Oregon
John A. Kitzhaber, M.D., Governor

Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: (503) 373-0050
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www.oregon.gov/LCD

NOTICE OF ADOPTED CHANGE TO A COMPREHENSIVE PLAN OR LAND USE REGULATION

Date:	June 02, 2015
Jurisdiction:	City of Oregon City
Local file no.:	LE-14-004
DLCD file no.:	004-14

The Department of Land Conservation and Development (DLCD) received the attached notice of adopted amendment to a comprehensive plan or land use regulation on 05/28/2015. A copy of the adopted amendment is available for review at the DLCD office in Salem and the local government office.

Notice of the proposed amendment was submitted to DLCD 35 days prior to the first evidentiary hearing.

Appeal Procedures

Eligibility to appeal this amendment is governed by ORS 197.612, ORS 197.620, and ORS 197.830. Under ORS 197.830(9), a notice of intent to appeal a land use decision to LUBA must be filed no later than 21 days after the date the decision sought to be reviewed became final. If you have questions about the date the decision became final, please contact the jurisdiction that adopted the amendment.

A notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR chapter 661, division 10).

If the amendment is not appealed, it will be deemed acknowledged as set forth in ORS 197.625(1)(a). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

DLCD Contact

If you have questions about this notice, please contact DLCD’s Plan Amendment Specialist at 503-934-0017 or plan.amendments@state.or.us

DLCD FORM 2

NOTICE OF ADOPTED CHANGE TO A COMPREHENSIVE PLAN OR LAND USE REGULATION

FOR DLCD USE
File No.: 004-14 {22313}
Received: 5/28/2015

Local governments are required to send notice of an adopted change to a comprehensive plan or land use regulation **no more than 20 days after the adoption**. (*See* OAR 660-018-0040). The rules require that the notice include a completed copy of this form. **This notice form is not for submittal of a completed periodic review task or a plan amendment reviewed in the manner of periodic review.** Use Form 4 for an adopted urban growth boundary including over 50 acres by a city with a population greater than 2,500 within the UGB or an urban growth boundary amendment over 100 acres adopted by a metropolitan service district. Use Form 5 for an adopted urban reserve designation, or amendment to add over 50 acres, by a city with a population greater than 2,500 within the UGB. Use Form 6 with submittal of an adopted periodic review task.

Jurisdiction: CITY OF OREGON CITY

Local file no.: **LE 14-04**

Date of adoption: May 20, 2015 Date sent: 5/28/2015

Was Notice of a Proposed Change (Form 1) submitted to DLCD?

Yes: Date (use the date of last revision if a revised Form 1was submitted): 06/09/2014

No

Is the adopted change different from what was described in the Notice of Proposed Change? Yes No

If yes, describe how the adoption differs from the proposal:

The final adoption includes a revised intersection analysis with five alternatives for the Linn Avenue, Central Point Rd, Warner-Parrott Rd and Warner-Milne Rd Intersection. The City Commission approved Alternative 5 as the long-term preferred alternative, a five-legged roundabout.

Local contact (name and title): Pete Walter, AICP, Associate Planner

Phone: (503) 496-1568 E-mail: pwalter@orcity.org

Street address: 221 Molalla Avenue, Ste. 200 City: Oregon City Zip: 97045

PLEASE COMPLETE ALL OF THE FOLLOWING SECTIONS THAT APPLY

For a change to comprehensive plan text:

Identify the sections of the plan that were added or amended and which statewide planning goals those sections implement, if any:

Updates the 2013 Oregon City Transportation System Plan, consistent with Metro RTP. Implements Goals 1, 2, 5, 6, 7, 11, 12, and 13.

For a change to a comprehensive plan map:

Identify the former and new map designations and the area affected:

Change from N/A to N/A N/A acres. A goal exception was required for this change.

Change from N/A to N/A N/A acres. A goal exception was required for this change.

Change from N/A to N/A N/A acres. A goal exception was required for this change.

Change from N/A to N/A N/A acres. A goal exception was required for this change.

Location of affected property (T, R, Sec., TL and address): N/A

The subject property is entirely within an urban growth boundary

The subject property is partially within an urban growth boundary

If the comprehensive plan map change is a UGB amendment including less than 50 acres and/or by a city with a population less than 2,500 in the urban area, indicate the number of acres of the former rural plan designation, by type, included in the boundary.

Exclusive Farm Use – Acres: N/A	Non-resource – Acres: N/A
Forest – Acres: N/A	Marginal Lands – Acres: N/A
Rural Residential – Acres: N/A	Natural Resource/Coastal/Open Space – Acres: N/A
Rural Commercial or Industrial – Acres: N/A	Other: N/A – Acres: N/A

If the comprehensive plan map change is an urban reserve amendment including less than 50 acres, or establishment or amendment of an urban reserve by a city with a population less than 2,500 in the urban area, indicate the number of acres, by plan designation, included in the boundary.

Exclusive Farm Use – Acres: N/A	Non-resource – Acres: N/A
Forest – Acres: N/A	Marginal Lands – Acres: N/A
Rural Residential – Acres: N/A	Natural Resource/Coastal/Open Space – Acres: N/A
Rural Commercial or Industrial – Acres: N/A	Other: N/A – Acres: N/A

For a change to the text of an ordinance or code:
Identify the sections of the ordinance or code that were added or amended by title and number:

Revised City of Oregon City Municipal Code Chapter 12.04.180 Street Design

For a change to a zoning map:
Identify the former and new base zone designations and the area affected:

Change from N/A	to N/A	Acres: N/A
Change from N/A	to N/A	Acres: N/A
Change from N/A	to N/A	Acres: N/A
Change from N/A	to N/A	Acres: N/A

Identify additions to or removal from an overlay zone designation and the area affected:

Overlay zone designation: N/A Acres added: N/A Acres removed: N/A

Location of affected property (T, R, Sec., TL and address): N/A

List affected state or federal agencies, local governments and special districts: Oregon City, ODOT, Metro, Tri-Met, Clackamas County, Clackamas River Water District, Tri-City Sewer District, Water Environment ServIces.

Identify supplemental information that is included because it may be useful to inform DLCD or members of the public of the effect of the actual change that has been submitted with this Notice of Adopted Change, if any. If the submittal, including supplementary materials, exceeds 100 pages, include a summary of the amendment briefly describing its purpose and requirements.

N/A

ORDINANCE NO. 14-1013

AN ORDINANCE ADOPTING THE LINN AVENUE, LELAND ROAD, MEYERS ROAD CORRIDOR CONCEPT PLAN, AN UPDATE TO THE OREGON CITY TRANSPORTATION SYSTEM PLAN

WHEREAS, the 2013 Transportation System Plan (TSP) is an ancillary document to the Oregon City Comprehensive Plan; and

WHEREAS, the 2013 TSP identified the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan as a necessary planning document to address vehicle, pedestrian and bicycle transportation safety and capacity deficiencies along the corridor; and

WHEREAS, the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan involved citizens through public open houses, flyers, a project website, and meetings with input from Oregon City residents, affected agencies, city boards, the Citizen Involvement Committee, Transportation Advisory Committee, Neighborhood Associations, Planning Commission and City Commission; and

WHEREAS, the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan Cost includes estimates and contingencies for the planning and design of recommended system facilities for the corridor; and

WHEREAS, the Oregon City Planning Commission and City Commission held a series of public hearings to review the proposed Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan; and

WHEREAS, the Planning Commission, based on the oral and written testimony received during public hearings, made specific recommendations regarding the plan and subsequently unanimously recommended that the City Commission adopt the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan; and

WHEREAS, the City Commission, based on the oral and written testimony received during public hearings, made specific recommendations regarding the plan and subsequently refined the plan to more fully accommodate the needs of adjacent businesses, property owners, and residents; and

WHEREAS, the proposed Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan complies and is consistent with State statutes and Metro regulations, Statewide Planning Goals, and the goals and policies of the Oregon City Comprehensive Plan; Oregon Highway Plan, Oregon Transportation Plan, Regional Transportation Functional Plan, and Oregon City Transportation System Plan; and

WHEREAS, adoption of the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan is in the best interest of Oregon City to ensure that the goals and policies of the City can be realized.

NOW, THEREFORE, OREGON CITY ORDAINS AS FOLLOWS:

Section 1. The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan, attached as Exhibit 1, is hereby adopted based on the findings contained in Exhibit 2, all of which are incorporated herein by reference.

Section 2. The Oregon City Transportation System Plan, an ancillary document to the Oregon City Comprehensive Plan, is hereby amended.

Read for the first time at a regular meeting of the City Commission held on the 6th day of May, 2015, and the City Commission finally enacted the foregoing ordinance this 20th day of May, 2015.

DAN HOLLADAY, Mayor

Attested to this 20th day of May, 2015:

Kattie Riggs

Kattie Riggs, City Recorder

Approved as to legal sufficiency:

City Attorney

Exhibits:

Exhibit 1 – Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan

Exhibit 2 - Staff Report and Exhibits for Legislative File L 14-04

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

NOTICE OF DECISION – LEGISLATIVE
Date of Mailing of NOD: May 28, 2015

FILE NO.: L 14-04 – Linn Avenue, Leland Road, and Meyers Road Corridor Plan 2015

APPLICANT: Oregon City Public Works Department, John Lewis, P.E., Director
625 Center Street, Oregon City, Oregon 97045

REPRESENTATIVE: Wallace Engineering / DKS

REQUEST: Adopt the Linn Avenue, Leland Road, and Meyers Road Corridor Plan 2015 as an amendment to the Oregon City Transportation System Plan, an Ancillary Document to the Oregon City Comprehensive Plan.

LOCATION: City-wide

REVIEWERS: Pete Walter, AICP
Tony Konkol, Community Development Director

DECISION: On May 20, 2015, after reviewing all of the evidence in the record and considering all of the evidence and arguments made by the applicant, property owners and interested citizens, the City Commission concluded that the Linn Avenue, Leland Road, and Meyers Road Corridor Plan 2015 had met all of the applicable requirements of the Oregon City Municipal Code and Oregon City Comprehensive Plan and voted 5-0 to approve the second reading of Ordinance 14-1013.

Notice of Final Decision. Not later than five days following the city commission final decision, the planning manager shall mail notice of the decision to DLCD in accordance with ORS 197.615(2). (Ord. 98-1008 §1(part), 1998). The city commission decision is the city's final decision and is appealable to the land use board of appeals (LUBA) within twenty-one days of when it becomes final.

Legislative actions involve the adoption or amendment of the city's land use regulations, comprehensive plan, maps, inventories and other policy documents that affect the entire city or large portions of it. Legislative actions which affect land use must begin with a public hearing before the planning commission.

1. *B. Planning Commission Review.*
   1. *Hearing Required. The planning commission shall hold at least one public hearing before recommending action on a legislative proposal. Any interested person may appear and provide written or oral testimony on the proposal at or prior to the hearing. The planning manager shall notify the Oregon Department of Land Conservation and Development (DLCD) as required by the post-acknowledgment procedures of ORS 197.610 to 197.625, as applicable.*
   2. *Planning Manager's Report. Once the planning commission hearing has been scheduled and noticed in accordance with Section 17.50.090(C) and any other applicable laws, the planning manager shall prepare and make available a report on the legislative proposal at least seven days prior to the hearing.*

    3. *Planning Commission Recommendation. At the conclusion of the hearing, the planning commission shall adopt a recommendation on the proposal to the city commission. The planning commission shall make a report and recommendation to the city commission on all legislative proposals. If the planning commission recommends adoption of some form of the proposal, the planning commission shall prepare and forward to the city commission a report and recommendation to that effect.*

2. *C. City Commission Review.*
    1. *City Commission Action. Upon a recommendation from the planning commission on a legislative action, the city commission shall hold at least one public hearing on the proposal. Any interested person may provide written or oral testimony on the proposal at or prior to the hearing. At the conclusion of the hearing, the city commission may adopt, modify or reject the legislative proposal, or it may remand the matter to the planning commission for further consideration. If the decision is to adopt at least some form of the proposal, and thereby amend the city's land use regulations, comprehensive plan, official zoning maps or some component of any of these documents, the city commission decision shall be enacted as an ordinance.*
    2. *Notice of Final Decision. Not later than five days following the city commission final decision, the planning manager shall mail notice of the decision to DLCD in accordance with ORS 197.615(2). (Ord. 98-1008 §1(part), 1998). The city commission decision is the city's final decision and is appealable to the land use board of appeals (LUBA) within twenty-one days of when it becomes final.*

City of Oregon City

625 Center Street
Oregon City, OR 97045
503-657-0891

Staff Report

File Number: PC 15-177

Agenda Date: 5/20/2015

Status: Public Hearing

To: City Commission

Agenda #: 6a.

From: Public Works Director John Lewis

File Type: Planning Item

SUBJECT:
Second Reading of Ordinance No. 14-1013, Approving the Linn Avenue / Leland Road / Meyers Road Corridor Plan (Planning File LE 14-04)

RECOMMENDED ACTION (Motion):
Staff recommends that the City Commission approve the second reading of Ordinance No. 14-1013.

BACKGROUND:
This item was approved and first read on May 6th. The final revisions to the draft plan based on the April 7, 2015 work session with the City Commission have been completed. These include the addition of the roundabout intersection analysis, the recommendations of the planning commission and city commission, and all public comments.

At the work session on April 7, the City Commission encouraged staff to continue to work with abutting property owners to minimize impacts of the roundabout alternative (alternative 5) on three abutting properties - Verhaalen Painting, the Plaid Pantry commercial site (Savage), and First Presbyterian Church.

The Linn Avenue / Leland Road / Meyers Road Corridor Plan (Plan) is being developed to address deficiencies in the pedestrian and bicycle facilities along the corridor. The area of the plan is from 5th Street at Jackson Street to Meyers Road at Moccasin Way. Along this route there are very few existing sidewalks and designated bicycle lanes. The Plan will identify preferred street sections to address these deficiencies when future development occurs. The Plan will also look at connecting important features along the corridor (i.e. parks and schools) by means of paths, sidewalks and bicycle lanes. In addition, the Plan will address the needs of the Linn Avenue, Warner Milne Road, Leland Road, Warner Parrott Road and Central Point Road intersection by proposing an intersection improvement plan.

On August 25, 2014, the Planning Commission voted unanimously to recommend approval of the Linn Avenue / Leland Road / Meyers Road Corridor Plan with the following recommendations:

- Consider the use of rumble strips or other visual methods to adequately separate bicycle lanes from vehicle travel lanes, particularly on inside curves;
- Minimize impacts to the Plaid Pantry commercial properties;

- Maximize the use of green techniques and landscaping to make the roundabout and intersection as visually attractive as possible;
- Recommend moving the center of the 5-legged roundabout north and west in order to minimize impacts to the Plaid Pantry (Savage) property;
- Look at options to improve the intersection with Electric Avenue with respect to stormwater management improvements;
- Utilize efficient street lighting to maximize safety along the right-of-way.

On September 17, 2014, legislative review of the Linn Avenue / Leland Road / Meyers Road Corridor Plan was requested. More public testimony was introduced and discussed, specifically related to concerns about the 5-leg roundabout proposed in the Plan for the Linn Avenue, Leland Road, Warner Milne Road, Warner Parrott Road and Central Point Road intersection(s). With the additional testimony, staff recommended that the topic be continued until November 19 so further determinations could be made.

On November 19, 2014, the corridor plan adoption was continued a second time until April 15, 2015 to allow the project team time to complete a detailed intersection control analysis. The agreement for professional services with Wallis Engineering was amended to include the supplemental scope to further ascertain the long term needs of the intersection, but more specifically, to complete a detailed analysis of 5 intersection scenarios. This additional work was anticipated to require 15 weeks to complete.

Wallis Engineering and DKS Associates have provided the City with an Intersection Control Analysis Draft Report which on February 18th was presented to the Transportation Advisory Committee. Project stakeholders and interested public were also provided access to the plan.

The draft intersection control analysis considers 6 alternatives including a do nothing alternative. Considerations including traffic operations, construction and maintenance costs, safety, system context, and right of way / access impacts were all studied. The report also describes other costs that are more difficult to quantify such as construction delay costs, opportunity costs, impacts to private businesses, or right-of-way impacts.

Overall, the roundabout alternatives (alternatives 4 and 5) show the greatest benefit for operations and safety, but also have the largest construction cost, which includes right-of-way acquisition. Alternatives 1 and 2 have much more modest construction cost yet the operational benefits and safety benefits are not nearly what can be achieved with the roundabout options. Alternative 3, where both intersections are signalized, does not meet operational standards.

Based on future traffic operations and potential savings related to safety, Alternative 5 is recommended as the long-term preferred alternative for these study intersections. If a short term solution is desired, Alternative 1 or 2 could be implemented at a significantly lower cost.

