accessible dial-a-ride within ¾ miles of TriMet routes. Dial-a-ride services are available daily from 5 AM to 1:45 AM.

STUDY INTERSECTIONS

The following intersections were identified for operational analyses based on collaboration with the City of Gresham:

1. Powell Boulevard/SE 174th Avenue
2. Powell Boulevard/SE 182nd Avenue[1]
3. Springwater Corridor Trail/SE 174th Avenue
4. SE Foster Road/SE Jenne Road
5. SE Foster Road/SE Giese Road Extension (future intersection)
6. SE 174th Extension/SE Giese Road Extension (future intersection)
7. SE Foster Road/SE 172nd Avenue
8. SE 190th Avenue/SE Giese Road

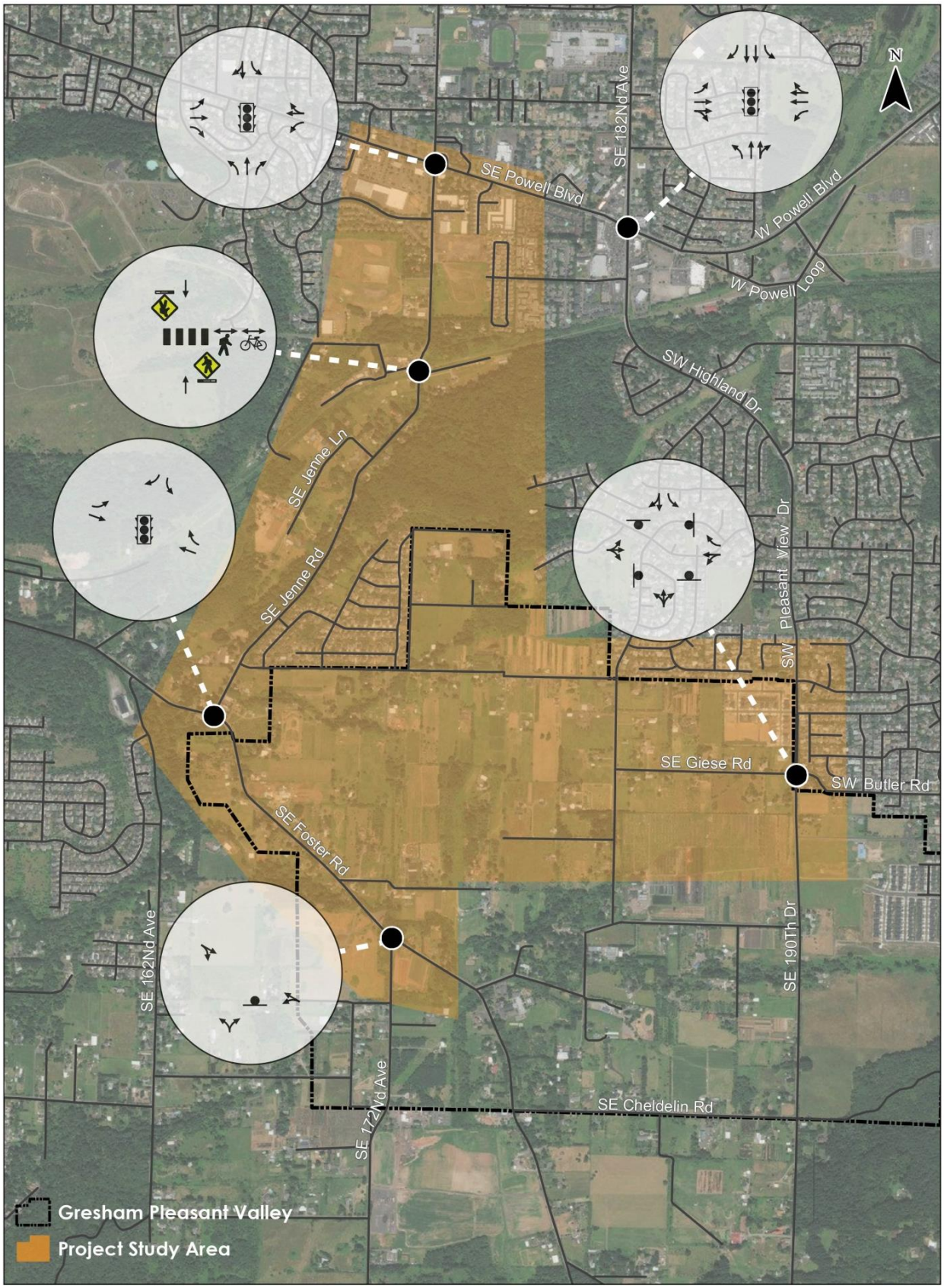
The intersections of Powell Boulevard/SE 174th Avenue, Powell Boulevard/SE 182nd Avenue and SE Foster Road/SE Jenne Road are located within the City of Portland. SE 190th Avenue/SE Giese Road is located within the City of Gresham. The remaining study intersections are located within unincorporated Multnomah County. Figure 2 illustrates the existing lane configurations and traffic control devices at each of these study intersections.

OPERATIONS ANALYSIS METHODOGY

A level of service (LOS) analysis was conducted on the study intersections to assess how well they are able to accommodate existing and future traffic demands. The analysis was primarily performed using Synchro 9 software in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM, Reference 1). To evaluate worst-case conditions, the peak 15-minute flow rates of the weekday AM and PM peak hours were used in the evaluation of all intersection LOS. For this reason, the operations analyses reflect conditions that are likely to occur for the peak 15 minutes out of each weekday AM and PM peak hour. Traffic conditions during other weekday hours will likely operate under better conditions than those described in this report. *A description of level-of-service criteria is contained in Appendix A.*

[1]The Powell Boulevard/SE 182nd Avenue intersection was identified during TAC Meeting #1 for operational analysis. A weekday PM peak hour traffic count was obtained from a prior traffic study; a weekday AM peak hour traffic count was not available. Therefore, only weekday PM peak hour traffic conditions were evaluated at the intersection. Based on existing operations at the Powell Boulevard/SE 174th Avenue intersection, the weekday PM peak hour is the critical peak hour. Given the proximity to the Powell Boulevard/SE 182nd Avenue intersection, the weekday PM peak hour is likely the critical time period at Powell Boulevard/SE 182nd Avenue as well.

Figure 2 – Existing Lane Configurations



JURISDICTIONAL OPERATING STANDARDS AND THRESHOLDS

The City of Portland identifies interim deficiency thresholds and operating standards per the Regional Mobility Policy. The volume-to-capacity (v/c) ratio threshold of 0.99 applies to Powell Boulevard/SE 174th Avenue, Powell Boulevard/SE 182nd Avenue and SE Jenne Road/SE Foster Road. All remaining intersections are either currently under the City of Gresham's jurisdiction or will be incorporated, and thus will be evaluated under the City of Gresham standards. The City of Gresham sets operating standards for both signalized and unsignalized intersections at level-of-service (LOS) LOS D and a v/c ratio of 0.90. Individual movement level of service must meet LOS E and a v/c ratio of less than 1.0.