Project Website:
http://www.orcity.org/publicworks/linn-avenue-leland-road-meyers-road-corridor-plan

OREGON CITY

Linn Avenue, Leland Road, and Meyers Road Corridor Plan 2015

wallis engineering

DKS

City of Oregon City

Linn Avenue, Leland Road, and Meyers Road Corridor Plan

OREGON
CITY

April 2015

WE #1366A

REGISTERED PROFESSIONAL
ENGINEER
84136PE
OREGON
MARCH 09, 2010
DAVID CHANNING BROKAW
EXPIRES: 12/31/15

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660

DKS

Oregon City
Linn Avenue, Leland Road, and Meyers Road Corridor Plan

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Chapter 1: Introduction

BACKGROUND AND PURPOSE

Linn Avenue, Leland Road and Meyers Road constitute a key corridor for Oregon City. These roadways provide a continuous north-south route through a total of six distinct neighborhoods, and significant connectivity between residential and commercial areas. However, the corridor currently lacks continuous facilities for pedestrians and bicyclists, and there are a number of deficiencies in roadway operation and safety. The City's 2013 update to their Transportation System Plan (TSP) identified several projects that would improve multi-modal travel within the corridor.

The City of Oregon City contracted with Wallis Engineering to develop a corridor plan for this key corridor in order to address multi-modal facility deficiencies and provide a complete multi-modal route along the corridor.

A corridor plan is typically defined as the process and the product of creating a vision for a roadway corridor. The corridor planning effort culminates in a set of design recommendations.

These recommendations usually focus on providing safe and useable facilities for vehicles, pedestrians, transit users and bicyclists.

PLAN LOCATION

The project corridor is located on Linn Avenue, Leland Road, and Meyers Road. The corridor stretches approximately two miles, from the intersection of 5th Street and Linn Avenue to the intersection of Meyers Road and Moccasin Way. The project location is shown on the following page in *Figure 1-1: Vicinity Map*. For the purposes of this Plan, the corridor has been divided into four segments. These segments are shown on Figure 1-1, and include:

- Segment 1 - Linn Avenue: 5th Street to Park Drive
- Segment 2 - Linn Avenue: Park Drive to Leland Road
- Segment 3 - Leland Road: Linn Avenue to Meyers Road
- Segment 4 - Meyers Road: Leland Road to Moccasin Way

PLAN OBJECTIVES AND ROLE

The overall goal of the planning effort was to provide a continuous multi-modal route through the corridor, with specific implementation and phasing for the projects that would complete this route. This goal will be achieved by the following objectives:

- Identify transportation deficiencies and needs from existing planning documents, field survey, and input from public involvement.
- Develop solutions which recognize the existing built-out conditions and constraints while endeavoring to meet City standards for multi-modal facilities.
- Recognize that many of the planned improvements have budget constraints which limit construction of a complete multi-modal system. Provide an implementation plan which breaks up improvements into phases which are constructible within budget limitations and which have opportunities for obtaining funding.

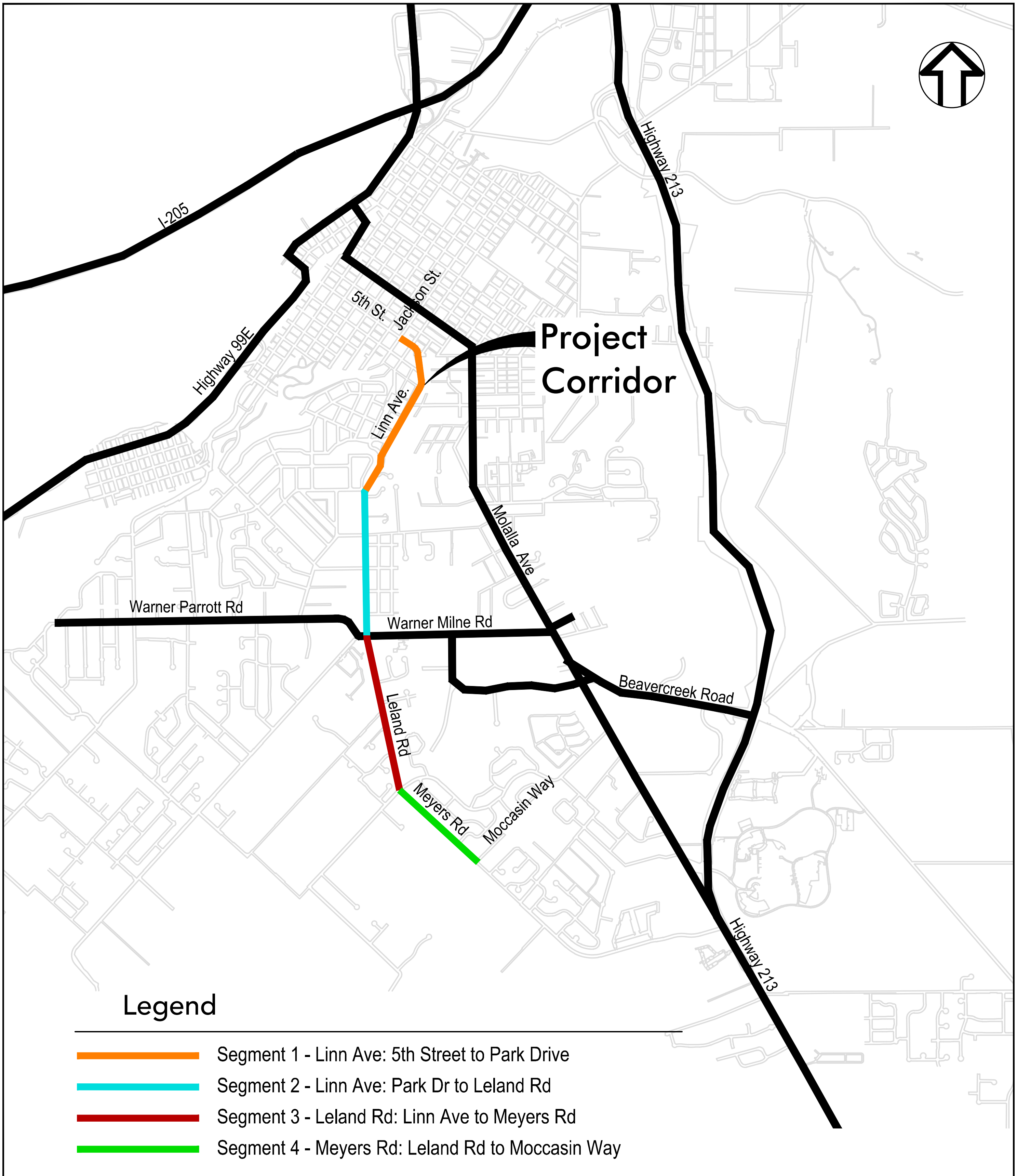


Figure 1-1: Vicinity Map

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014

PLAN ROLE

The plan will be used by the City to guide future projects which improve the roadways within the corridor. The plan does not stand alone, but builds on a number of other City planning documents. In particular, the plan modifies, supplements, and re-prioritizes some of the projects described in the TSP. As these documents and conditions through the corridor change, the plan should be updated accordingly.

PLANNING PROCESS

The Linn Avenue, Leland Road, and Meyers Road Corridor Plan followed a step-by-step planning process. This process was structured to include public involvement and participation throughout plan development. The following steps were included in the planning process:

1. Defining the scope and focus of the corridor plan, including the overall goals and vision for the corridor
2. Evaluating existing conditions throughout the corridor
3. Identifying existing and future needs for the corridor and its users
4. Developing alternative concept plans that will provide a complete multi-modal route through the corridor
5. Selecting and refining the preferred concept plan for the corridor, including specific project and design recommendations
6. Preparing an implementation strategy and phasing to accompany the overall corridor plan

PLAN ORGANIZATION

The corridor plan is divided into a total of six chapters. A brief description of each chapter (excepting Chapter 1) is included in the following paragraphs.

Chapter 2: Existing Conditions Analysis

The existing conditions throughout the corridor are described in detail, including the character of the corridor, transportation facilities, safety, streetscape elements, and public utilities.

West shoulder on Leland Road

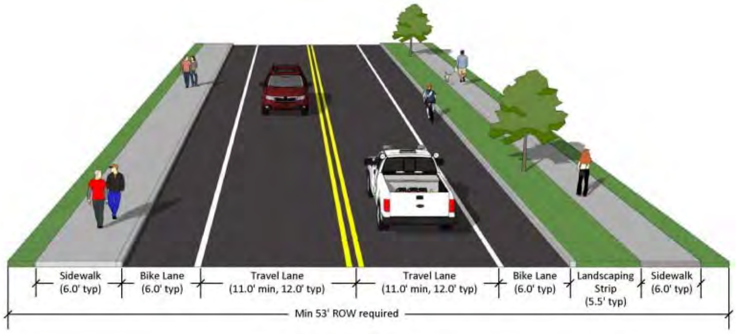
Chapter 3: Future Needs Assessment

The existing and future needs of the corridor are summarized, based on the existing conditions described in Chapter 2 and on the planning objectives. This assessment provides a basis for determining which deficiencies within the existing transportation system should be addressed by the corridor concept plan and specific design recommendations.

Bus stop on west side of Linn Avenue

Chapter 4: Alternative Development and Selection

The criteria used to develop concept plan alternatives are defined, as well as other criteria included in the scope of the plan. These alternatives and their expected implications for transportation and safety are discussed.



Concept Plan Alternative A for Meyers Road

Chapter 5: Final Concept Plan

The final plan is detailed according to each segment of the corridor. Recommendations are made for the roadway, streetscape, facilities for non-vehicular users, drainage and utilities, and pavement.

Chapter 6: Implementation Plan

The implementation plan for the corridor is described in terms of phasing and with regards to specific projects or planned improvements. Planning-level cost estimates for the proposed improvements are also included in this chapter.

INTRODUCTION

The existing conditions of the corridor are analyzed in this chapter. A discussion of these conditions includes the character of the corridor and its surrounding land uses, transportation facilities for each mode of travel, existing streetscape elements, and public utilities within the corridor.

CORRIDOR CHARACTER AND LAND USE

The Linn Avenue corridor consists of three roads in central Oregon City, which extend roughly north-south: Linn Avenue, Leland Road, and Meyers Road. The corridor is bounded by 5th Street at the northern extent, and by Moccasin Way at the southernmost extent. A general vicinity map is included as *Figure 1-1* (see Chapter 1). For the purposes of this Plan, the corridor has been divided into four segments according to their general character. These segments are shown on *Figure 1-1*, and include:

- Segment 1 - Linn Avenue: 5th Street to Park Drive
- Segment 2 - Linn Avenue: Park Drive to Leland Road
- Segment 3 - Leland Road: Linn Avenue to Meyers Road
- Segment 4 - Meyers Road: Leland Road to Moccasin Way

The transportation facilities and other characteristics of each of these segments are discussed in greater detail in the following sections.

Topography

In general, the corridor slopes downwards from Meyers Road toward Linn Avenue. The first segment of the project (Linn Avenue between 5th Street and Park Drive) exhibits the greatest topographical variation and steepest slopes. The majority of this segment is located in areas classified as having geologic hazards due to steep slopes or landslides. Retaining walls are frequently present on both sides of the roadway, often within City of Oregon City Right-of-way. In addition, roadway longitudinal slopes are as steep as eleven (11) percent in some areas. The other three segments of the project (Linn Avenue south of Park Drive, Leland Road, and Meyers Road), are considerably flatter, with no mapped geologic hazards or excessively steep slopes.

The corridor extends through and adjacent to a number of environmentally-sensitive areas associated with streams and creeks. The City classifies environmentally-sensitive areas through the corridor including a Natural Resources Overlay District, Water Quality Overlay District, wetlands and streams. These environmentally-sensitive areas are shown in more detail in *Figure 2-1*. As seen in this figure, the corridor is both adjacent to and crosses Singer Creek and Mud Creek at several locations.

Legend

— Streams

🟩 Wetlands

🟨 Natural Resource Overlay District

🟦 Water Quality District

🟩 City Park or Green Space

0 350 700
SCALE IN FEET

Figure 2-1: Environmentally-Sensitive Areas

Linn Avenue, Leland Road & Meyers Road Corridor Plan

August 2014

Land Use

Land use through the Linn Avenue corridor is predominantly built-out with residential and commercial development. The corridor is largely zoned residential with some commercial properties, as shown in *Figure 2-2*. The majority of the commercial properties are located around the intersection of Linn Avenue and Warner Parrott Road.

There are a number of public facilities and properties which generate activity through the corridor, including public parks, schools, and churches. These are shown on *Figure 2-3*.

Road Character

Oregon City classifies Linn Avenue, Leland Road, and Meyers Road as minor arterial roadways. As minor arterials, these roadways function to carry local traffic to community and regional facilities and to connect principal traffic generators. According to the City's 2013 Transportation System Plan (TSP), minor arterials should provide neighborhood accessibility, with lower speeds and traffic volumes. Linn Avenue, Leland Road and Meyers Road are also residential streets. The TSP notes that these streets should be "designed to emphasize walking," as well as prioritizing safety improvements for pedestrians.

This corridor is significant as a parallel facility to the City's key major arterial Molalla Avenue, and as a connection to the important minor arterial Warner Parrott Road/Warner Milne Road. In addition, the corridor is particularly accessible for vehicles, with only three intersections requiring a stop (two stop-controlled and one signalized intersection). The corridor passes through a total of six distinct neighborhoods, and includes a number of key transportation facilities for vehicles, pedestrians, bicyclists and transit users.