EXISTING TRAFFIC OPERATIONS

Turning movement counts were obtained at the study intersections o n a midweek day in October 2017. Counts were collected during the morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods. Schools were in session on the days the traffic counts were collected. Based on a review of seasonal trends from the surrounding area, the traffic counts collected represent average conditions[2]. The traffic counts revealed a local system morning peak from 7:40 AM to 8:40 AM and evening peak from 4:20 PM to 5:20 PM.

Figures 3 and 4 show the existing traffic volumes and operations at each of the study intersections during weekday AM and PM peak hours, respectively. As shown in the figures, the SE Foster Road/SE 172nd Avenue intersection operates over capacity and at LOS F during both weekday AM and PM peak hours and the Powell Boulevard/SE 174th Avenue intersection operates over capacity during the weekday PM peak hour[3]. All other study intersections operate acceptably during both peak periods and meet the LOS and/or volume-to-capacity ratio standards enforced by the governing agency. *Appendix B includes the traffic count data, and Appendix C includes the existing traffic analysis worksheets.*

[2]Traffic patterns are reflective of the Commuter trend, with high volumes July-October and the peak mid-August. Traffic counts were collected early October and are therefore representative of typical conditions.

[3] No future analysis was conducted for the weekday AM peak hour given the lack of available counts.

Figure 3 – Existing Traffic Conditions, Weekday AM Peak Hour

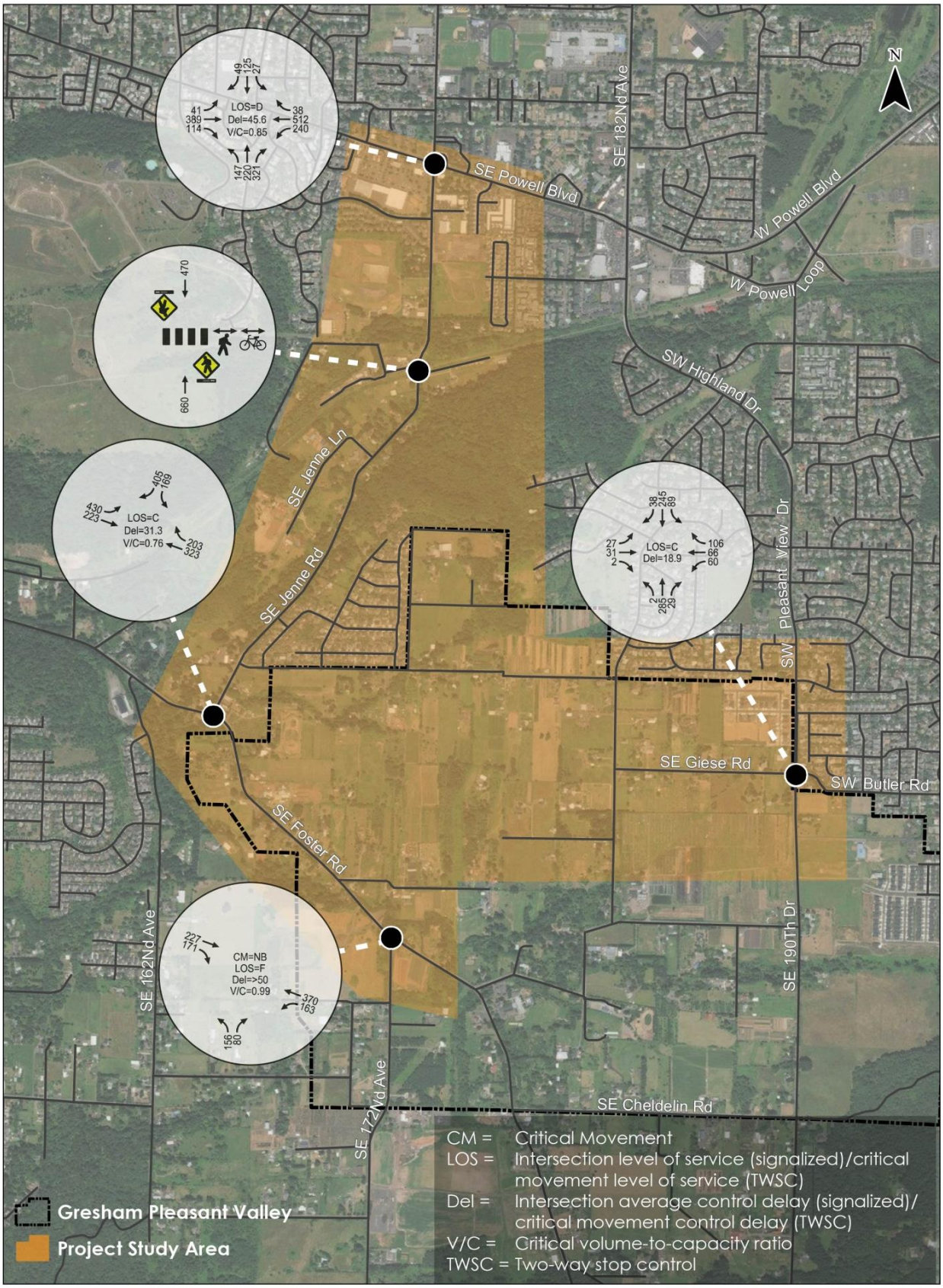
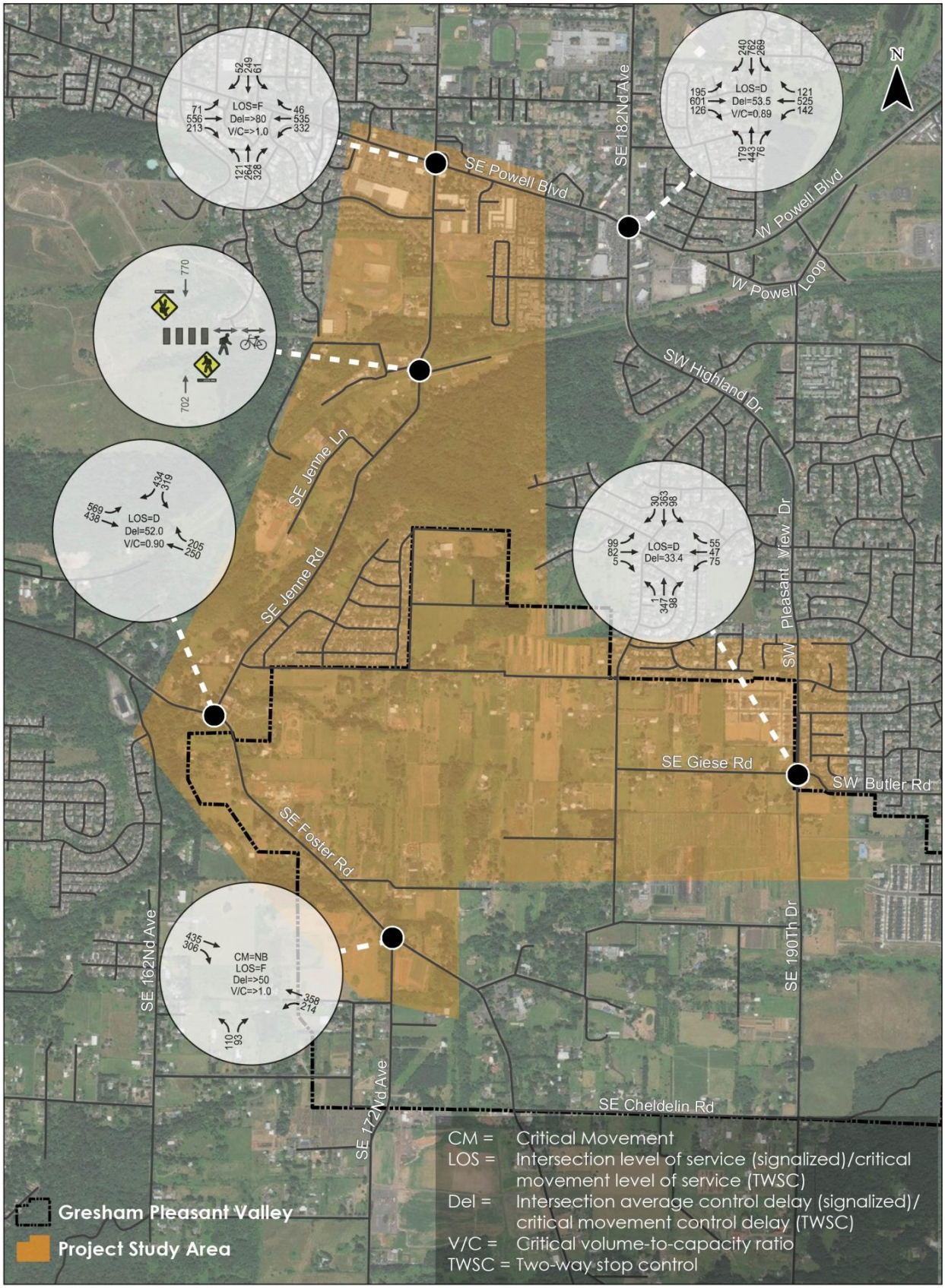