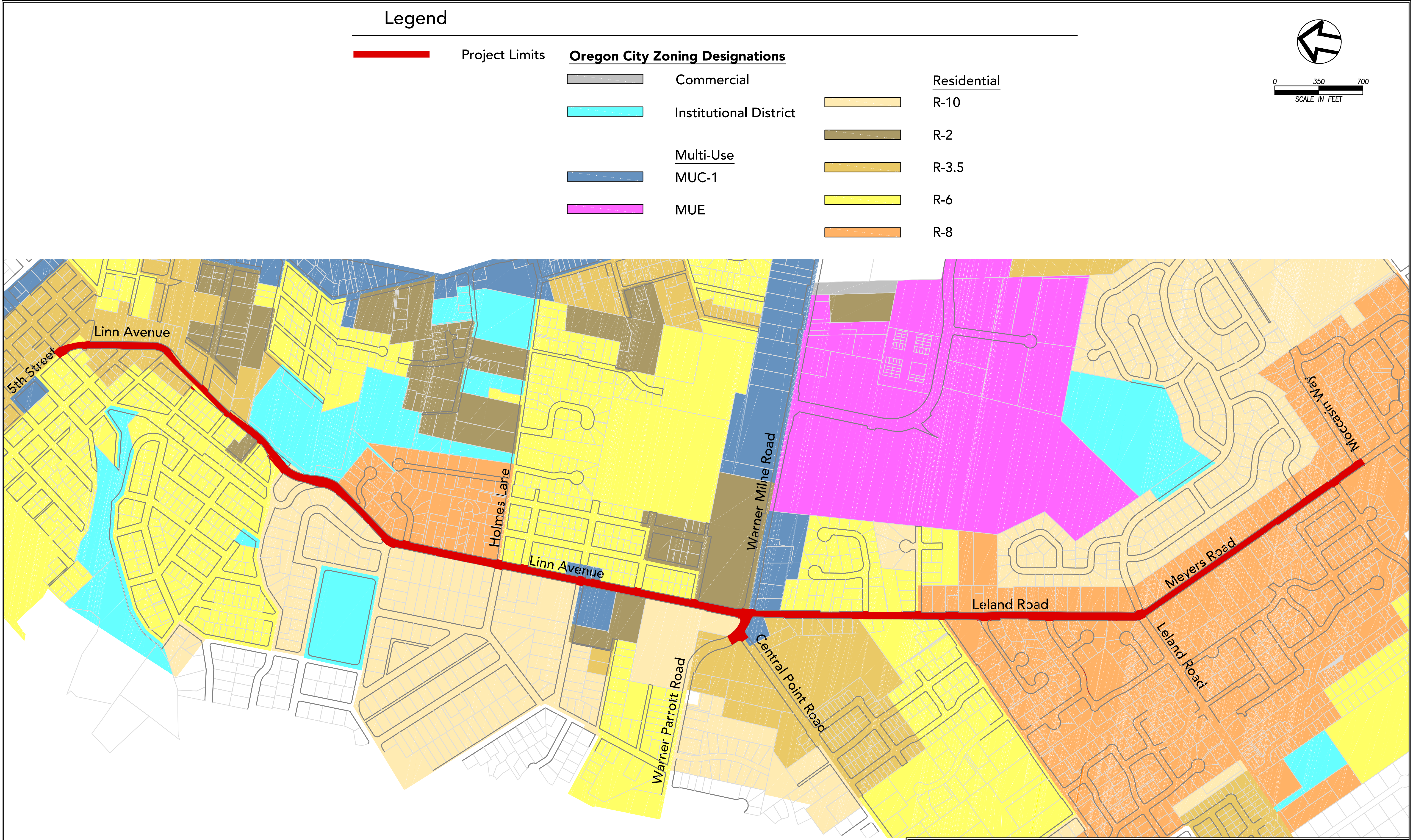


Figure 2-2: Zoning

Linn Avenue, Leland Road & Meyers Road Corridor Plan

August 2014

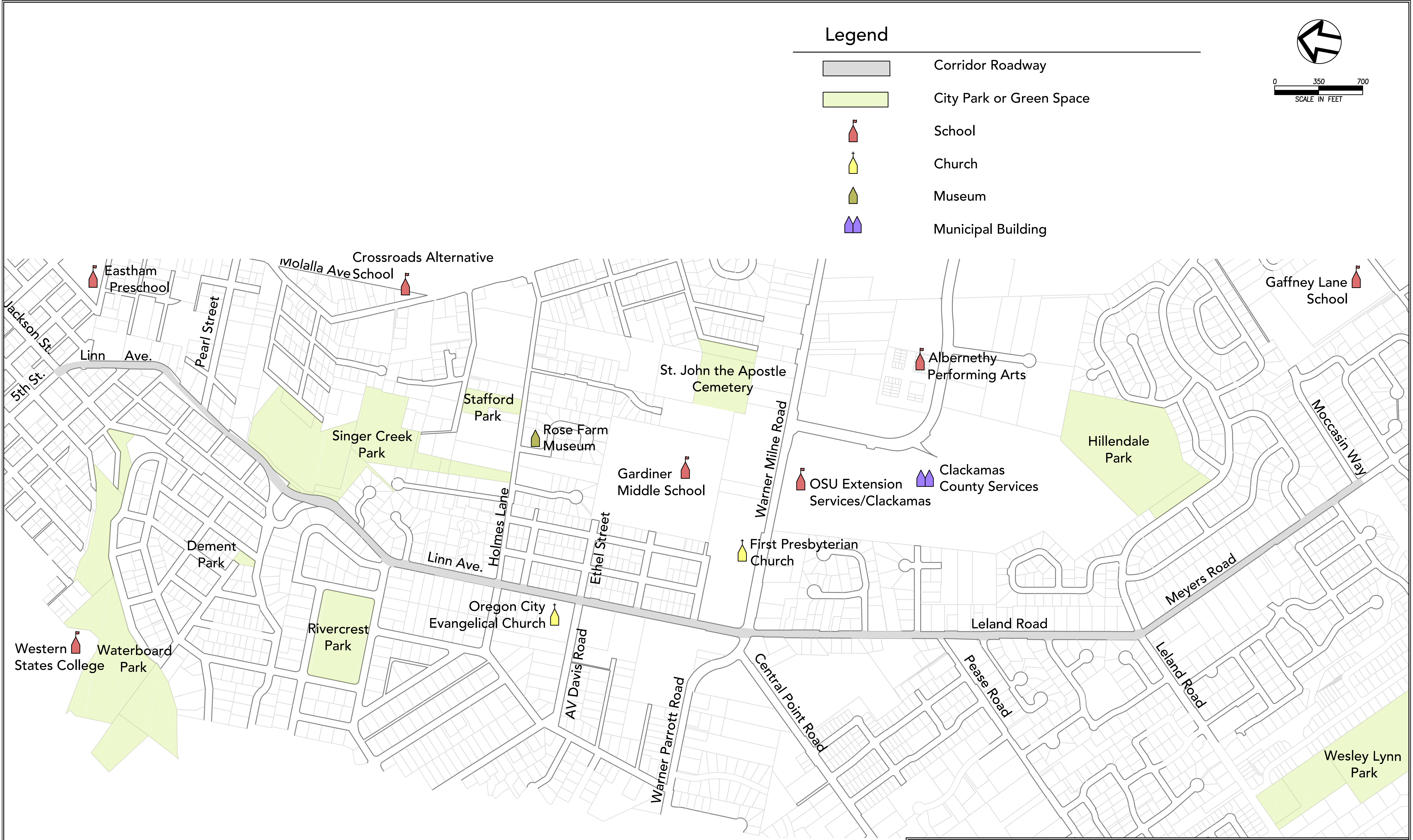


Figure 2-3: Activity Generators

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014

EXISTING TRANSPORTATION FACILITIES

The Linn Avenue corridor offers a number of transportation opportunities for vehicles, bicycles, pedestrians, and users of public transit. However, facilities for non-vehicular users are incomplete and deficient throughout the corridor, as addressed in the City of Oregon City's Transportation System Plan and in this chapter.

General Roadway Characteristics

The roadways which constitute the corridor are two-lane minor arterials with sidewalks and bicycle lanes present throughout most, but not all segments. There are a number of roadways intersecting with the corridor roadways which are relevant to a discussion of the corridor. *Table 2-1* below lists the general roadway characteristics within the general corridor study area. The roadways listed below do not include all roadways which intersect the corridor, simply those which are of particular size or importance.

Table 2-1: General Roadway Characteristics

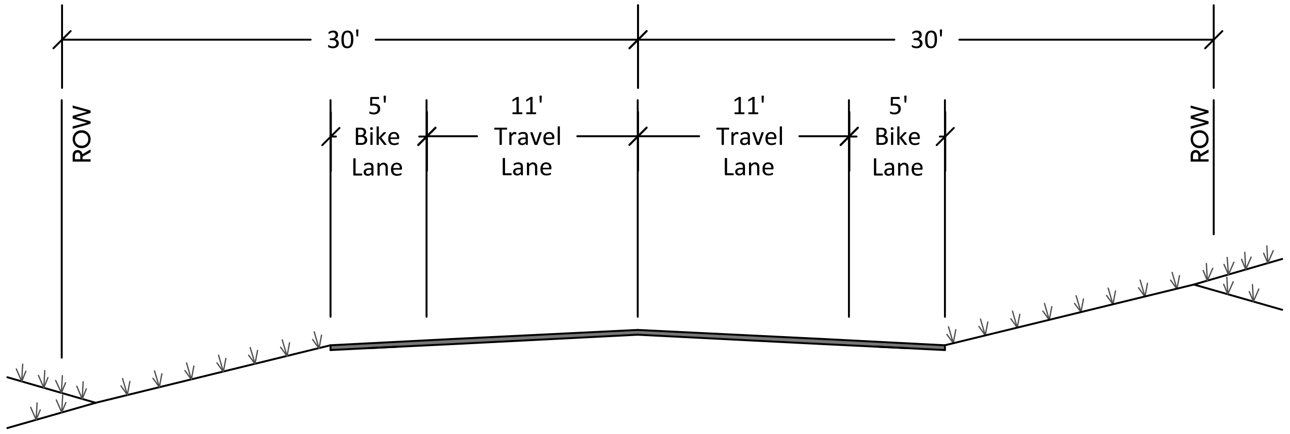
Street	**Classification**	**Cross-section**[1]	**Posted Speed**	**Sidewalks**	**Bike lanes**	**On-street Parking**	**TriMet Service**
Linn Ave – 5th St to Park Dr	Minor arterial	2 lanes	35 mph	No	Yes	No	Yes
Linn Ave – Park Dr to Warner-Parrott Rd	Minor arterial	2 lanes	35 mph	One side	Yes	Some[2]	Yes
5th St	Minor arterial	2 lanes	25 mph	Both sides	Yes	Yes	Yes
Pearl St	Collector	2 lanes	25 mph	One side	No	No	No
Charman St	Collector	2 lanes	25 mph	No	Some	No	No
Holmes Ln	Collector	2 lanes	25 mph	One side	Yes	No	No
AV Davis Rd	Collector	2 lanes	25 mph	Some	Some	No	No
Central Point Rd	Collector	2 lanes	35 mph	Yes	Yes	No	No
Warner Parrott Rd	Minor arterial	3 lanes	30 mph	Yes	Yes	No	No
Warner Milne Rd	Minor arterial	3 lanes	30 mph	Yes	Yes	No	Yes
Leland Rd	Minor arterial	2 lanes	35 mph	Some	Some	No	No
Pease Road	Collector	2 lanes	25 mph	Some	Some	No	No
Meyers Rd	Minor arterial	2 lanes	35 mph	Some	Some	No	No

[1] Cross-section in the vicinity of Linn Avenue, Leland Road or Meyers Road.

[2] The term "Some" indicates that facilities are not present for the entire street, as discussed in the following sections

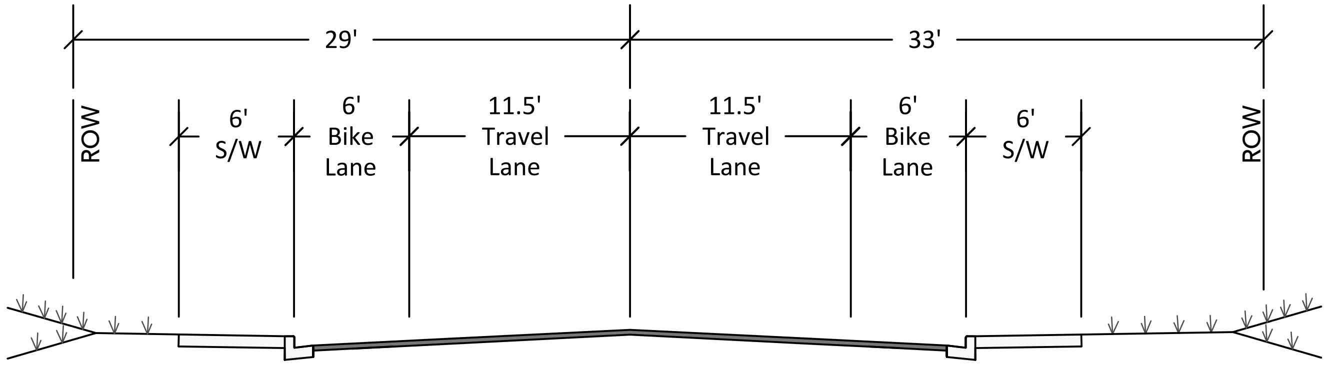
Typical Sections

There is a great deal of dimensional variation in right-of-way, travel lanes, sidewalk and bike lanes throughout the corridor. In addition, some sections of the corridor have been widened to provide complete multi-modal facilities. Taking this variation into account, two types of typical sections were created for each segment of the corridor: undeveloped and developed sections. Undeveloped sections are typical of the majority of the segment. Developed sections are typical portions of the segment where complete multi-modal facilities exist. Typical sections are included as *Figures 2-4* and *2-5.*



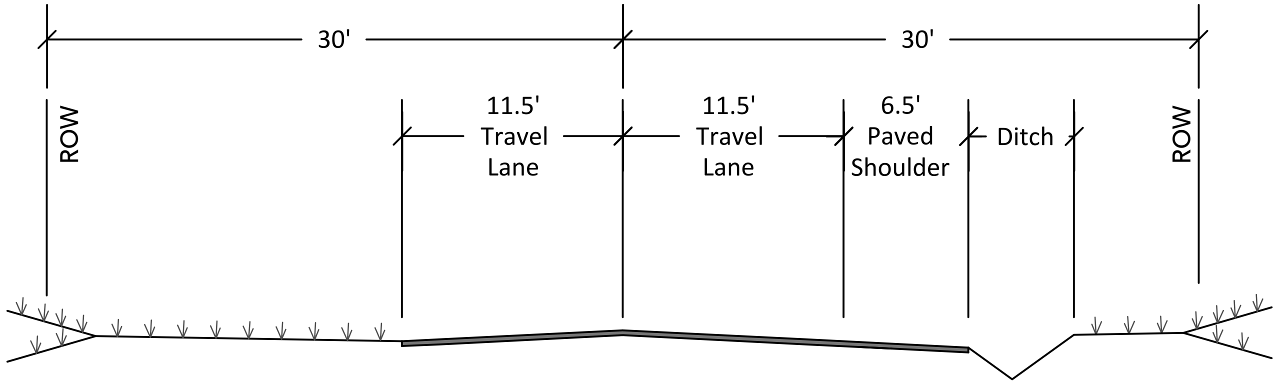
Segment 1: Linn Avenue

5th Street to Park Drive



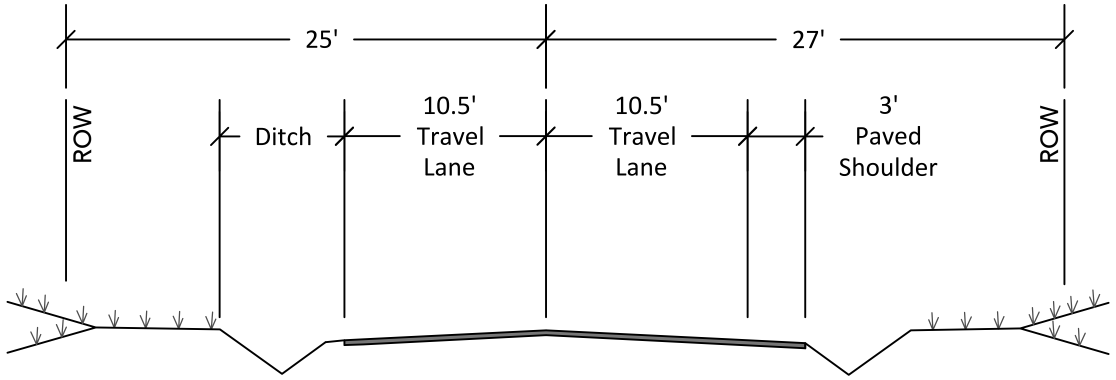
Segment 2: Linn Avenue

Park Drive to Warner Parrott Road/Warner Milne Road



Segment 3: Leland Road

Warner Parrott Road/Warner Milne Road to Meyers Road



Segment 4: Meyers Road

Leland Road to Moccasin Way

Notes:

1. Typical sections are rough approximations of existing dimensions. Right-of-Way, lane and sidewalk widths exhibit considerable variability through each segment of the corridor.
2. Where bike lanes and sidewalks are shown, this is indicative of the majority of the segment. Sidewalk and bike lanes are not present on both sides of the road through the entirety of the corridor.

Figure 2-4: Existing Typical Undeveloped Sections

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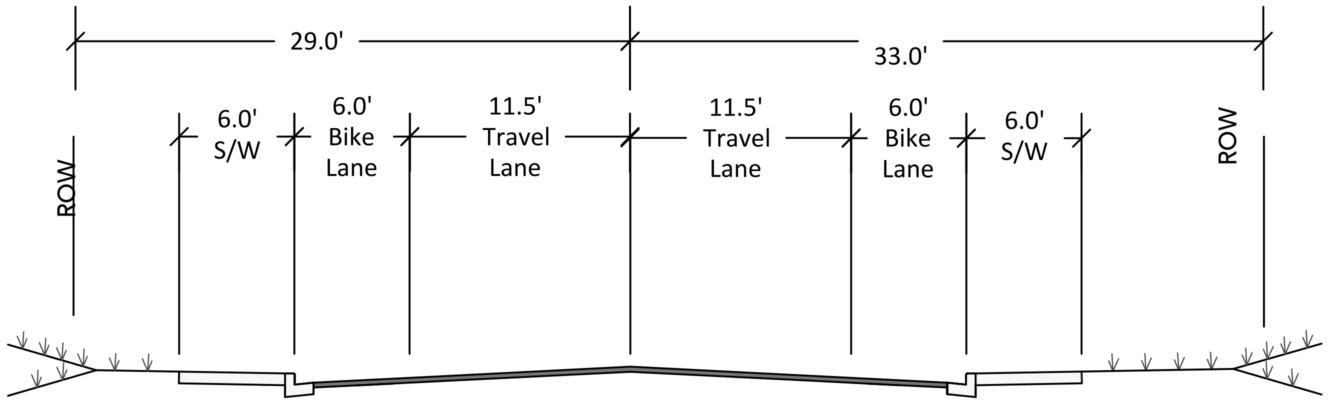
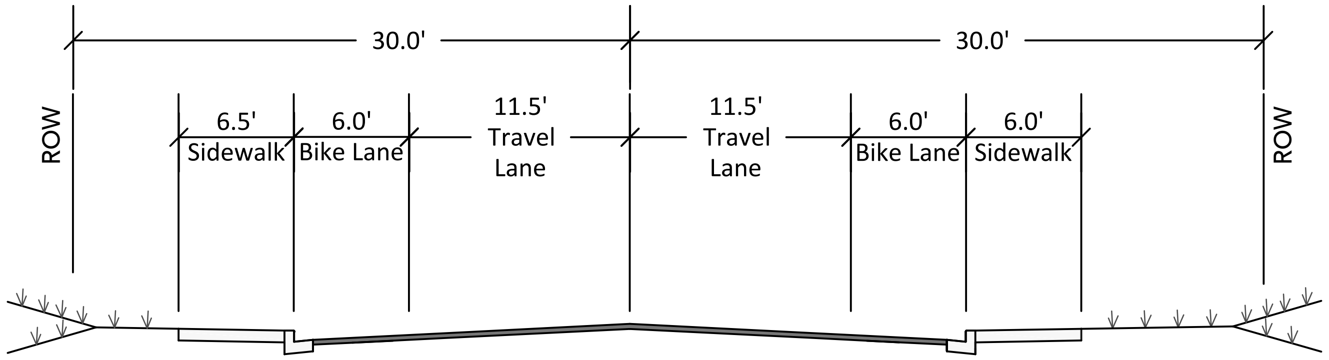


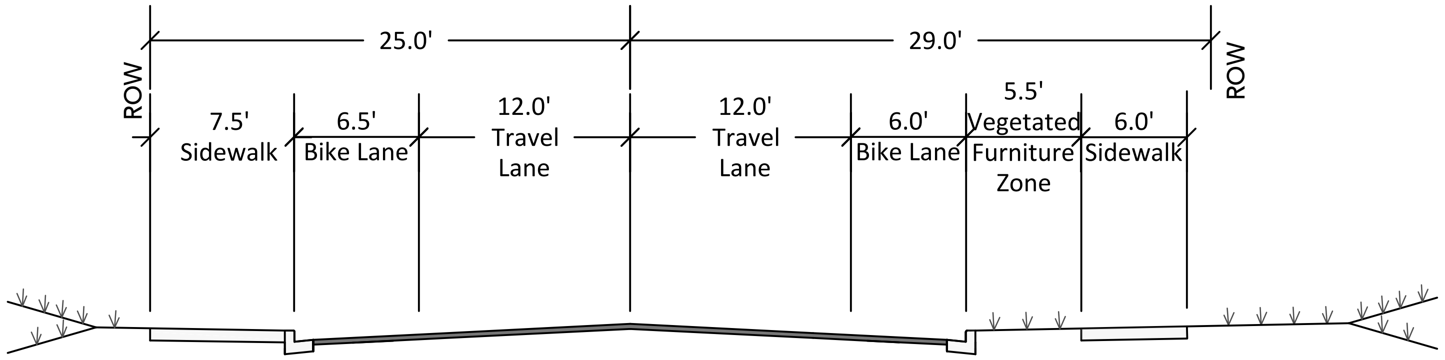
Segment 2: Linn Avenue

Park Drive to Warner Parrott Road/Warner Milne Road



Segment 3: Leland Road

Warner Parrott Road/Warner Milne Road to Meyers Road



Segment 4: Meyers Road

Leland Road to Moccasin Way

Notes:

1. These typical sections are representative of the limited portions within each corridor segment which have been fully developed with facilities for pedestrians and bicyclists. They are not representative of each segment as a whole.
2. A typical developed section is not shown for Segment 1 - no portion of this segment has been fully developed.