Figure 4 – Existing Traffic Conditions, Weekday PM Peak Hour



TRAFFIC SAFETY SUMMARY

Historical crash data for the study area was reviewed in an effort to identify potential existing safety issues. Crash data for the study intersections and segments was obtained from ODOT for the five-year period on record (January 1, 2011 through December 31, 2015). Figure 5 illustrates the reported crash data by crash type and severity. Table 2 identifies the reported crashes at each of the intersections and study segments during this five-year period. *Appendix D contains the historical traffic safety data provided by ODOT.*

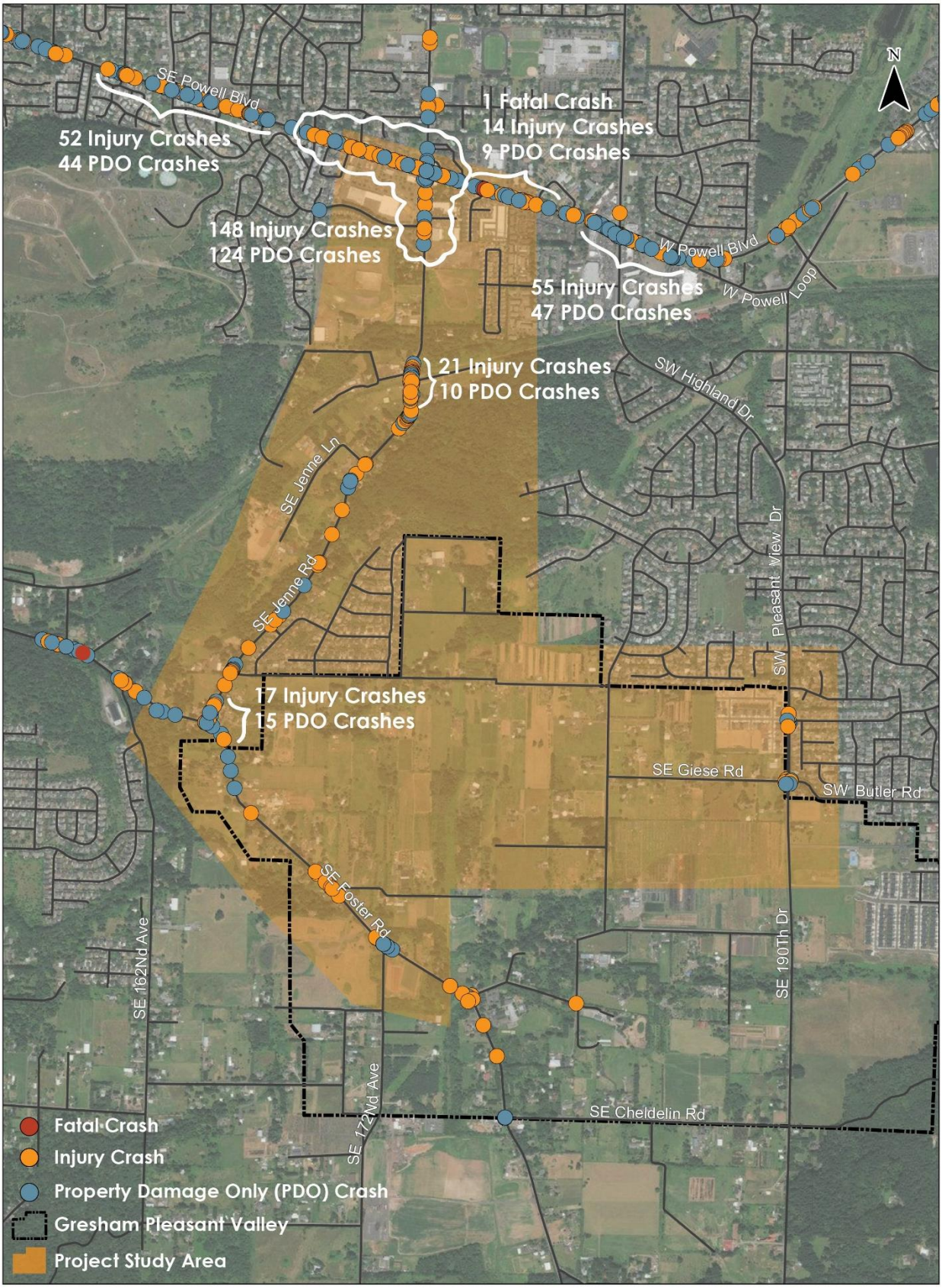
Table 2. Intersection and Segment Crash History (January 1, 2011 through December 31, 2015)

Intersection/Segment	Crash Type							Crash Severity		
	Rear-End	Turning	Angle	Ped	Fixed Object	Side-swipe	Other	Property Damage Only	Injury	Fatal
Powell Blvd/SE 174th Ave	40	6	2	1	1	1	-	25	26	-
Powell Blvd/SE 182nd Ave	34	6	8	1	6	2	1	23	35	
SE Foster Rd/SE Jenne Rd	4	2	-	-	2	-	-	3	5	-
SE Foster Rd/SE 172nd Ave	13	16	-	-	-	-	1[3]	12	18	-
SE 190th Dr/ SE Giese Rd	-	-	-	-	-	-	-	-	-	-
SE 174th Ave from Powell Blvd to SE Circle Ave	3	3	-	-	2	1	2	7	4	-
SE Foster Rd between SE Jenne Rd and SE 172nd Ave	3	-	-	-	2	-	-	1	4	-
SE Jenne Rd from SE Circle Ave to SE McKinley Rd[1]	21	1	-	-	12	5	6[2]	14	31	-
SE Jenne Rd from SE McKinley Rd to SE Foster Rd[1]	-	-	-	-	1	-	-	-	1	-
SE 190th Dr from SE Giese Rd to SE Tillstrom Rd	-	5	1	-	-	-	-	3	3	-

[1]Crashes attributed to study intersections were removed from segment crash data
[2]Head-on (5), ran-off-the-road (1)
[3]Ran-off-the-road (1)

As shown in Table 2 and Figure 5, no fatalities were reported in the study area between 2011 and 2015.

Figure 5 – Reported Crash Data



Critical crash rates were calculated for each of the study intersections following the analysis methodology presented in ODOT's *SPR 667 Assessment of Statewide Intersection Safety Performance (*Reference 2). SPR 667 provided average crash rates at a variety of intersection configurations in Oregon based on number of approaches and traffic control types. The average crash rate represents the approximate number of crashes that are "expected" at a study intersection.

Table 3 summarizes the critical crash rate for each intersection and compares those values to the observed crash rate. Per ODOT, if the observed crash rate at the study location exceeds the critical rate, it is a possible indication that the location is exceeding average crash rates.

Table 3. Critical Crash Rates

Intersection	Total Crashes	Observed Crash Rate at Intersection	Average Crash Rate by Traffic Control	Observed Crash Rate> Average Crash Rate?
Powell Blvd/ SE 174th Ave	51	0.99	0.477	**Yes**
Powell Blvd/ SE 182nd Ave	58	0.86	0.477	**Yes**
SE Jenne Rd/ SE Foster Rd	8	0.20	0.275	No
SE 172nd Ave/ SE Foster Rd	30	1.08	0.131	**Yes**
SE 190th Dr/ SE Giese Rd	0	0.00	0.198	No

As shown in Table 3, the observed crash rate at Powell Boulevard/SE 174th Avenue, Powell Boulevard/SE 182nd Avenue, and SE 172nd Avenue/SW Foster Road exceeds the statewide average crash rate. At Powell Boulevard/SE 174th Avenue, 78% of crashes were rear-end crashes. The rear-end crash pattern is common for signalized intersections in congested areas, where the effect of signal cycles create stop-and-go conditions. Similarly, 59% of crashes at the signalized intersection of Powell Boulevard/SE 182nd Avenue were rear-end crashes. At SE 172nd Avenue/SE Foster Road, 53% of crashes were turning angle crashes, which may be associated with the skewed intersection angle and longer exposure length for northbound left-turn movements. 44% of the turning angle crashes included northbound left-turn vehicles. Exhibit 1 shows the intersection during PM peak hour conditions, when gaps are limited for northbound left-turning vehicles

Exhibit 1. SE 172nd Avenue/SE Foster Road Intersection, Looking South

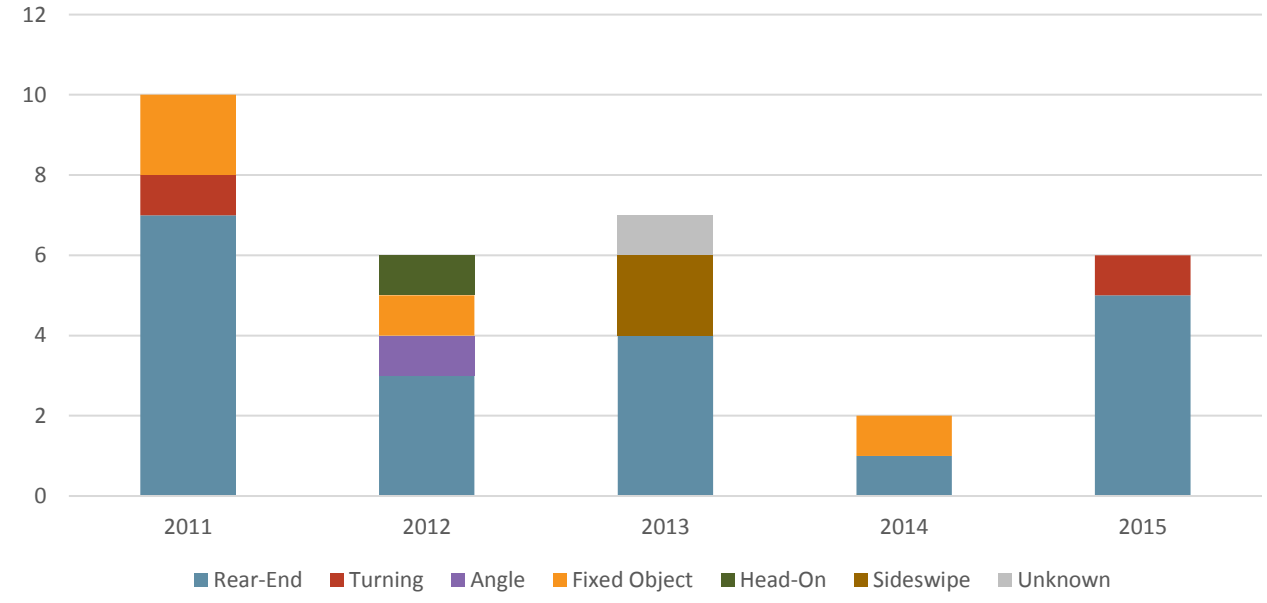
The Oregon Department of Transportation (ODOT) 2016 Safety Priority Index System (SPIS) list identifies existing hazardous intersections for potential safety improvements. Intersections are included in the SPIS list if they have three or more crashes or if they have one or more severe injury or fatal crashes within three consecutive years. Powell Boulevard/SE 174th Avenue is listed in the top ten percent of ODOT's SPIS ranking program, with a SPIS score of 90.94 based on the observed crash count.

SE Jenne Road from SE Circle Avenue to SE McKinley Road shows 47% rear-end crashes, 29% fixed-object or ran-off-the-road crashes, and 22% sideswipe or head-on crashes. These crashes could be associated with the lack of turn lanes, clear shoulder area, and separation from opposing traffic, respectively.