Figure 2-5: Existing Typical Developed Sections

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Geometry

The roadway characteristics of the corridor were compared to the City of Oregon City's standards for street design (described in the Municipal Code as well as the TSP) in order to determine the presence of substandard features or specifically deficient locations. A number of deficiencies were noted, including less than allowable minimum corner radii, inadequate sight distance, and acute angle street intersections. These general deficiencies are described in the following paragraphs and illustrated in *Figure 2-6*.

Less than Minimum Corner Radius

City street design standards require curb radii to be a minimum of 25 feet at intersections. Several intersection radii within the corridor do not meet this design standard.

Inadequate Sight Distance

The speed limit within the project corridor is noted as 35 miles per hour (mph). For this design speed, the City's Municipal Code requires a minimum corner sight distance of 350 feet. Corner sight distance is defined in City Code 10.32.020. Generally, it is measured from the centerline of the minor road to the major road at a designated height assumed typical for the driver's eye. A number of locations within the corridor have been noted that do not meet this sight distance requirement.

Acute Angle Street Intersections

Within the corridor there are numerous intersecting streets which intersect at angles less than ninety (90) degrees. The City's Municipal Code states that the minimum angle of intersecting streets shall be eighty (80) degrees unless design restricts it otherwise. There are a total of five streets within the corridor which do not meet that code restriction. These intersections are listed below in *Table 2-2*.

Table 2-2: Acute Street Intersections

Street	**Intersecting Street**	**Approximate Angle of Intersection[1]**
Linn Avenue	4th Street	45°
Linn Avenue	Pearl Street	56°
Linn Avenue	Charman Street	61°
Linn Avenue	Electric Avenue	58°
Leland Road	Meyers Road/Clairmont Road	68°

[1] Angle as measured from street centerlines from City of Oregon City GIS

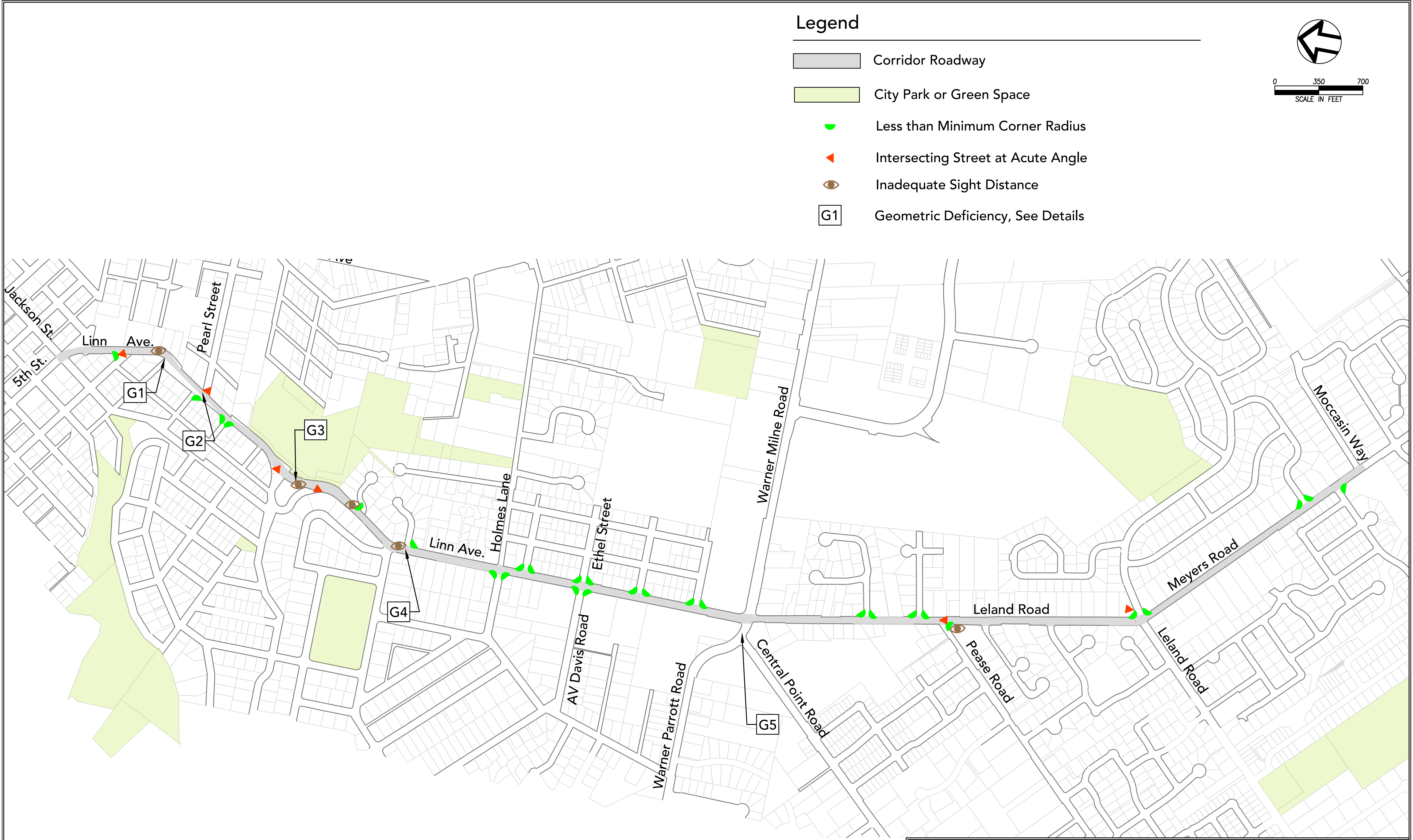

Figure 2-6: Existing Geometric Deficiencies

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Specific Geometric Deficiencies

We have identified a number of specific geometric issues within the corridor. These are shown on *Figure 2-6*. Specific geometric deficiencies noted on this graphic are described as follows:

G1 Linn Avenue between 3rd to 4th Streets: There is an extremely tight turn for southbound drivers on Linn Avenue prior to Oak Street at this location. This location has poor sight distance for drivers, and an obstruction in the clear zone in the form of a high retaining wall and vegetation. This geometric deficiency has safety implications for drivers, as well as for pedestrians and bicyclists within the paved shoulder/bike lane located between the retaining wall and the drive lane. Public opinion of this location is that it is highly unsafe.

G2 Pearl and Oak Streets at Linn Avenue: Pearl Street and Oak Street represent an offset intersection with Linn Avenue. The intersecting streets are less than 90 feet apart at their centerlines. City Code requires a minimum block spacing between streets of 150 feet. This intersection does not meet City Code requirements, and is a geometric deficiency.

G3 Linn Avenue between Charman Street and Glenwood Court: Linn Avenue undergoes an ‘S’ type curve at this location. Given the steep grade south of this intersection and the pedestrian crossing at the bottom of that steep downgrade, this curve presents safety concerns. In addition, the turning radius is excessively wide for drivers turning left onto Charman Street from Linn Avenue. The location of a striped crosswalk crossing Linn Avenue at Charman Street presents a specific safety concern. This crosswalk is located at the bottom of a hill with steep downgrades. Vehicles driving north on Linn Avenue may easily travel greater than the posted speed limit of 35 mph due to the steep slope. At speeds of 40 mph and greater, there is a potential that the vehicle’s sight distance is not adequate for stopping prior to the crosswalk.

G4 Narain Court and Park Drive at Linn Avenue: Narain Court and Park Drive represent an offset intersection with Linn Avenue. The intersecting streets are less than 150 feet apart at their centerlines. This intersection does not meet City Code requirements, and is a geometric deficiency.

G5 Linn Avenue and Leland Road intersection with Warner Parrott Road and Warner Milne Road: The close proximity of the intersection of Central Point Road and Warner Parrott Road to the intersection of Linn Avenue/Leland Road and Warner Parrott Road/Warner Milne Road has been noted as the reason for this intersection’s poor functionality – with long queues on Central Point Road and vehicle yielding issues. This intersection has been flagged for improvement in the 2013 Transportation System Plan.

Vehicular Facilities

The Linn Avenue corridor consists of two-lane asphalt paved minor arterial roadways. Intersecting streets are typically two-way stop-controlled in favor of the corridor roadway, except for the following intersections:

- Linn Avenue and Holmes Lane is a 4-way stop intersection with a flashing red signal
- Linn Avenue/Leland Road and Warner Parrott/Warner Milne Road is a signalized intersection
- Leland Road & Meyers Road is a 4-way stop intersection

Speeding

The posted speed limit throughout the corridor is 35 miles per hour (mph). Public concern has been expressed with regard to high vehicular speeds through the corridor, which prompted a speed study on Linn Avenue in 2011. The study found that the 85th percentile speeds were equal to or greater than 35 mph on Linn Avenue between 5th Street and Glenwood Court. There are contributing factors typical of higher speeds through this portion of the corridor: an absence of stops for drivers traveling on Linn Avenue, and steep longitudinal slopes. The study further indicated that the 85th percentile speeds were equal to or less than 30 mph on Linn Ave between Holmes Way and Warner Parrott/Warner Milne Road. The lower observed speeds through this segment of Linn Avenue may have been the result of the speed signage posted adjacent to the Mt. Pleasant Elementary School. The Oregon City School District no longer operates a school at this property; however, at the time of the speed study, Mt. Pleasant was a school, and was correspondingly speed signed during school hours at 20 mph.

No speed studies have been performed on Leland Road or Meyers Road within the corridor.

Clear Zone Issues

There are a number of potential safety issues associated with obstructions within the clear zone throughout the corridor. The clear zone is the open, moderately flat area located adjacent to the edge of the roadway which allows errant vehicles to recover themselves. Clear zone obstructions are typically defined as fixed objects within the clear zone which would cause injury to motorists upon vehicle collision. Obstructions within the corridor that occur with relative frequency include retaining walls, steep slopes and ditches, utility poles, mailboxes, trees, and fire hydrants. *Appendix A* includes plan sheets which show the locations of some of these obstructions.

Crash History

In order to identify additional existing safety issues or concerns, the crash history of the corridor was reviewed. The Oregon Department of Transportation (ODOT) supplied historical information summarizing all reported collisions along the corridor occurring in the five year period between January 1, 2008 and December 31, 2012. The raw data is included in *Appendix B*. Crash information was analyzed and is summarized in *Table 3* below with respect to the severity of the crash and the collision type.

Table 2-3: Corridor Safety History – 2009 to 2013

Intersection/Area	Crash Severity[1]		Collision Type[2]					Total crashes
	PDO	Injury	Rear -End	Turning	Fixed Object	Angle	Sideswipe	
Linn Ave at 3rd St[3]	2	3			2		3	5
Linn Ave / Oak St		1			1			1
Linn Ave / Pearl St	2		1		1			2
Linn Ave / Hazel St	1		1					1
Linn Ave / Charman St	2	1			2		1	3
Linn Ave / Electric Ave	1	5	2	1	1		2	6
Linn Ave / Park Dr		1	1					1
Linn Ave / Holmes Ln	2	7	3	1		4	1	9
Linn Ave / Ella St		1		1				1
Linn Ave / AV Davis Rd/Ethel St	4	7	2	5		4		11
Linn Ave / Hood St		2	1	1				2
Linn Ave / Williams St	1		1					1
Linn Ave Warner Parrott Rd / Warner Milne Rd	3	4	3	2		1	1	7
Leland Rd Warner Parrott Rd / Warner Milne Rd	4	5	4	2	1	2		9
Warner Parrott Rd / Central Point Rd	5	5	1	6	2		1	10
Leland Rd / Pease Rd	2	1	1	2				3
Leland Rd / Dalles St	1		1					1
Leland Rd / Lot Whitcomb Dr		1			1			1
Leland Rd / Meyers Rd	2	2	2		1	1		4
Meyers Rd / Frontier Pkwy	1	5	4	2				6
Total	**33**	**51**	**28**	**23**	**12**	**12**	**9**	**84**

1. PDO means “Property Damage Only.” Injury means that the crash led to one or more injuries. The total number of injuries resulting from each crash incident is not included in this table, but may be found in the crash data included in *Appendix B*.

Footnotes for Table 2-3 continued:

2. ODOT defines the collision types listed above as follows:
    a. Angle - An angle collision results when vehicles collide while traveling on crossing paths.
    b. Backing - A backing collision results when a vehicle is backing in a traffic lane and strikes another vehicle also in a traffic lane.
    c. Fixed Object - A fixed or other object collision results when one vehicle strikes a fixed or other object on the roadway or off roadway.
    d. Rear End - A rear end collision results when a vehicle traveling in the same direction or parallel on the same path as another vehicle, collides with the rear end of a second vehicle.
    e. Sideswipe - A sideswipe collision results when vehicles traveling on parallel paths collide. When they are traveling in opposite directions it would be a Sideswipe-meeting Collision; in the same direction would be defined as a Sideswipe-overtaking Collision.
    f. Turning- A turning movement collision results when one or more vehicles in the act of a turning maneuver is involved in a collision with another vehicle.
3. 3rd Street is located directly west of Linn Avenue but does not intersect. However, between the intersection of 4th Street and Linn Avenue and the location where 3rd Street would intersect represents a tight angled turn with limited sight distance

Multiple collisions were recorded that involved a person using a non-motorized means of travel: three involving bicyclists, and three involving pedestrians.

All three collisions resulted in the bicyclist sustaining injuries. A bicyclist traveling within the roadway on AV Davis Road at Linn Avenue was rear-ended by a vehicle. On the other side of Linn Avenue, at Ethel Street, a bicycle was struck by a vehicle at an angle. A bicyclist traveling along Warner Parrott Road struck a vehicle traveling north on Central Point Road who did not yield to traffic at this intersection.

Three collisions involved drivers who did not yield to pedestrians crossing the crosswalk at an intersection. All three collisions resulted in the pedestrian sustaining injuries. A pedestrian traveling across the crosswalk was struck by a vehicle turning across the intersection of AV Davis Road and Linn Avenue. A pedestrian traveling through the crosswalk across Leland Road was hit by a vehicle turning right onto Leland from Warner Parrott Road. A pedestrian traveling through the crosswalk across Meyers Road at Frontier Parkway was struck by a vehicle traveling straight through Meyers.

One crash involved a bus, and occurred on Linn Avenue adjacent to Electric Avenue. In this incident, a passenger vehicle collided with a stopped bus due to speeds within the posted limit, but too high for the warranted conditions. Injuries were sustained by all drivers and passengers involved for a total of nine injuries.

There are a number of specific locations which warrant consideration given the collected crash data and other observed safety concerns. Each of these locations and their associated safety issues are described in the following paragraphs.

Linn Avenue at 3rd(4th) Street – The intersection of 4th Street with Linn Avenue is located between two relatively tight curves near the base of the steepest section of the corridor. The collision types noted for this intersection are 'Fixed Object' and 'Sideswipe'. These crash types are indicative of loss of control accidents, and are likely due to speed and geometry issues. In addition, sight distance from this intersection is approximately 150 feet uphill and approximately 300 feet downhill. 4th Street intersects Linn Avenue at approximately 45 degrees, requiring drivers to look over their shoulder to see southbound vehicles on Linn Avenue.