At the Springwater Corridor Trail crossing at SE 174th Avenue, thirty-one crashes were recorded within 400 feet of the crossing. A rectangular rapid flashing beacon (RRFB) was installed at the crossing in early 2014, as shown in Exhibit 2. The crash data by year and type is graphed in Exhibit 3.

Exhibit 2. RRFB at Springwater Corridor Trail Crossing

Exhibit 3. Crash Data within 400 feet of Springwater Corridor Trail Crossing (Jan 1, 2011 – Dec 31, 2015)



As shown in Exhibit 2, the predominant crash type at the crossing is rear-end crashes. No pedestrians were involved in any of the reported crashes. A bicyclist was involved in the angle crash reported in 2012, which did result in an injury. While a reduction of crashes was observed in 2014 immediately after the installation of the RRFB, there is insufficient data to assess the impact of the RRFB on crash frequency, severity, or type. Crashes are rare and random events, so multiple years of data are needed to identify trends.

FUTURE CONDITIONS

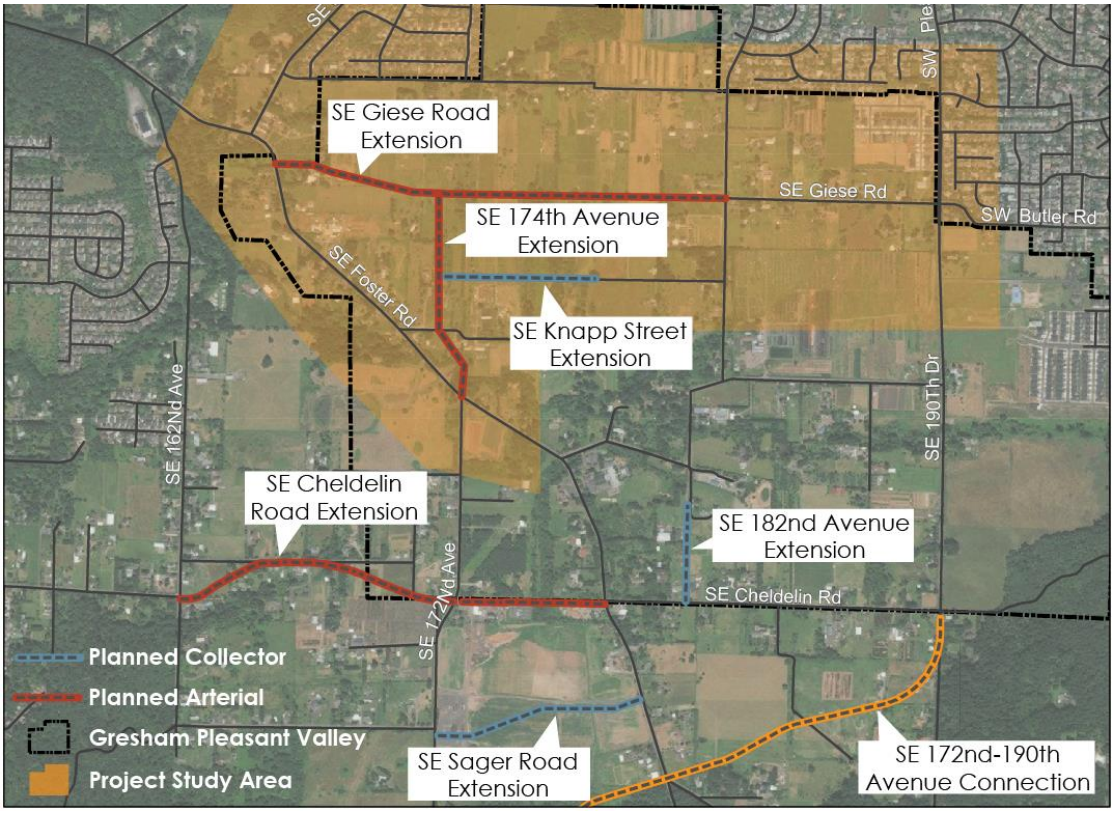
Future planning documents for the study area were reviewed to determine the future planned network for the area, including pedestrian, bicycle and transit routes and connections. A full summary of the document review is included in *Appendix E*, and includes the following documents:

- Pleasant Valley Concept Plan – August 2002
- Pleasant Valley TSP – January 2005
- Happy Valley TSP – November 2016
- Gresham TSP – December 2013
- Clackamas County TSP – December 2013
- Multnomah County TSP – August 2016
- Metro Powell/Foster Corridor Refinement Plan – September 2003
- Metro Regional Transportation Plan – July 2014
- East Metro Connections Plan – June 2012

PLANNED IMPROVEMENTS

Based on a review of plans for the area, Figure 6 shows the planned network changes impacting travel patterns in the study area.

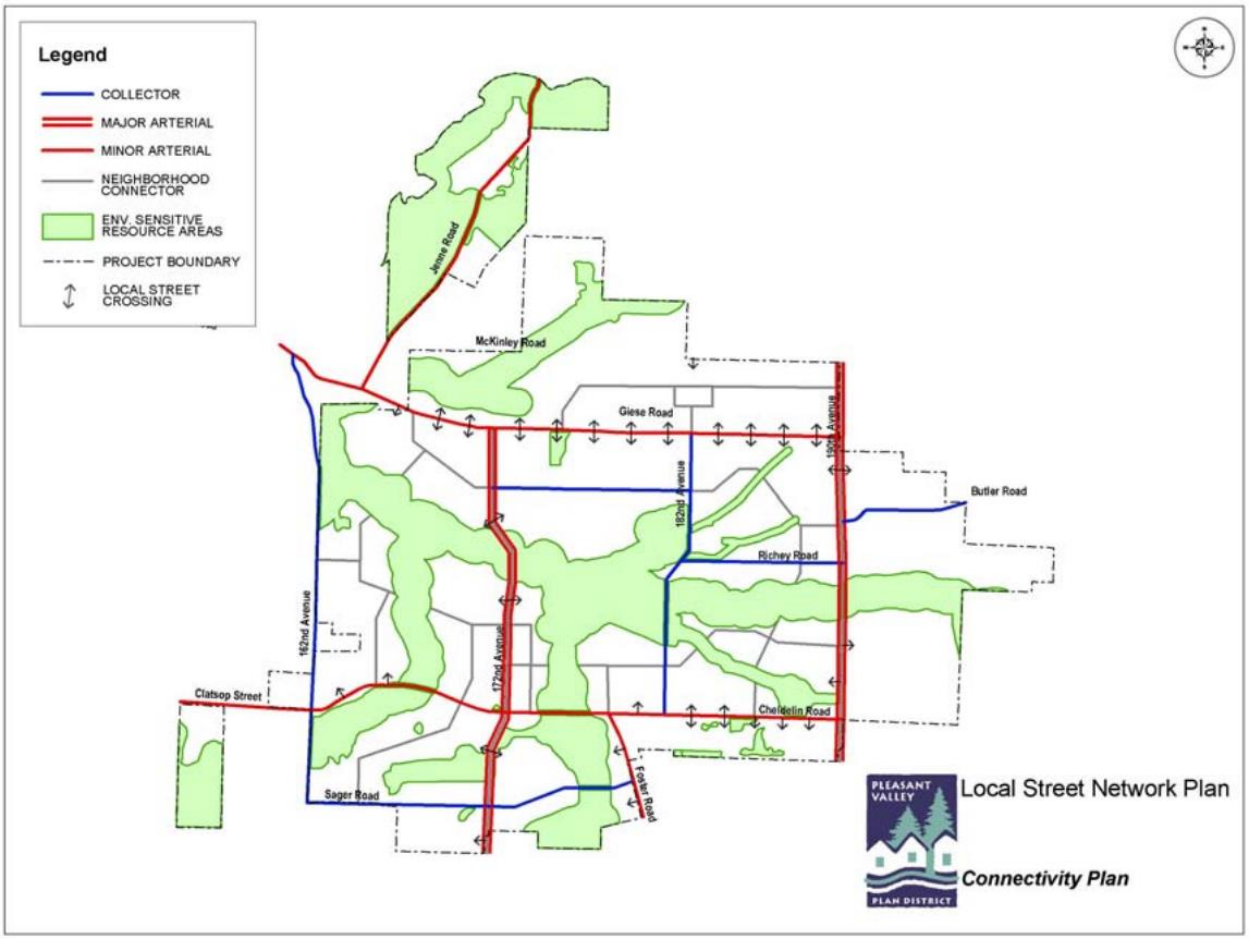
Figure 6 – Future Planned Network



Network changes from the City of Portland TSP include the expansion of Powell Boulevard from SE 162nd Avenue to SE 174th Avenue to a four-lane cross-section. Network changes from the Pleasant Valley TSP include the extension of SE Giese Road, SE Knapp Street, SE Cheldelin Road, SE Sager Road, SE 174th Avenue, and SE 182nd Avenue. A new corridor from SE 172nd Avenue to SE 190th Drive is included in the Clackamas County and Happy Valley TSPs. Although some plans have shown SE 174th Avenue extending north of SE Giese Road, the Pleasant Valley TSP Connectivity Plan does not include it and it was not included in the Future Planned Conditions Analysis to determine its need and benefits.

The assumed functional classification of roadways in the study area is provided in the Pleasant Valley Connectivity Plan for the Concept Plan, also included in the TSP and shown in Figure 7.

Figure 7 – Connectivity Plan (Pleasant Valley TSP)



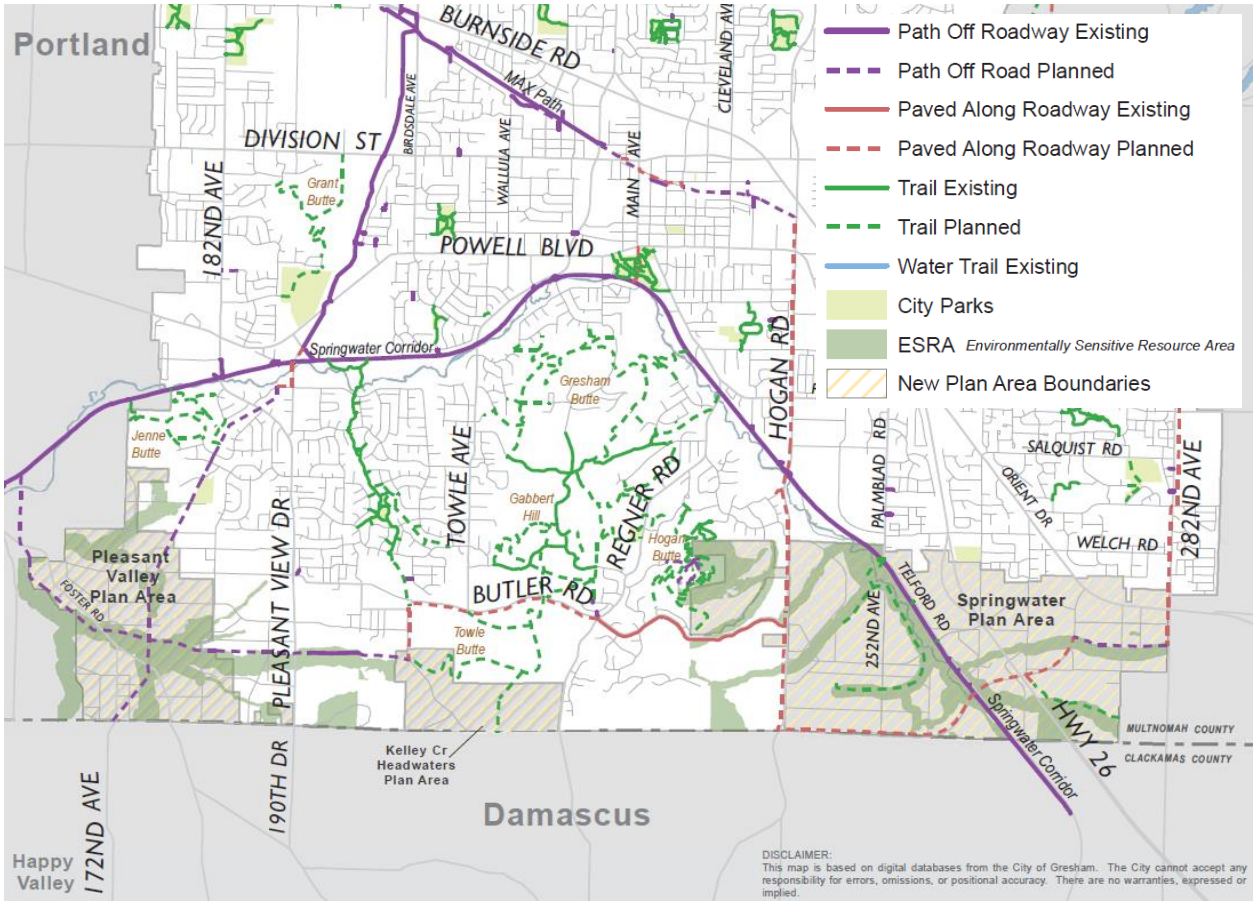
Pedestrian Facilities

The Pleasant Valley TSP provides preferred street design elements that include sidewalks on all roadways. Wider sidewalks are recommended on roadways within the town center.

Bicycle Facilities

The Pleasant Valley TSP provides preferred street design elements that include 5- to 6-foot bike lanes on all roadways. The Gresham *Parks and Recreation Trails and Natural Areas Master Plan*, adopted in 2009, includes a Paths and Trails Master Map, shown in Figure 8. This map builds from the work done as part of the Pleasant Valley Concept Plan, with minor modifications based on further analysis.