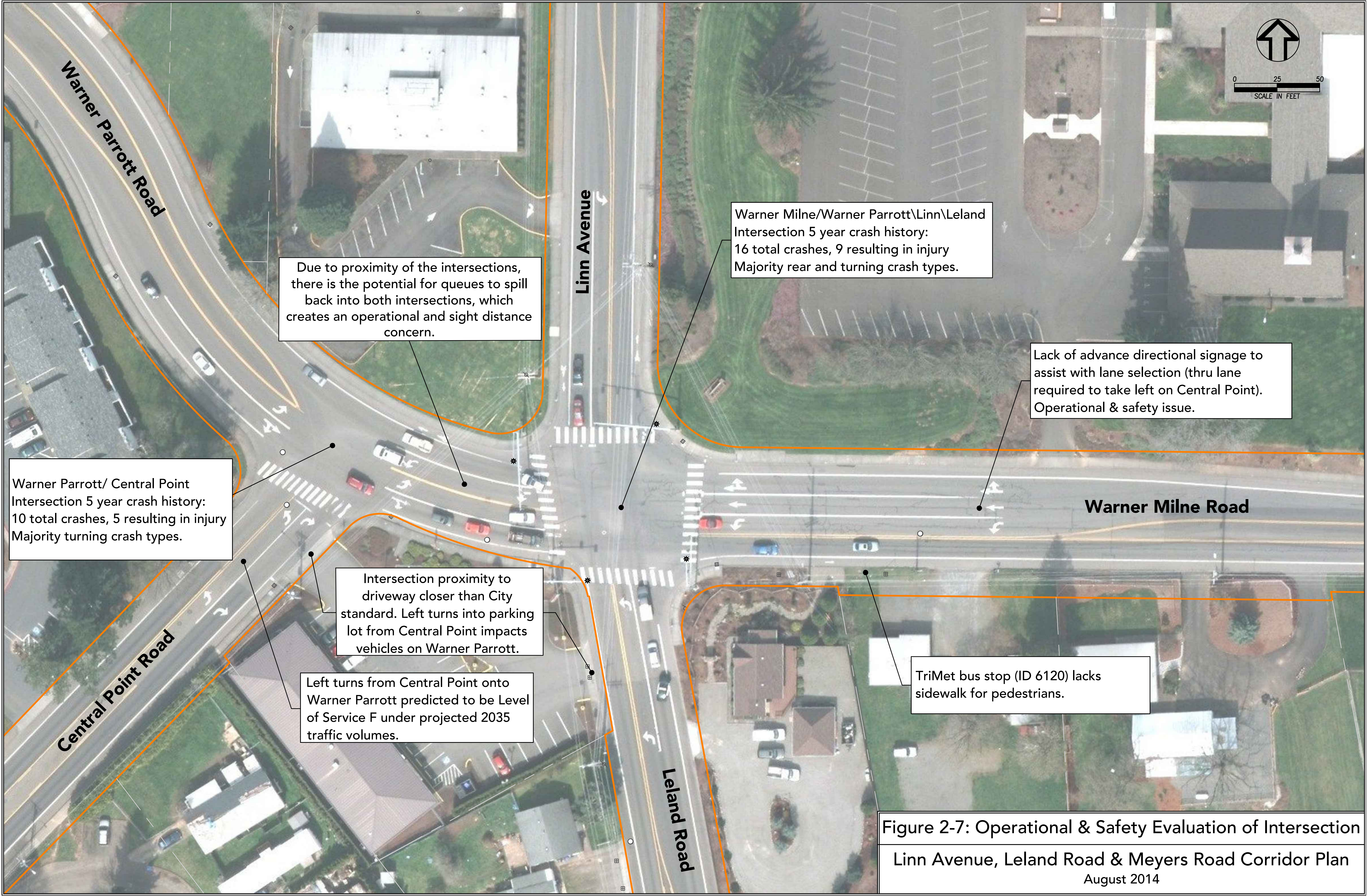
Linn Avenue at Electric Street – This intersection is located between reverse curves along Linn Avenue, at the bottom of a steep hill. Electric Street intersects Linn Avenue at approximately 53 degrees, requiring drivers to look sharply left to see southbound vehicles on Linn. The crash types vary for this location and may be indicative of the variety of geometric issues at this particular location. In addition, this intersection is located less than 300 feet from Charman Street and has sight distance obstructions.

Linn Avenue at Holmes Street – This 4-way stop-controlled intersection has experienced a relatively high rate of crashes compared to similar locations along Linn Avenue. Three separate incidents involved vehicles who were following too closely, resulting in rear-end type crashes. Four other incidents involved drivers who did not yield Right-of-way at the intersection, and one driver disregarding the stop sign (on Holmes St) altogether. This intersection has an overhead flashing red beacon which may be partially obscured by overhead branches from trees on the east side of Linn Avenue.

Linn Avenue at AV Davis Road/Ethel Street – This location has two-way stop control on the intersecting streets. The crash types at this location are primarily 'Turning' and 'Angle' type crashes. These crash types are indicative of speed and sight distance issues. For vehicles entering from AV Davis Road, vegetation obscures crossing vehicles from both directions. Sight distance to the south (westbound from AV Davis Road) appears to be less than 125 feet. This intersection is of particular note due to the fact that in the last five years it has been the location of a total of three crashes involving non-motorized means of travel - with injuries sustained by two bicyclists and a pedestrian.

Linn Avenue and Leland Road intersection with Warner Parrott Road and Warner Milne Road – This intersection has experienced multiple rear and turning-type crash incidents. A graphic illustrating existing safety and operational issues at this intersection is included as *Figure 2-7*.

Central Point Road at Warner Parrott Road – This intersection has experienced multiple crashes, predominantly turning type crashes. It is important to note that the majority of these crashes are listed as resulting from vehicles who did not yield Right-of-way. *Figure 2-7* illustrates existing safety and operational issues with this intersection.



Due to proximity of the intersections, there is the potential for queues to spill back into both intersections, which creates an operational and sight distance concern.

Warner Milne/Warner Parrott\Linn\Leland Intersection 5 year crash history:
16 total crashes, 9 resulting in injury
Majority rear and turning crash types.

Lack of advance directional signage to assist with lane selection (thru lane required to take left on Central Point). Operational & safety issue.

Warner Parrott/ Central Point Intersection 5 year crash history:
10 total crashes, 5 resulting in injury
Majority turning crash types.

Intersection proximity to driveway closer than City standard. Left turns into parking lot from Central Point impacts vehicles on Warner Parrott.

Left turns from Central Point onto Warner Parrott predicted to be Level of Service F under projected 2035 traffic volumes.

TriMet bus stop (ID 6120) lacks sidewalk for pedestrians.

Figure 2-7: Operational & Safety Evaluation of Intersection

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Safety

There are a number of safety concerns associated with streets within the corridor, including low lighting, roadside obstructions, lack of designated pedestrian and bicycle facilities, concerns with speeding and geometric issues.

Lighting throughout the corridor has been identified as a public concern with regard to safety for drivers and other users. The locations and frequency of lighting is discussed in detail later in this report, but can be assessed as being detrimental to safety.

The lack of designated pedestrian and bicycle facilities is of particular concern in narrow, constrained sections of roadway. Throughout Segment 1 (Linn Avenue) there are no physical barriers separating vehicular traffic from bicyclists and pedestrians in the shoulder. In addition, the presence of retaining walls adjacent to roadway shoulder limit the safety of pedestrians and bicyclists, who are confined within the narrow space between vehicular traffic and the wall.

Retaining wall and jersey barrier on Linn Avenue (Segment 1)

Shoulder and ditch on Leland Road (Segment 3)

In Segments 3 and 4 (Leland Road and Meyers Road), the paved roadway is typically narrow, coupled with a narrow or nonexistent shoulder adjacent to a ditch. This limited area for bicyclists and pedestrians forces these users either into the roadway, or narrowly skirting the limited space between the travel lane and a deep ditch.

As discussed, speeding has been perceived as a safety issue by residents and other users of the corridor. In general, vehicles traveling at speeds greater than designated limits intensify safety concerns. Safety is a particular issue where speeding is added to poor vehicular stopping sight distances.

Pedestrian Facilities

Pedestrian facilities throughout the corridor are not continuous, and in many locations do not meet the requirements of current ADA standards. A graphic illustration of pedestrian facilities and facility deficiencies is included as *Figure 2-8*. This figure illustrates standard facilities (sidewalks and curb ramps).

Pedestrian connectivity through the corridor is limited throughout most of the segments. In addition, the surrounding street grid is largely deficient of pedestrian facilities.

Legend

▭ Corridor Roadway

🟩 City Park or Green Space

○ Ramp

● Ramp Meeting ADA Requirements*

— Sidewalk, Path or Trail

▬ Striped Crosswalk

↔ Excessive Block Length Without Pedestrian Crossing

P1 Pedestrian Facility Deficiency, See Plan For Details

** Assessment of ramps meeting or not meeting ADA requirements was based on visual observations.*

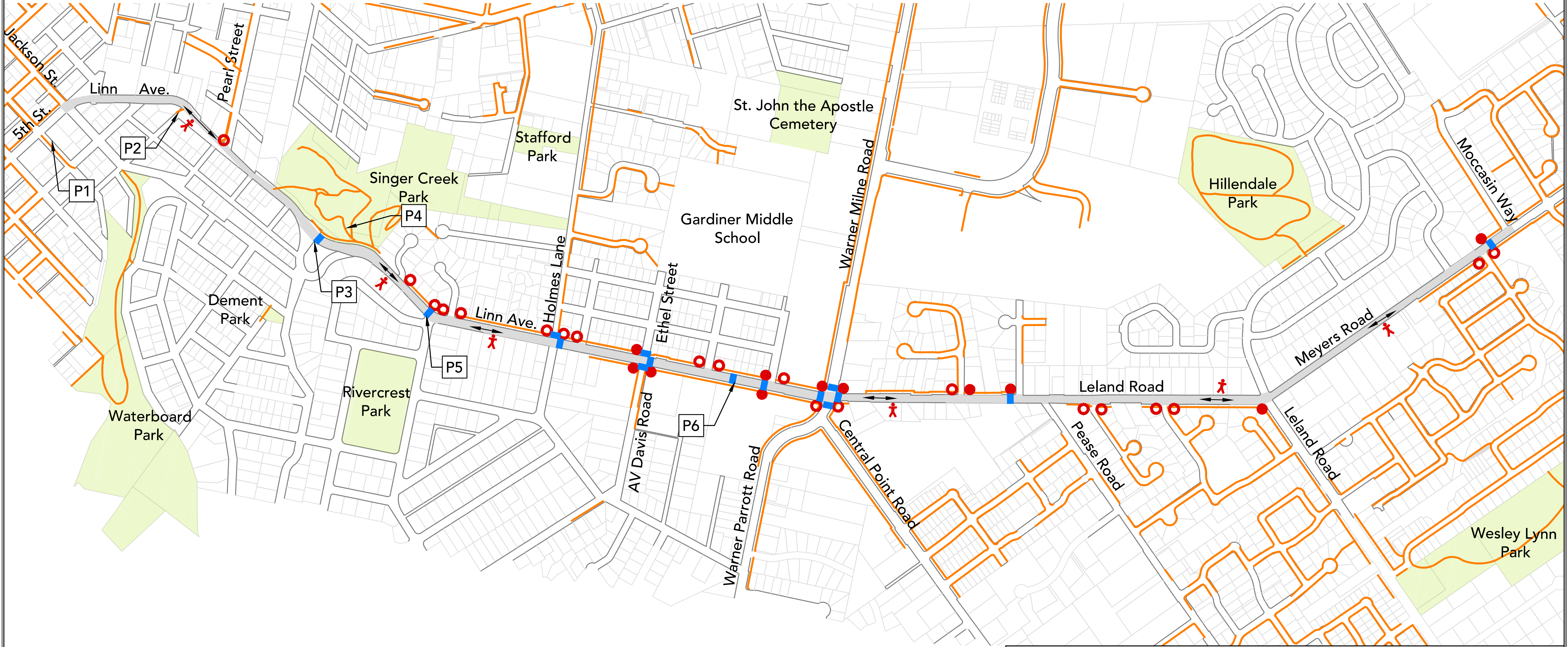

Figure 2-8: Existing Pedestrian Facilities

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In Segment 1, connectivity is limited by the lack of continuous sidewalks on Linn Avenue, though there is a paved shoulder (a bike lane) which is used by pedestrians as well as bicyclists. Some pedestrians walk within the paved shoulder, while others travel parallel routes within the surrounding residential neighborhoods. This lack of connectivity limits pedestrian access from neighborhoods to adjacent attractions such as Singer Creek Park east of Linn Avenue, and Waterboard Park west of Linn Avenue. It also limits movements from these neighborhoods north to the downtown area. Significantly, there is no continuous sidewalk from the surrounding street grid to Gardiner Middle School. There is sidewalk and trail access to the school from Holmes Lane along Haley Court, Rilance Lane and Laurel Court, but fencing and lack of a paved connection block or restricts access to the school property.

Singer Creek Park

In Segments 3 and 4, connectivity is limited by the lack of continuous sidewalks on Leland Road and Meyers Road. Pedestrian access through the corridor is further limited by the lack of a useable shoulder on portions of Leland and Meyers Roads. The majority of these roads only have a six to twelve-inch wide paved shoulder, immediately adjacent to deep ditches. This is not a comfortable walking area, and presents safety concerns.

Where present, sidewalks meet the City of Oregon City standard 5-feet minimum width for minor arterial roadways. However, the majority of the curb ramps throughout the corridor do not meet ADA standards, generally because of excessive slopes and the lack of tactile warning systems. In addition, the majority of driveways which cross the sidewalk have steep cross slopes which do not meet the requirements of ADA.

Pedestrian crossings through the corridor are present both at intersections and at some key midblock locations. Intersection pedestrian crossings largely consist of striped crosswalks. The only pedestrian-actuated push buttons within the corridor are located at the intersection of Linn Avenue and Leland Road with Warner Parrott Road/Warner Milne Road. One midblock crossing is located on Linn Avenue between Hood Street and Williams Street at the former Mt. Pleasant Elementary School. Midblock crossings are generally considered unsafe due to lack of driver expectation and limited visual cues to drivers which would indicate the presence of pedestrians within the roadway.

Midblock crossing at former Mt. Pleasant School

We have identified a number of specific deficiencies in pedestrian facilities within the corridor. These are located on *Figure 2-8*. The noted deficiencies are described in the following paragraphs.

P1 Asphalt trail from 5th Street to Terrace Avenue: This asphalt-paved trail does not meet ADA requirements due to excessive longitudinal slopes, and does not have an adequate connection to existing pedestrian facilities within the neighborhood.

P2 Route/trail from 3rd Street to Linn Avenue: This route consists of concrete stairs and an unpaved trail. This route does not meet ADA requirements, and does not provide a sufficiently wide or smooth travel surface for users.

P3 Crosswalk across Linn Avenue at Charman Street: This crossing does not connect to the asphalt pathway on the east side of Linn Avenue (there is a grass furniture zone between the drive lane and the pathway). In addition, there is no sidewalk on the west side of Linn Avenue where the crosswalk terminates.

P4 Asphalt trails through Singer Creek Park: Portions of the existing asphalt-paved trails through this park do not meet ADA requirements due to excessive slopes.

P5 Crosswalk across Linn Avenue at Park Drive: This crossing does not connect to a sidewalk on the west side of Linn Avenue.

P6 Midblock crossing on Linn Avenue: There is a striped crosswalk located midblock between Hood Street and Williams Street that connects to the former Mt. Pleasant Elementary School. This midblock crossing is unnecessary due to the presence of a crosswalk at Williams Street and the fact that Mt. Pleasant is no longer in operations as a school. In addition, there are no ADA-compliant curb ramps allowing access to the sidewalk on either side of the crosswalk.

Bicycle Facilities

Bicycle lanes are present through the majority of the corridor, though they are largely unmarked. However, these facilities vary from substandard to wider-than-standard. The majority of intersecting streets throughout the corridor do not have marked bike lanes. Major bikeways which connect to the corridor include Warner Parrott / Warner Milne Road, and Molalla Avenue (accessible outside of the corridor limits from Meyers Road). *Figure 2-9* illustrates bicycle facilities and deficiencies throughout the corridor.

The 2013 Transportation System Update identified three permissible minimum widths for bike lanes which were context dependent. A minimum 4-feet wide lane was permitted only for very constrained locations. A minimum width of five-foot would be permissible for bike lanes adjacent to curb or a parking lane. Otherwise, the standard bike lane would be 6 feet wide.

Connectivity for bicyclists throughout the corridor is limited. The majority of Linn Avenue has bike lanes, but they are rarely marked, and in many locations they are narrower than the standard width. Leland Road and Meyers Road largely lack bicycle lanes, and in many places these roadways have little to no shoulder useable by bicyclists.