Figure 8 – Path and Trails Master Map (City of Gresham)



Transit Facilities

The Pleasant Valley Concept Plan outlines several potential corridors for transit service, including:

- 172nd Avenue
- Giese Road
- 182nd Avenue
- 190th Avenue
- New east/west collector south of Giese Road
- Clatsop Street/Cheldelin Road

In addition, the Pleasant Valley TSP includes an action measure focused on transit, detailed below:

8. Expand the TriMet service boundary to include areas within Clackamas County to allow TriMet to serve this area. Work with TriMet to develop a transit plan for Pleasant Valley that:
   a. Establishes a transit hub within the town center zoning district that provides transfer opportunities between regional and community transit routes
   b. Implements recommended community and regional transit service.
   c. Determines appropriate locations and design of bus loading areas and transit preferential treatments such as reserved bus lanes and signal pre-emption to enhance transit usage and public safety and to promote the smooth flow of traffic.
   d. That, with other transit service providers, and employers and social service agencies' efforts enhances access for elderly, economically disadvantaged, and people with disabilities.

Source: Pleasant Valley TSP

The Pleasant Valley TSP illustrates recommended regional transit service for the short- and long-term, noted in Table 4.

Table 4. Recommend Regional Transit Service (Pleasant Valley TSP)

Transit Route	To/From	Short-term Implementation (0-10 years)	Long-term Implementation (10-20 years)
Powell Boulevard/Foster Road	Downtown Portland to Pleasant Valley	Regional bus (15 minute peak/15 minute off-peak)	Extend Rapid Bus to Damascus
Foster Road		No Service	Rapid bus (10 minute peak/15 minute off- peak)
Sunnyside Road	Clackamas regional center to Damascus	Regional Bus (15 minute peak/30 minute off-peak)	Frequent bus (7 minute peak/15 minute off- peak)
172nd Avenue/190th Avenue	Damascus to Gresham	Regional Bus (15 minute peak/15 minute off-peak)	Frequent bus (10 minute peak/15 minute off- peak)
Town center/190th Avenue/ 181st Avenue/Airport Way	Pleasant Valley town center to Columbia Corridor	Regional Bus (15 minute peak/30 minute off-peak)	Regional Bus (15 minute peak/15 minute off- peak)
82nd Avenue/Sunnyside Road/97th/Stevens/ Mather Road/122nd/145th /Clatsop/172nd/Foster Road	Clackamas regional center to Happy Valley to Pleasant Valley to Lents	Regional Bus (15 minute peak/30 minute off-peak)	Regional Bus (10 minute peak/15 minute off- peak)
Foster Road/ Butler Road/Towle Road	Damascus to Gresham	No Service	Community bus (15 minute peak/30 minute off-peak)
Pleasant Valley loop	Within study area	Community bus (15 minute peak/30 minute off-peak)	Community bus (15 minute peak/30 minute off-peak)

TRAVEL DEMAND MODEL ANALYSIS

The most-recent Metro 2035 Regional Transportation Plan model[4] was modified based on the future network illustrated in Figures 6 and 7 to reflect future planned traffic conditions. *Appendix F includes the travel demand model network characteristics, volume capacities, and lane results.*

Model volumes shown reflect the peak two-hour weekday AM and PM periods. These volumes were converted to hourly volumes based on a 0.55 factor identified by Metro. The volumes were refined using recommended procedures for producing travel forecasts from *NCHRP 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design* (Reference 3), the update to *NCHRP 255: Highway Traffic Data for Urbanized Area Project Planning and Design*.

It should be noted that model volumes on the segment of SE Foster Road between the SE Giese Road extension and SE 172nd Avenue were higher than anticipated for a local street. With the SE Giese Road and SE 172nd Avenue extensions, traffic is anticipated to divert from SE Foster Road toward SE Giese Road and SE 172nd Avenue.

FUTURE PLANNED TRAFFIC OPERATIONS

The Pleasant Valley TSP identifies signalization of SE Foster Road/SE Giese Road, SE Giese Road/SE 172nd Avenue, SE Giese Road/SE 190th Avenue, and SE Foster Road/SE 172nd Avenue. Signal warrants were evaluated at these intersections based on the *Manual on Uniform Traffic Control Devices, 2009* (Reference 4). All intersections are forecast to meet peak hour warrants based on the eight-hour, four-hour, and peak-hour vehicular volume warrants (Warrants 1, 2 and 3). Future traffic control devices and lane configuration assumptions are shown in Figure 9. *Signal warrant analysis worksheets are provided in Appendix G*.

Figures 10 and 11 show the projected future traffic volumes and operations at each of the study intersections under the planned future conditions during weekday AM and PM peak hours, respectively. As shown in the figures, Powell Boulevard/SE 182nd Avenue is forecast to operate over capacity during the weekday PM peak hour[5] and Powell Boulevard/SE 174th Avenue is forecast to operate over capacity during both weekday AM and PM peak hours. All other study intersections operate acceptably during both peak periods and meet the LOS and/or volume-to-capacity ratio standards enforced by the governing agency. *Appendix H includes the future conditions traffic analysis worksheets.*

[4]2035 Regional Transportation Plan Model, Scenario 4178

[5]No future analysis was conducted for the weekday AM peak hour given the lack of available counts.

Figure 9 – Future Lane Configurations and Traffic Control Devices

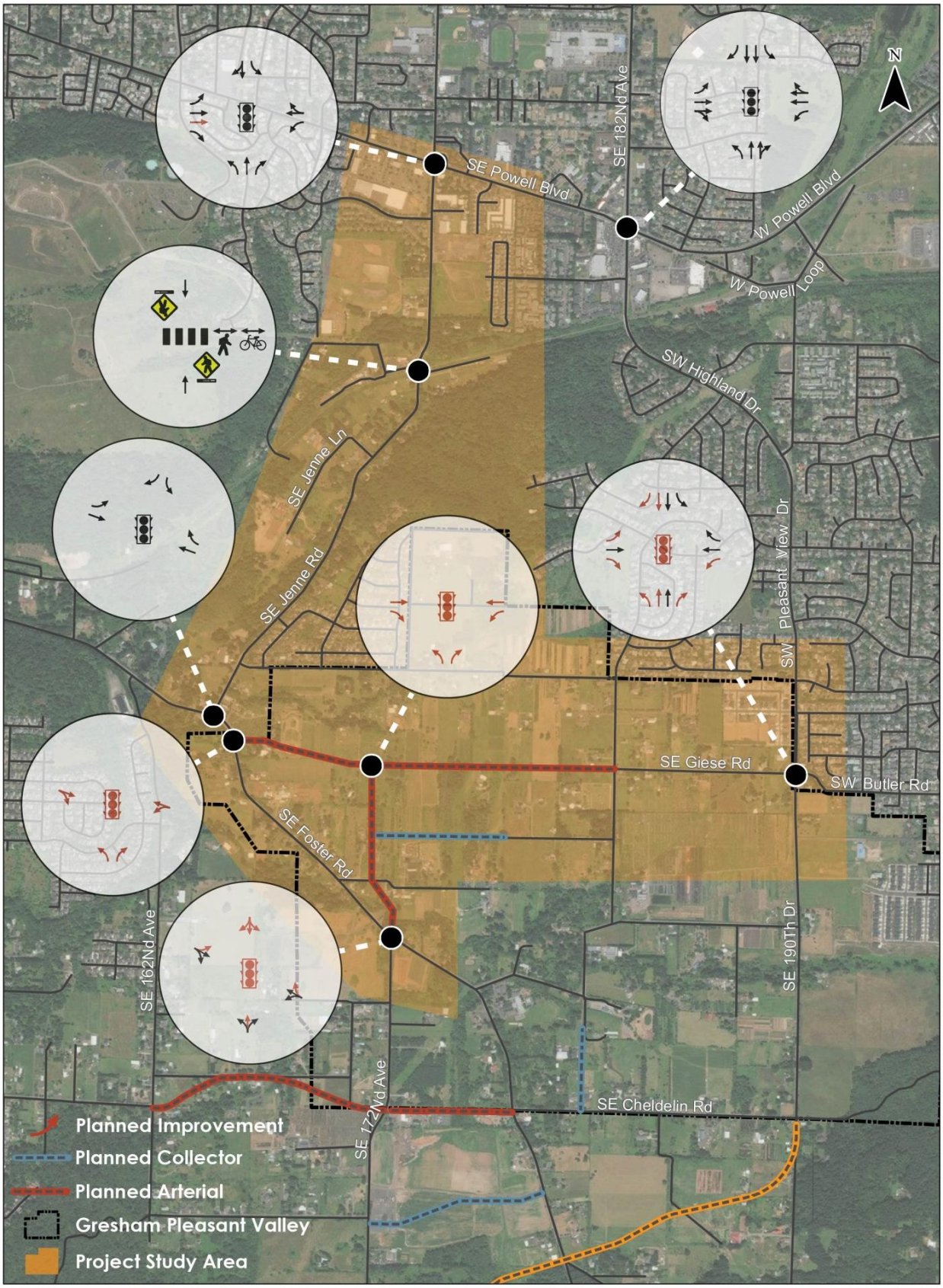
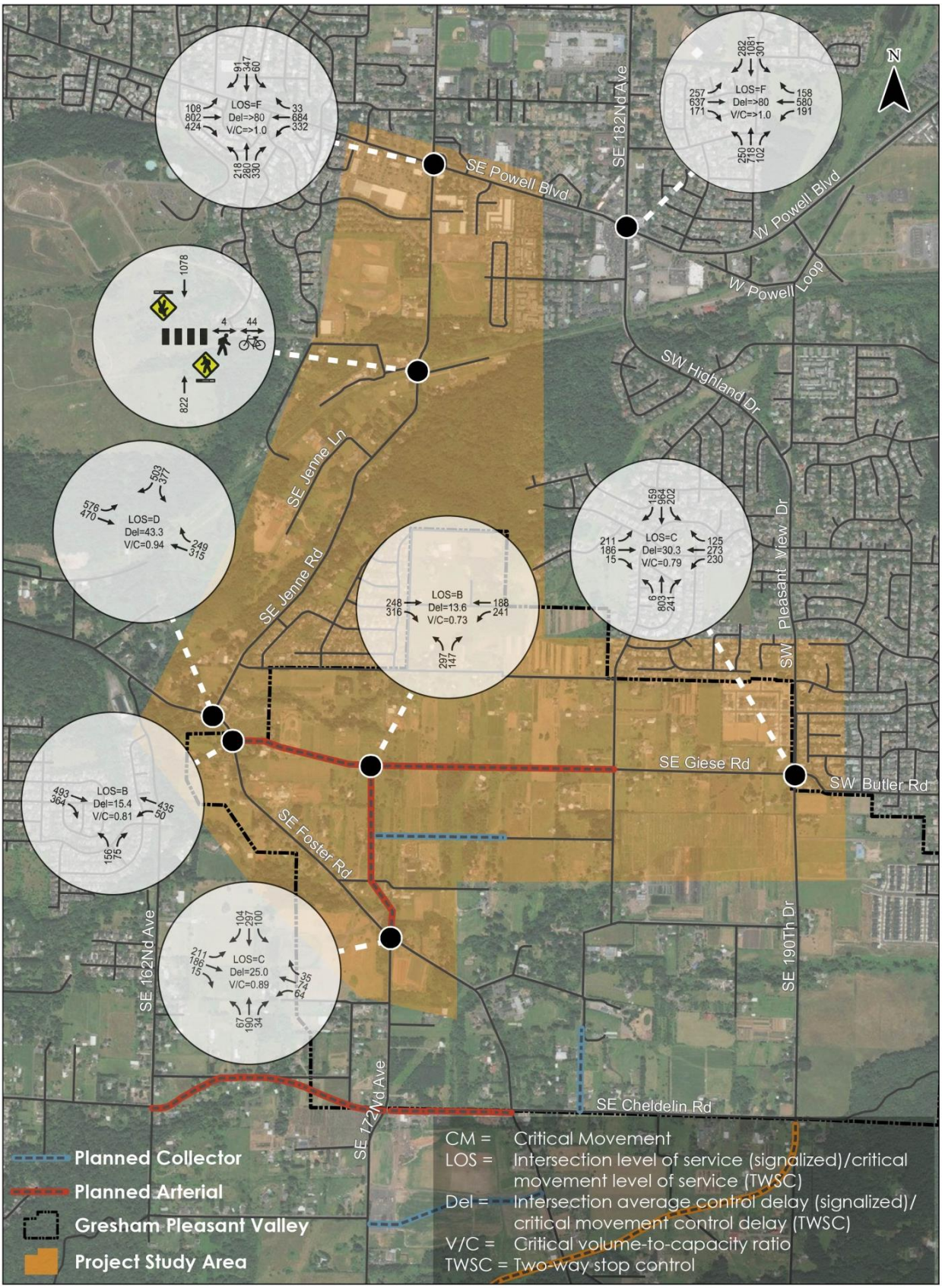


Figure 10 – Future Planned Traffic Conditions, Weekday AM Peak Hour

Figure 11 – Future Planned Traffic Conditions, Weekday PM Peak Hour



NEXT STEPS

The existing safety and operations performance, planned improvements, and future planned operations will be reviewed with the Technical Advisory Committee (TAC) and Community Advisory Committee (CAC) in the first meeting of each group. This analysis establishes the baseline for comparing alternatives and determining the need for capacity enhancements.

REFERENCES

1. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
2. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance.* June 2011.
3. Transportation Research Board. NC*HRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design*. 2014.
4. Federal Highway Administration. *Manual on Uniform Traffic Control Devices.* May 2012.