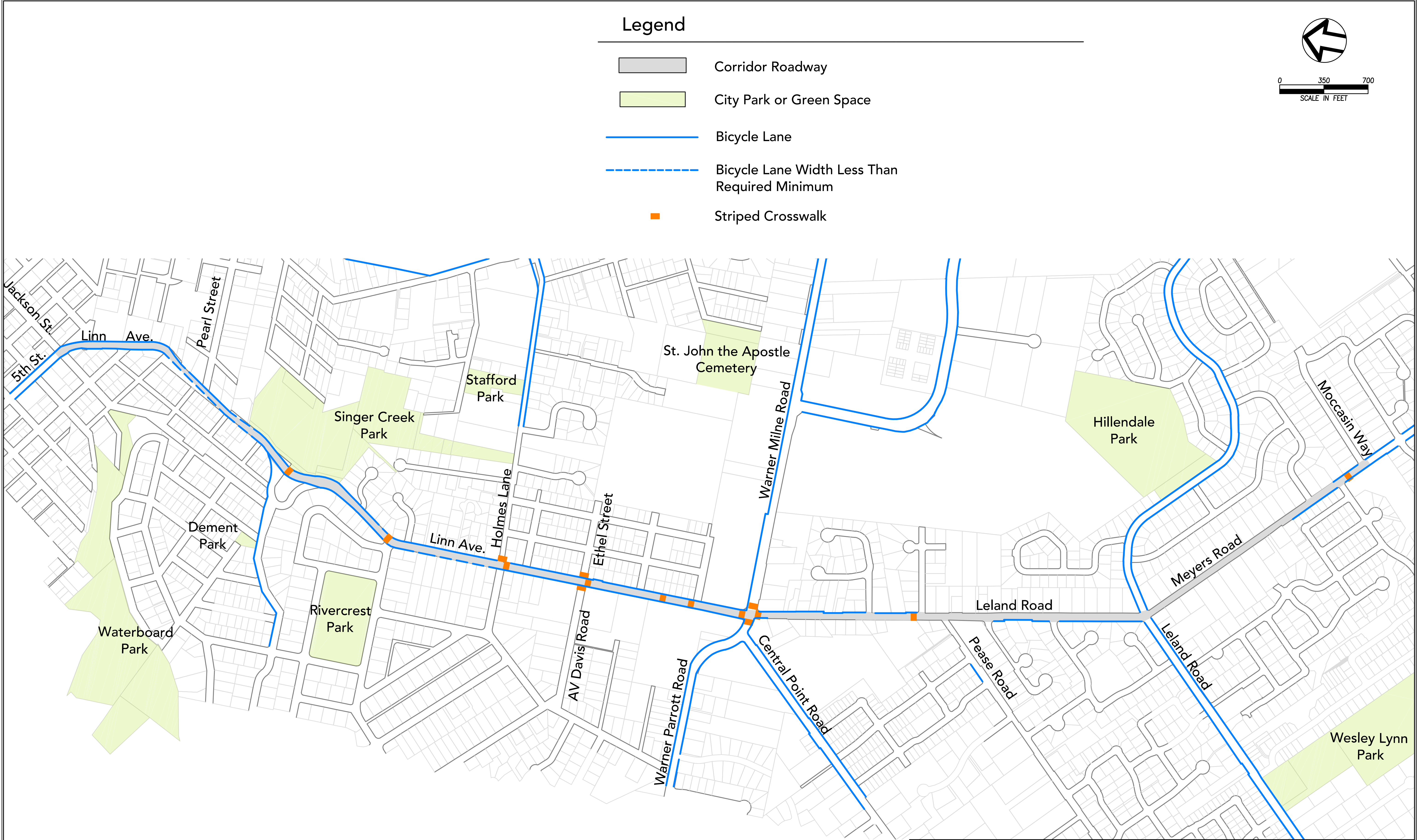

Figure 2-9: Existing Bicycle Facilities

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Wayfinding

The TSP identifies wayfinding as an important element within the streetscape which would benefit pedestrians and bicyclists. There are a number of schools, parks and other attractions within the corridor which lack wayfinding signage.

Wayfinding sign on Linn Avenue and Holmes Lane

Existing Connectivity and Access Parallel to Linn Avenue

An investigation of existing connectivity and access in the areas parallel to Linn Avenue (in Segment 1) found that there is currently no continuous route adjacent to Linn Avenue for pedestrians or bicyclists. In addition to this lack of connectivity, vehicular access is also limited. In particular, Singer Creek Park is extremely difficult to access; there are no connected pedestrian facilities, no off-street parking, nor is there on-street parking on Linn Avenue. Though bicyclists can access the park from Linn Avenue, there is no bike parking available within the park. Existing multi-modal facilities and access deficiencies are illustrated in *Figures 2-10* and *2-11*.

Existing Connectivity and Access to Gardiner Middle School

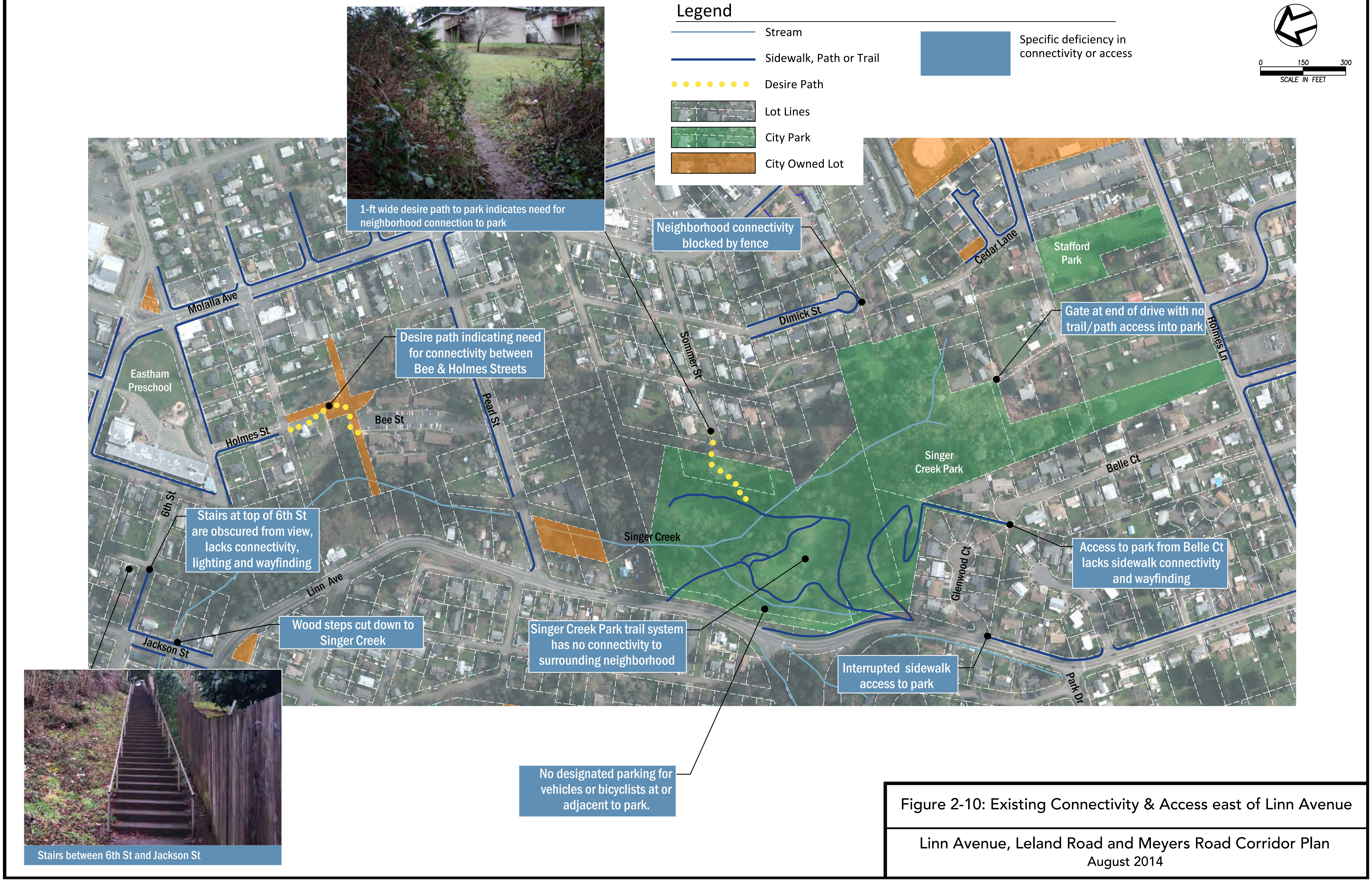
There is currently limited connectivity for pedestrians from the surrounding neighborhoods and street grid to access Gardiner Middle School, which is located directly east of the corridor. This corridor planning effort reviewed existing conditions for pedestrian connectivity and access to the school. The results of this review are illustrated in *Figure 2-12*.

Public Transit Facilities

TriMet provides public transit service through the corridor. This transit service currently consists of bus service along the entirety of Linn Avenue as part of Route 33: McLoughlin. There is no regularly-scheduled transit service for Leland Road or Meyers Road.

A Park and Ride facility is located at the northeast intersection of Linn Avenue and Warner Milne Road, adjacent to the First Presbyterian Church parking lot. There are a total of fourteen bus stops on Linn Avenue. Only one of these stops is equipped with a bench or seating area. A sheltered bus stop is located adjacent to the Park and Ride. This stop experiences the highest level of use compared to all other stops on Linn Avenue. A graphic illustration of transit facilities, and frequency of use is included as *Figure 2-13*. Ridership data for Route 33 from TriMet is included in *Appendix C*.

A number of these stops are located in areas which may not be ideal for bus riders or traffic. These include intersections at Linn Avenue and 4th Street, Pearl Street, Electric Street and Park Drive. The northbound route bus stop at Electric Street is not actually located at that street intersection. Its midblock location isolates pedestrians in an area with a narrow shoulder and no sidewalk. The bus stop at Park Drive has a particularly constrained and uncomfortable location for any waiting passengers, situated between the paved shoulder and guardrail.



1-ft wide desire path to park indicates need for neighborhood connection to park

Neighborhood connectivity blocked by fence

Desire path indicating need for connectivity between Bee & Holmes Streets

Gate at end of drive with no trail/path access into park

Stairs at top of 6th St are obscured from view, lacks connectivity, lighting and wayfinding

Access to park from Belle Ct lacks sidewalk connectivity and wayfinding

Wood steps cut down to Singer Creek

Singer Creek Park trail system has no connectivity to surrounding neighborhood

Interrupted sidewalk access to park

No designated parking for vehicles or bicyclists at or adjacent to park.

Stairs between 6th St and Jackson St

Figure 2-10: Existing Connectivity & Access east of Linn Avenue

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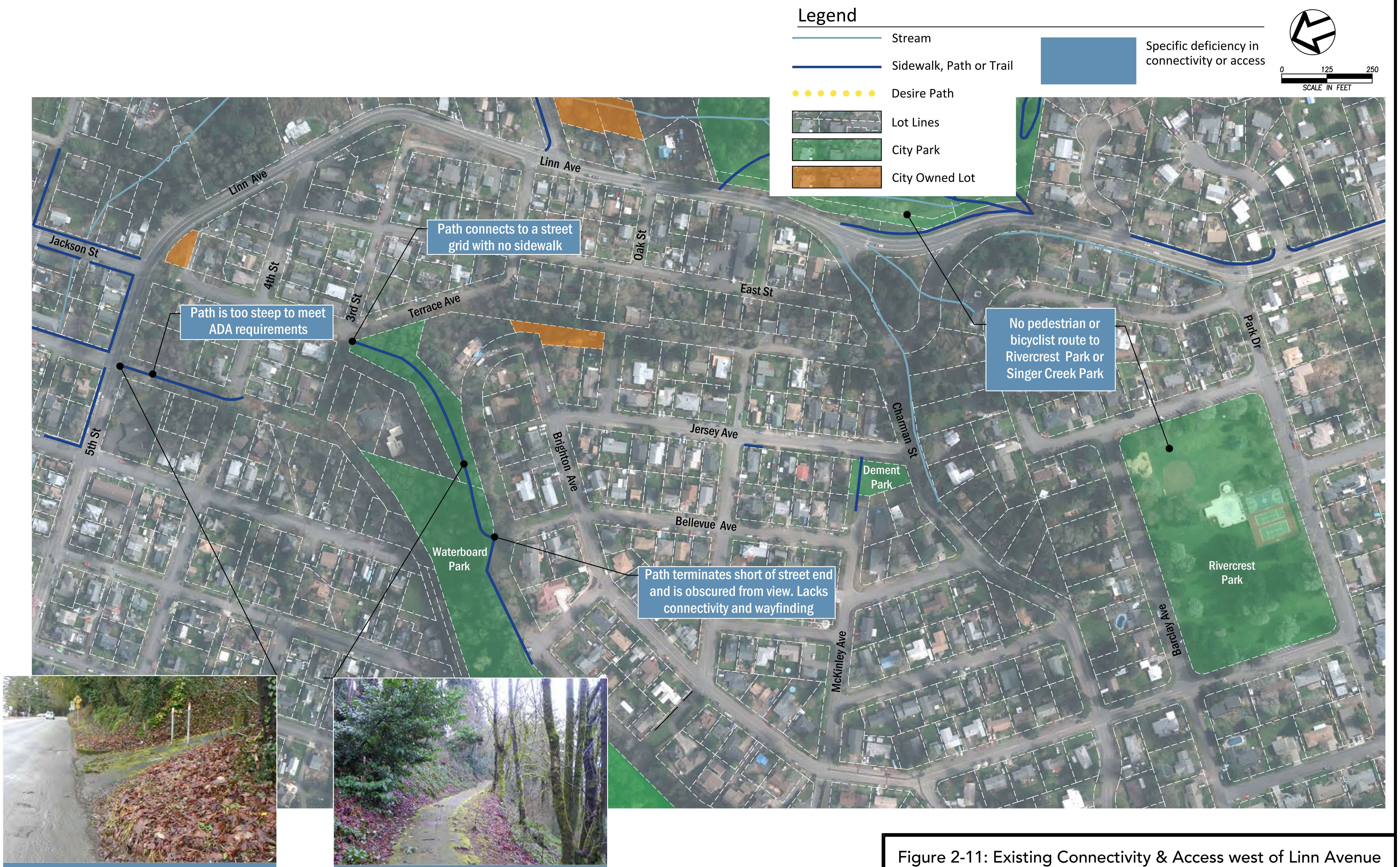

Path connection at 5th Street has no wayfinding signage. In addition, lack of landing and steep slopes are a hazard for path users.

Existing asphalt path is deteriorating in some locations and is not ADA compliant

Figure 2-11: Existing Connectivity & Access west of Linn Avenue

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Sidewalk ends at field with no paved access to school. Desire path extends to school loop road

Sidewalk ends at fence with 2-ft wide gap (limited accessibility)

Crosswalk from neighborhood lacks sidewalk landing

Gap in sidewalk connectivity

School access across City-owned property blocked by fence

No pedestrian connectivity to school from Linn Ave

Legend

─	Stream
━	Sidewalk, Path or Trail
• • • • • • •	Desire Path
Gap in sidewalk connectivity	Specific deficiency in connectivity or access
▨	Lot Lines
🟩	City Park or Green Space
🟧	City Owned Lot

Figure 2-12: Existing Connectivity and Access to Gardiner Middle School

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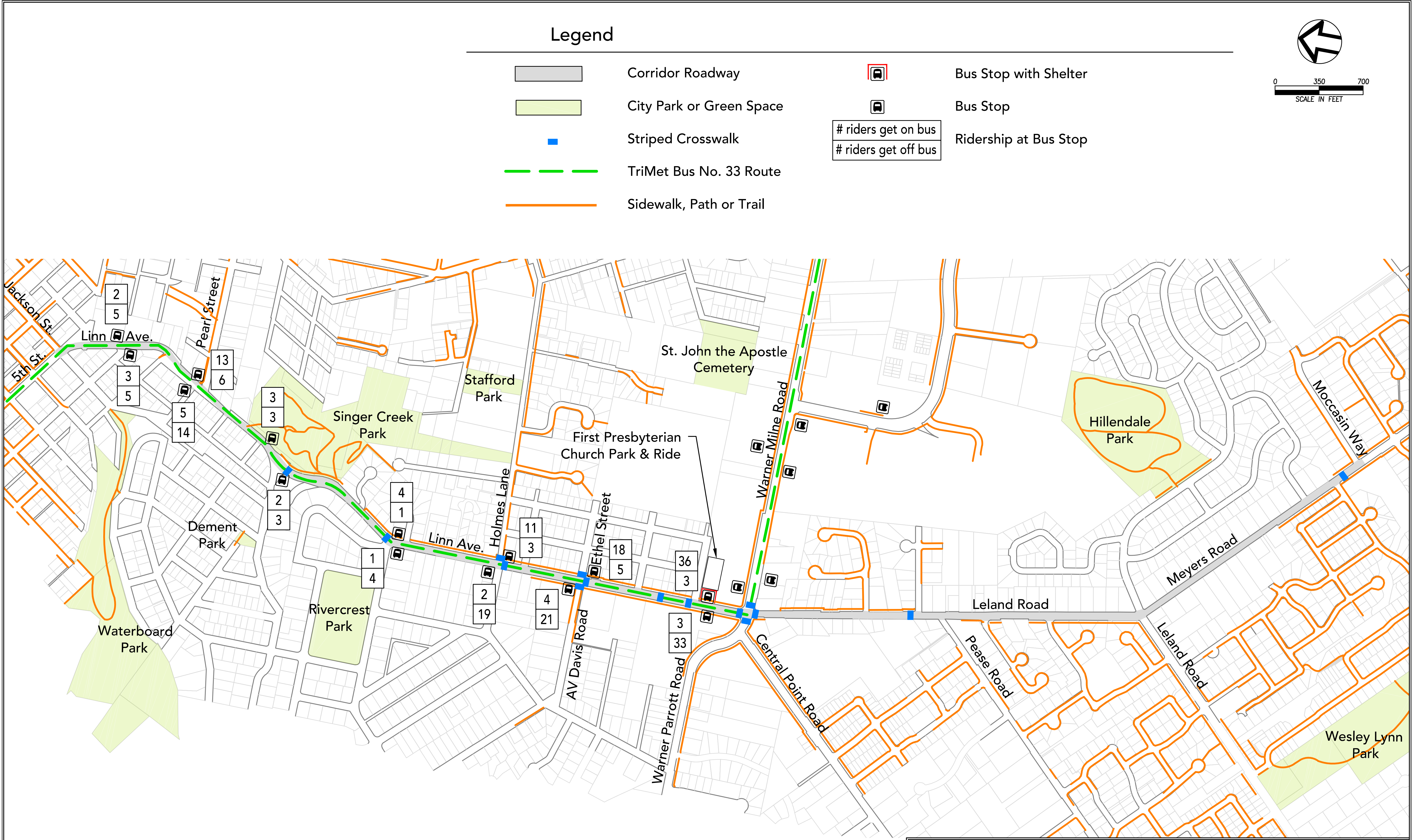

Figure 2-13: Existing Public Transit Facilities

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EXISTING STREETSCAPE ELEMENTS

A base map of the corridor was completed based on available City GIS, and supplemented by field inspection. This base mapping effort included a detailed evaluation of the existing streetscape elements within the corridor. Pavement, curbs, sidewalk and ramps, striping, crossings, parking, driveways, lighting and drainage were observed and analyzed for deficiencies. Detailed plan sheets illustrating the existing facilities are included in *Appendix A*. Streetscape elements shown on these plans are discussed briefly below.

Pavement

Existing pavement conditions through the corridor vary. The City of Oregon City completed a Five Year Pavement Maintenance Plan in 2011. This plan identified the majority of the roadways within the corridor as in need of rehabilitation – an observation which still appears to be valid. Mill and overlay projects are proposed for portions of Linn Avenue.

Pavement conditions in shoulder of Linn Avenue

Curbs, Sidewalks & Curb Ramps

As discussed previously, where sidewalks are present they meet width requirements, but in many respects they do not meet current ADA requirements. This is largely due to the presence of steep cross-slopes at driveways. In addition, there are obstructions frequently located within the sidewalk in the form of utility poles and mailboxes.

Obstructions within sidewalk on Linn Avenue

The majority of curb ramps within the corridor do not meet ADA requirements due to excessive slopes and the absence of tactile warnings.

Curbs are only present where sidewalks are present, with one small exception on a portion of Leland Road. Curbs throughout the corridor appear to be in good condition.

Pavement Markings / Crossings

Pavement markings vary in condition throughout the corridor. Portions of the fog line along Linn Avenue are faded and in poor condition. The majority of crosswalk markings are in acceptable condition. Bicycle lane markings are largely absent throughout the corridor, and in some locations are in poor condition. These deficiencies subtract from the usability and safety of the roadway.

On-street Parking & Driveways

On-street parking and driveways throughout the corridor can present conflict points for vehicles and other roadway users. It should be noted that crash data for the last five years does not describe more than a few incidents with vehicles exiting driveways or parking lanes.

On-street parking is infrequent through the corridor. Linn Avenue has a 7-foot parking lane along the east side of the street between Ethel and Williams Streets – a total length of approximately 520 feet. Some vehicles use widened driveways on Leland and Meyers Road to park parallel to the roadway.

City Code states that the minimum distance from driveways to street corners, and the minimum distance between non-residential driveways, shall be 175 feet. Throughout the corridor, existing driveways are commonly located less than 175 feet from intersecting street corners.

Driveway conditions throughout the corridor vary extremely. Driveways within Linn Avenue are largely constructed of concrete or asphalt and do not meet current ADA standards due to steep longitudinal and cross slopes. The majority of driveways along Leland Road and Meyers Road are comprised of asphalt.

Lighting

Lighting through the corridor typically consists of overhead cobra-head style poles typically mounted on existing utility poles. Lighting appears to be spaced relatively infrequently, and it is particularly limited in Segments 3 and 4 of the corridor (Leland Road and Meyers Road). Lighting locations are shown on the plan sheets included in *Appendix A.*

PUBLIC UTILITIES

Water, sewer and storm utilities within the corridor are owned, operated, and maintained by the City of Oregon City. The existing conditions of these facilities are briefly summarized in the paragraphs below.

Water

Public water throughout the corridor is conveyed through steel, cast iron, and ductile iron pipe. According to City staff, it is likely that much of the steel and cast iron pipe will require replacement due to age and condition. According to the 2012 City of Oregon City Water Master Plan, there are no specific projects within the corridor addressing this deficiency which would be completed within the next 5 to 10 years.

Sewer

Sanitary sewer service is provided by gravity sewers for the majority of customers within the corridor. There are a few issues which have been identified by the City within the corridor that should be addressed or considered during any construction projects.

Currently, the sanitary sewer line on Linn Avenue, located approximately between 5th Street and Narain Court, experiences surcharges and overflows during heavy rainfall events. This issue is addressed by the Linn Avenue Sewer Replacement project described in the Sewer Master Plan.

A portion of Meyers Road from Clairmont Way to Autumn Lane is currently not served by sewer. The Sanitary Sewer Master Plan (2014) identifies a specific project to provide sewer service to this area. In addition, there is some question as to whether or not sewer service stubs are provided to homes east of Leland Road between Hiefield Court and Clairmont Way. Prior to any construction on this section of Leland Road, sanitary sewer facilities should be investigated and stub-outs extended as needed to avoid pavement disturbances after improvements to Leland Road made as a result of this corridor planning effort.

Storm & Drainage

Stormwater throughout the corridor is collected by catch basins and ditches, and conveyed by underground storm mains and ditches. Stormwater collection and conveyance on Linn Avenue and portions of Leland Road and Meyers Road consists of catch basins and storm mains. However, stormwater for the majority of Leland and Meyers Roads is collected and conveyed by steep roadside ditches. These ditches ultimately discharge into Mud Creek at Meyers Road between Autumn Lane and Moccasin Way.

Soil erosion in Singer Creek Park

A number of drainage and stormwater issues associated with existing conditions have been identified by City staff. The largest issue is the presence of the roadside ditches on Meyers Road and Leland Road. Other problems include:

- Soil erosion and channel incision at Singer Creek Park due to impervious surfaces contributing stormwater, coupled with steep grades
- Significant ponding on Linn Avenue north of AV Davis Road/Ethel Street, north of Hood Street, and between Hood and Williams Street. This appears to be the result of an existing storm drain which is too shallow to drain these areas
- Flooding at the private property adjacent to Mud Creek due to heavy flows through the roadside ditch

INTRODUCTION

The existing corridor provides an important and continuous route through central Oregon City. However, the corridor currently has discontinuous and incomplete facilities for pedestrians, bicyclists and public transit users. A number of future needs for the corridor are discussed in this chapter, based on existing conditions discussed in Chapter 2 and the transportation system needs identified in previous City planning documents.

ROADWAY GEOMETRY AND SAFETY NEEDS

There are a number of deficiencies in safety conditions and the existing roadway geometry which appear to negatively influence the operational characteristics of the corridor, as discussed in Chapter 2 and shown graphically on *Figure 2-6*. Based on these deficiencies, there are a number of locations which appear to be in need of some modification to improve vehicular operations. Improvements to these locations may be warranted, though additional data such as traffic volumes is necessary before recommending specific design solutions. Safety needs specifically associated with pedestrians and bicyclists are discussed separately in this Chapter.

Linn Avenue between 4th and Oak Streets

There is an extremely tight turn for southbound drivers on Linn Avenue between 4th Street and Oak Street. This location has poor sight distance for drivers and clear zone obstructions. There are safety implications for drivers, as well as for pedestrians and bicyclists.

Tight turn on Linn Avenue between 4th Street & Oak Street

Pearl and Oak Streets at Linn Avenue

Pearl and Oak Streets intersect Linn Avenue at offset locations which present an opportunity for realignment and improved roadway operations. Of the offset intersections located throughout the corridor, this location is the most extreme of its type - and may be the most feasible to improve.

Electric Street/Charman Street intersections with Linn Avenue

The intersections of Electric Street and Linn Avenue, and the adjacent intersection of Charman Street and Linn Avenue, are located between reverse curves along Linn Avenue at the bottom of a steep hill. These locations present safety concerns - which are reflected in a high number of crash incidents.

AV Davis Road/Ethel Street intersection with Linn Avenue

This intersection has a history of crashes that may be indicative of speed and sight distance issues. Sight distance is limited due to vegetation on the west side of Linn Avenue. This location is also significant as a safety concern because Gardiner Middle School is located on Ethel Street west of Linn Avenue.

Central Point Road intersection with Warner Parrott Road

Crash data indicates a higher percentage of crash incidents at this intersection due to vehicle yielding issues. These incidents can be expected to increase with increased traffic volumes.

Pease Road intersection with Leland Road

Pease Road intersects Leland Road at an angle with poor sight distance and an obstructed view. The relatively high number of crashes reflect this intersection's operational deficiency.

Roadway Illumination

Illumination throughout the corridor appears to be deficient, a qualitative assessment agreed upon by City staff and the public. Lighting largely consists of cobra-head fixtures on overhead utility poles; specific locations of overhead light fixtures are shown in *Appendix A*. There is a clear need for improved lighting throughout the majority of the corridor in order to improve visibility and safety for all users.

VEHICULAR CAPACITY NEEDS

Analyses of the operational needs for the corridor included a review of previously-completed traffic analyses. The City of Oregon City completed an update in 2013 to their Transportation System Plan (TSP). The TSP projected motor vehicle travel growth for year 2035 growth and according to these projections, the majority of the roadways within the project corridor will have only a small increase in growth in traffic volumes (less than 250 additional vehicles compared to present conditions during the afternoon/evening peak hour). One segment of the corridor (Meyers Road between Leland Road and Moccasin Way) is anticipated to have moderate growth in traffic volumes (an increase between 250 and 500 vehicles during the peak afternoon/evening hour). Currently, all of the roadways within the corridor have only two vehicular travel lanes. Based on the small to moderate anticipated future travel growth within the corridor, it appears that the vehicular capacity of the roadways meet future operational needs – with the exception of one intersection.

The TSP includes traffic analyses for the intersection of Central Point Road with Warner Parrott Road. These analyses included projections of future travel conditions for motor vehicles, and found that year 2035 baseline intersection operations would be substandard for the existing intersection configuration. Based on these projections, future needs to maintain adequate vehicular facilities include some revision to the intersections of Central Point Road with Warner Parrott Road, and Linn Avenue/Leland Road with Warner Parrott Road/Warner Milne Road. After review of intersection modification options, a roadabout was proposed for these intersections, as described in the TSP.

Concept drawing developed in the TSP for a 5-leg roundabout

PAVEMENT NEEDS

Pavement through the majority of the corridor appears to be in need of some maintenance. The City completed a Five-Year Pavement Rehabilitation Plan in 2012, including the identification of pavement maintenance needs throughout the corridor. According to this plan, the majority of the corridor requires some form of pavement rehabilitation. However, only one section of the corridor is slated for a specific project: Linn Avenue between Charman Street and Holmes Lane. A grind and overlay project is proposed for this portion of the corridor.

The completion of multi-modal facilities will necessitate pavement widening in several locations which are currently unpaved in order to accommodate bike lanes. Projects slated to rehabilitate pavement in these locations should be scheduled to be completed after pavement widening.

It should be noted that according to ADA, pavement maintenance measures (such as pavement widening or mill and overlay) trigger the requirement to provide curb ramps where they are currently absent.

MULTI-MODAL NEEDS

General and specific deficiencies in existing facilities for vehicles, pedestrians, bicyclists and transit users are described in Chapter 2. Sidewalk and bicycle lanes are not present or continuous throughout the entire corridor, and in many locations do not meet City or ADA standards (see *Figures 2-8* and *2-9*). Providing continuous and standard facilities for pedestrians and bicyclists are a clearly identifiable existing need.

In addition, completing these facilities is designated in City planning documents. Outside of the corridor, connectivity and access to City parks and schools have been defined as deficient (see *Figures 2-10* and *2-11*). City planning documents identify connectivity and access to these activity generators as in need of future improvement

Discontinuous sidewalk and bike lanes on Leland Road

Public transit facilities within the corridor are shown on *Figure 2-12*. TriMet provides public transit service through approximately half of the corridor (Linn Avenue between 5th Street and Leland Road). The majority of the bus stops within the corridor are not equipped with seating or shelter for transit users. Discussions with TriMet indicate that some of these stops merit the addition of uncovered seating facilities according to their ridership numbers. A cut-sheet showing TriMet's preferred uncovered seating for bus stops is included in *Appendix C*. In addition, there is a lack of designated pedestrian crossings on Linn Avenue adjacent to bus stops. This creates an unsafe crossing environment for transit users that could be improved by implementing clearly-identifiable pedestrian crossings. There are a number of projects which would make these improvements within the corridor limits which have been identified in the TSP.

The City's TSP calls attention to the lack of wayfinding tools within Oregon City, and makes particular note of the benefit of these tools for orienting and providing direction to pedestrians and bicyclists. There are several schools, parks, and other attractions within the project corridor, as shown on *Figure 2-3* (Chapter 2). Given the current lack of signage or direction to these attractions, there is a need for wayfinding facilities.

DRAINAGE AND UTILITY NEEDS

A number of utility projects within the corridor have been identified in City planning documents, and are summarized in Chapter 2. No stormwater and drainage improvement projects have been specifically identified within the project area. As discussed in Chapter 2, there are a number of deficiencies with the drainage and stormwater facilities throughout the corridor. These include soil erosion and channel incision at Singer Creek Park, shallow storm drains on Linn Avenue, and a history of flooding in roadside ditches on Leland and Meyers Road.

Soil erosion and channel incision at Singer Creek Park appears to be the result of increases in the stormwater basin's impervious areas, exacerbated by steep slopes and the lack of curb or gutter on Linn Avenue. There is clearly a need for runoff control at this location.

The roadside ditches on Meyers Road and Leland Road currently discharge untreated stormwater into Mud Creek, and have resulted in flooding at the private property adjacent to the Creek. There is clearly an identifiable need for improved stormwater conveyance, runoff control, and treatment along these roadways. In addition, it is important to recognize that if sidewalk and bicycle lanes are added to Leland Road and Meyers Road, this construction would fill these ditches and require replacement with some other form of stormwater control.

PROJECTS INCLUDED IN CITY PLANNING DOCUMENTS

There are a number of projects which would make specific transportation improvements within the project corridor. These projects are largely included in the City's 2013 Transportation System Plan (TSP), but there are some which are described in the 2010 Oregon City Trails Master Plan. A graphic illustration of the location of these projects is included as *Figure 3-1*.

Projects included in the TSP were classified either "Likely to be Funded" or "Not Likely to be Funded," with associated phasing according to funding availability and likelihood of short or long-term construction. Projects included in the Trails Master Plan are divided into three priority-based tiers based on similar criteria.

Key multi-modal improvements include projects that add new sidewalk and bike lanes to portions of Linn Avenue, Leland Road, and Meyers Road. Also of note are shared-use paths and trails which would improve connectivity in the neighborhoods east and west of Linn Avenue, and new crosswalks and pedestrian-activated traffic control devices at key intersections through the corridor.

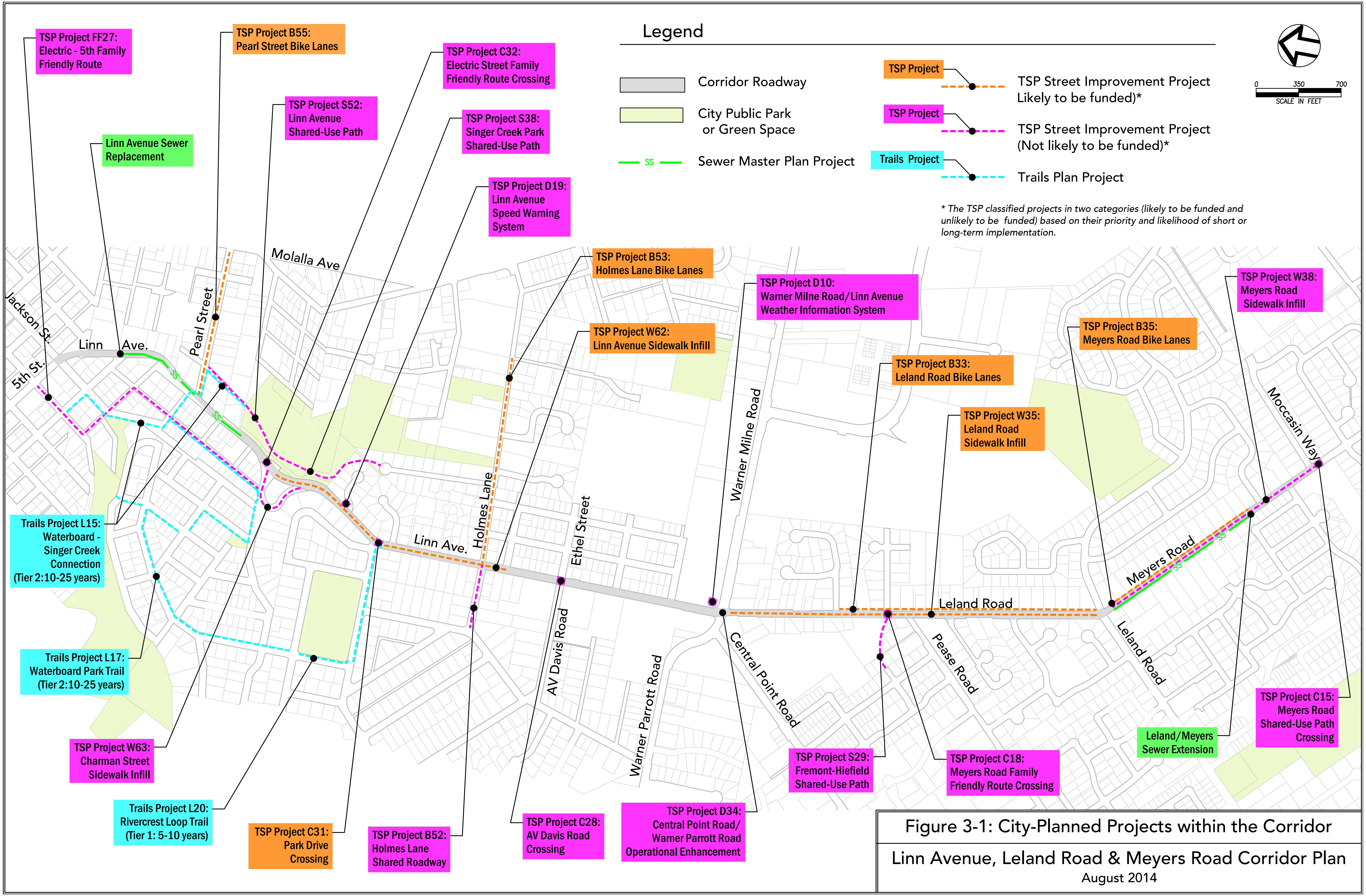

Figure 3-1: City-Planned Projects within the Corridor

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August 2014

Chapter 4: Alternative Development and Selection

INTRODUCTION

Existing conditions throughout the corridor include incomplete facilities for pedestrians and bicyclists. The ultimate goal of this corridor plan was to develop a complete multi-modal route along the project corridor. Other project objectives for the corridor include improving safety for all users, improving connectivity and access for pedestrians and bicyclists, incorporating projects described in other planning documents, and addressing stormwater concerns.

Alternative concept plans were developed that meet the project objectives and criteria within identified constraints to provide a complete multi-modal route through the corridor. The alternative plans also address the existing deficiencies and future needs discussed in previous chapters. The limiting constraints, planning criteria, and concept plan alternatives are described in this Chapter.

PLANNING CONSTRAINTS

There are number of existing conditions which limited or directed the development of concept plan alternatives. These existing conditions include the available City right-of-way, developed private properties adjacent to the roadway, steep slopes, and structures such as retaining walls.

Completing the multi-modal route will require some right-of-way acquisition depending on the preferred plan alternatives. Given the limited budget for transportation improvements, minimizing right-of-way acquisition while meeting City standard requirements will be a key planning constraint.

The roadways composing the project corridor are classified as minor arterials. Design standards for minor arterial cross-sections were recently revised in the City's 2013 TSP, and are included in *Appendix E*. According to these standards, the following facilities are required for both sides of the street: public access (6" strip behind sidewalk), sidewalk, landscape strip, bike lane, median, travel lanes and on-street parking.

Maintaining the existing number of lanes (2) through the corridor and assuming the minimum widths required by the City standard for a minor arterial requires a total of eighty-eight (88) feet of right-of-way. Implementing this standard in its entirety throughout the corridor is not feasible – typically, right-of-way is only about sixty (60) feet wide. In addition, the majority of the corridor has been completely developed with residences and some commercial buildings – in many cases buildings are located within twenty feet of the existing property line.

Commercial and residential development on either side of right-of-way (Linn Avenue at Ethel Street)

Acquiring easements to construct the full minor arterial standard would be restrictively expensive and disruptive of the established neighborhoods and commercial developments within the corridor. Standard minimum widths for pedestrian, bicycle, and travel lanes can be constructed through much of the existing corridor without necessitating extensive right-of-way acquisition. However, implementing parking lanes, landscaping strips or a roadway median will require additional right-of-way acquisition. Incorporating these options will require careful consideration of costs versus benefits.

Expanding the width of the existing street to complete the multi-modal route will have significant cost implications in some areas due to the presence of steep topography. As discussed in Chapter 2, Segment 1 of the corridor (Linn Avenue between 5th Street and Park Drive) has relatively steep slopes on either side of the existing roadway. Adding facilities for pedestrians and bicyclists will require the construction of retaining walls in many locations. Existing retaining walls are also present within right-of-way and private property. In some locations, widening the street to accommodate complete multi-modal facilities will require removal and replacement of these walls. The extent to which the street is widened will directly affect improvement costs because of the additional lengths and heights of retaining walls required.

Existing steep slopes on the west side of Linn Ave (north of Oak St)

CRITERIA FOR PLAN DEVELOPMENT

There are a number of planning criteria that were used to develop concept plan alternatives. These criteria include general objectives from City planning documents, specific projects described in City planning documents, and the character of existing multi-modal facilities throughout the corridor.

General Objectives for Transportation System Improvements

The 2013 Oregon City Transportation System Plan (TSP) identifies a number of goals to provide direction for the future transportation system. The goals are as follows:

- Enhance the health and safety of residents
- Emphasize effective and efficient management of the transportation system
- Foster a sustainable transportation system
- Provide an equitable, balanced and connected multi-modal transportation system
- Identify solutions and funding to meet system needs
- Increase the convenience and availability of pedestrian, bicycle, and transit modes
- Ensure the transportation system supports a prosperous and competitive economy
- Comply with state and regional transportation plans

These TSP goals and their associated objectives were important criteria for developing concept plans for the project corridor.

Specific Transportation System Improvement Projects

There are a number of projects specifically described in City planning documents which would improve the transportation system within the corridor and the study area in general. These projects are summarized in Chapter 3. The majority of the projects would improve non-vehicular travel modes, though some projects address vehicular speeding, safety and intersection capacity.

A number of projects described in the TSP would add sidewalks and bike lanes to both sides of the road on Segments 2, 3 and 4. Projects included in both the TSP and the Trails Master Plan would provide alternate routes for pedestrians and bicyclists off Linn Avenue (but parallel to this arterial) for Segment 1.

These projects would enhance safety for all users, and improve multi-modal connectivity and access through the corridor. Therefore, the inclusion of the improvements they describe was an important criterion for concept plan development.

Character of Existing Multi-modal Facilities

The existing streets within the project corridor include some areas with fully-developed or "built-out" multi-modal facilities. Segment 1 (Linn Avenue between 5th Street and Park Drive) is an exception to this – there are bike lanes but no sidewalk. As discussed in Chapter 2, the width and presence of these facilities are not consistent through the corridor. However, they do include one travel lane, sidewalk and bicycle lanes on both sides of the street, as well as intermittent landscaping strips between the curb and sidewalk. Travel lanes largely meet City standards for minimum lane width (11 feet). Most of the built sidewalks and bike lanes meet City standards for minimum widths.

Maintaining the character of the existing neighborhoods through this corridor was a key element in concept plan development.

In order to maximize the value of the City's existing infrastructure and maintain consistency throughout the corridor, matching the character of the existing streetscape in order to provide multi-modal facilities was an important element of concept plan development.

ALTERNATIVE CONCEPT PLANS

Alternative concept plans were developed in order to meet the primary goal of the corridor plan – to provide a complete multi-modal route. The primary objective of this stage of the planning effort was to develop conceptual cross-sections that would provide a basis for selection by the City. Two concept plan alternatives were developed for each of the four defined segments within the corridor. Cross-sections for each of these concept plans were presented to City staff for review. City staff held internal discussions within Planning, Public Works, and Parks departments in order to comment on and revise these alternatives.

Alternative Concept Plans for Segment 1 - Linn Ave: 5th Street to Park Drive

Concept development for Segment 1 was more challenging because of the lack of a fully-developed cross-section and constraints from limited right-of-way, steep slopes, and existing retaining walls.

Two alternative concept plans were developed for Segment 1. Conceptual cross sections for these two plans are included as *Figure 4-1*. *Appendix F* includes fully-developed plan and section views of the two plans. Alternative A proposes a shared-use path on the west side of Linn Avenue, and a widened shoulder on the east side of Linn Avenue. Alternative B would include a sidewalk on both sides of the street, with widened travel lanes, and only one designated bike lane – a climbing lane for bikes traveling south on Linn Avenue (uphill).

The potential impacts of implementing alternative plans for Segment 1 were also reviewed as part of the plan development process. In particular, the potential impacts on overall safety, traffic operation, and multi-modal access and connectivity were examined. Multi-modal access and connectivity is expected to greatly improve as a result of implementing either alternative – simply through the addition of pedestrian and bicycle facilities. However, each alternative has its own set of implications for multi-modal travel.

Alternative A restricts pedestrian travel on standard facilities to the shared-use path on the west side of Linn Avenue, though a non-standard widened shoulder is available on the east side of Linn. The majority of residences are located on the west side of Linn Avenue, but there are some houses on the east side of Linn. In addition, this option does not facilitate travel on the east side of Linn Avenue to Singer Creek Park – pedestrians would have to use the west side sidewalks and cross at Charman Street to access the park. This alternative does enable bicyclists to use the shared-use path (uphill), or if desired, the widened shoulder for northbound travel (downhill). The advantage of the shared-use path over on-street bike lanes is the ability of the path to accommodate varying cyclist ability and comfort. Transit users on the west side of Linn Avenue would have a protected shared-use path at which to disembark or wait for the bus. However, transit users on the east side of Linn would utilize a widened shoulder. In many locations this would be an improvement over the existing narrow shoulder/bike lane, but a shoulder is not a designated and protected area.

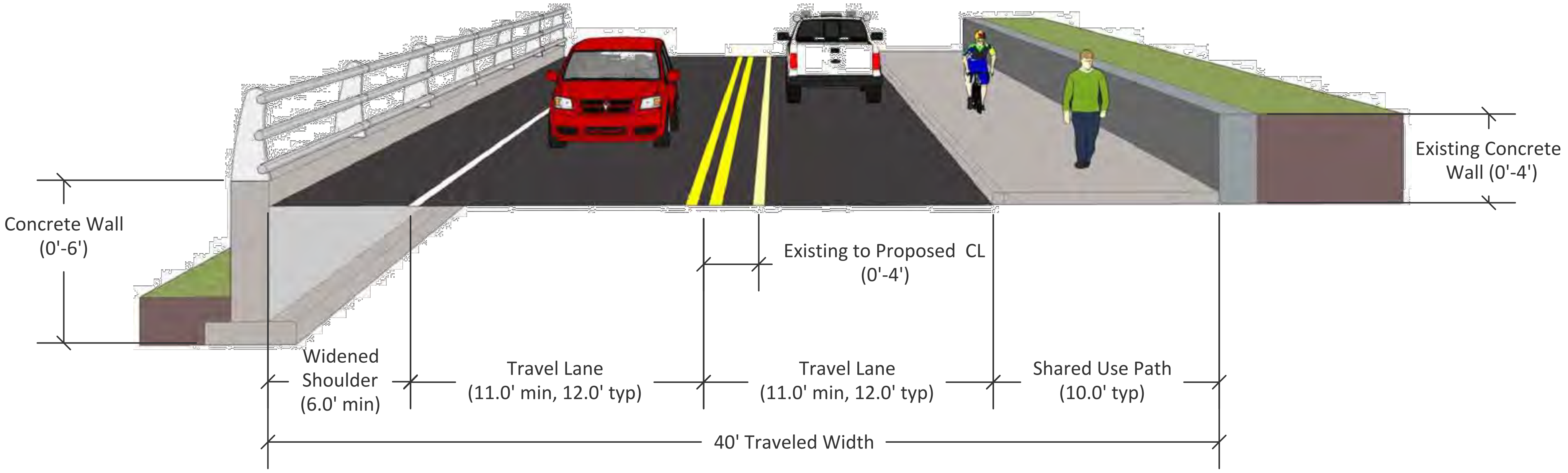
Alternative B proposes standard pedestrian facilities with a sidewalk on both sides of the street. However, this alternative would only provide one bike lane: a climbing lane for bikes traveling south on Linn Avenue (uphill). Bikes traveling northbound (downhill) would be able to maintain relatively high speeds, and could share the travel lane or use the sidewalk if necessary. Transit users on both sides of Linn Avenue would have a sidewalk available at which to disembark or wait for the bus.

Segment 1 - Linn Avenue:
5th Street to Park Drive

Typical Section - Alternative A

NTS

Section View
Looking South



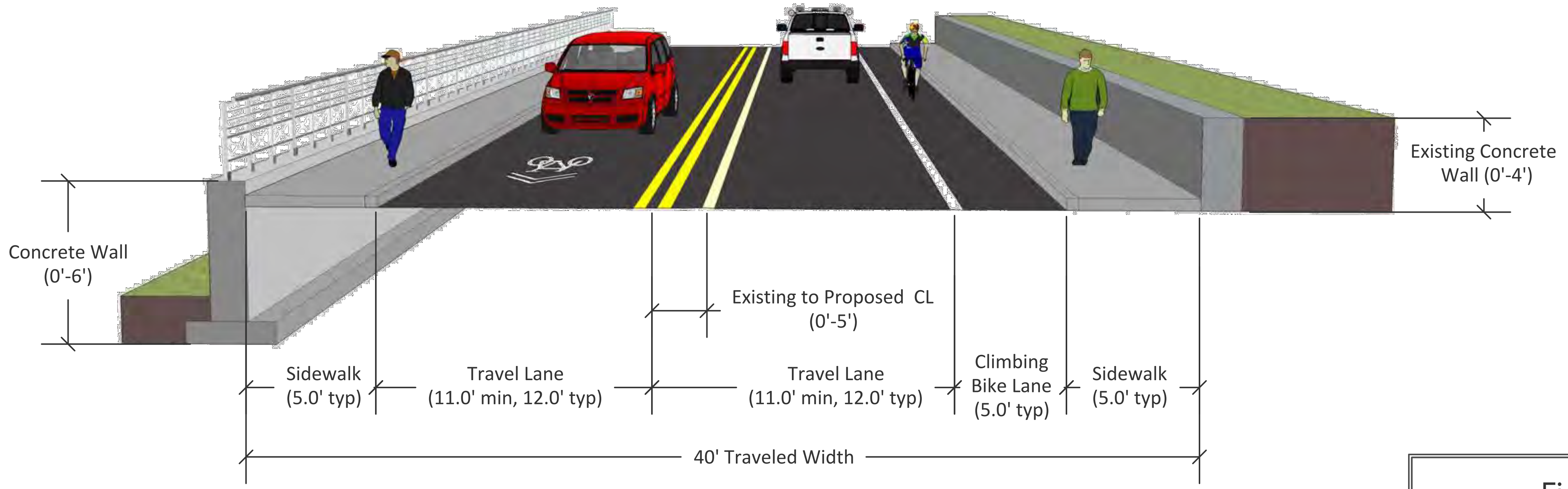
Key Elements - Alternative A

- Shared use path allows for bicyclists of all comfort levels and for travel in either direction
- Designated facilities for pedestrians or bicyclists are absent on the east side of Linn Ave - though use of the widened shoulder is available

Typical Section - Alternative B

NTS

Section View
Looking South



Key Elements - Alternative B

- Pedestrian access provided on both sides of the roadway
- Designated bike lane only provided for southbound (uphill) travel. Northbound (downhill) bike travel assumed in the travel lane.

Figure 4-1: Segment 1 Concept Plan Alternatives

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Alternative Concept Plans for Segments 2, 3 and 4

Alternative concept plans for Segments 2, 3 and 4 are relatively similar, with different implications for each corridor according to planning criteria and existing constraints. These segments are defined as follows:

- Segment 2: Linn Avenue - Park Drive to Leland Road
- Segment 3: Leland Road - Linn Avenue to Meyers Road
- Segment 4: Meyers Road - Leland Road to Moccasin Way

Existing conditions throughout Segments 2, 3 and 4 of the corridor include some portions of the street which have fully-developed multi-modal facilities. These portions include both bike lanes and sidewalks on both sides of the street, with varying widths. In some areas, fully-developed street portions also include a landscaping strip with street trees.

Two alternative concept plans were developed for each Segment, and are included as *Figures 4-2, 4-3,* and *4-4*. Alternative A would add sidewalk and bike lanes to both sides of the street, with a landscaping strip between the bike lane and the sidewalk on the west side of the street. This landscaping strip would provide space for stormwater treatment, or as an option, the addition of street furniture and other amenities. Alternative B simply proposes bike lanes and sidewalk on both sides of the street.

The potential impacts of implementing alternatives for each segment were reviewed as part of the plan development process. In particular, the potential impacts on traffic operation and multi-modal access and connectivity were evaluated.

Overall safety for pedestrians, bicyclists and transit users is expected to improve as a result of either alternative for each segment simply through the addition of complete multi-modal facilities. There does not appear to be a significant difference in the overall safety implications between either alternative.

In general, both alternatives for each segment would greatly improve connectivity and access along the corridor through the improvement of pedestrian, bicycle and transit facilities. However, there are unique implications on each mode of travel which are associated with alternatives.

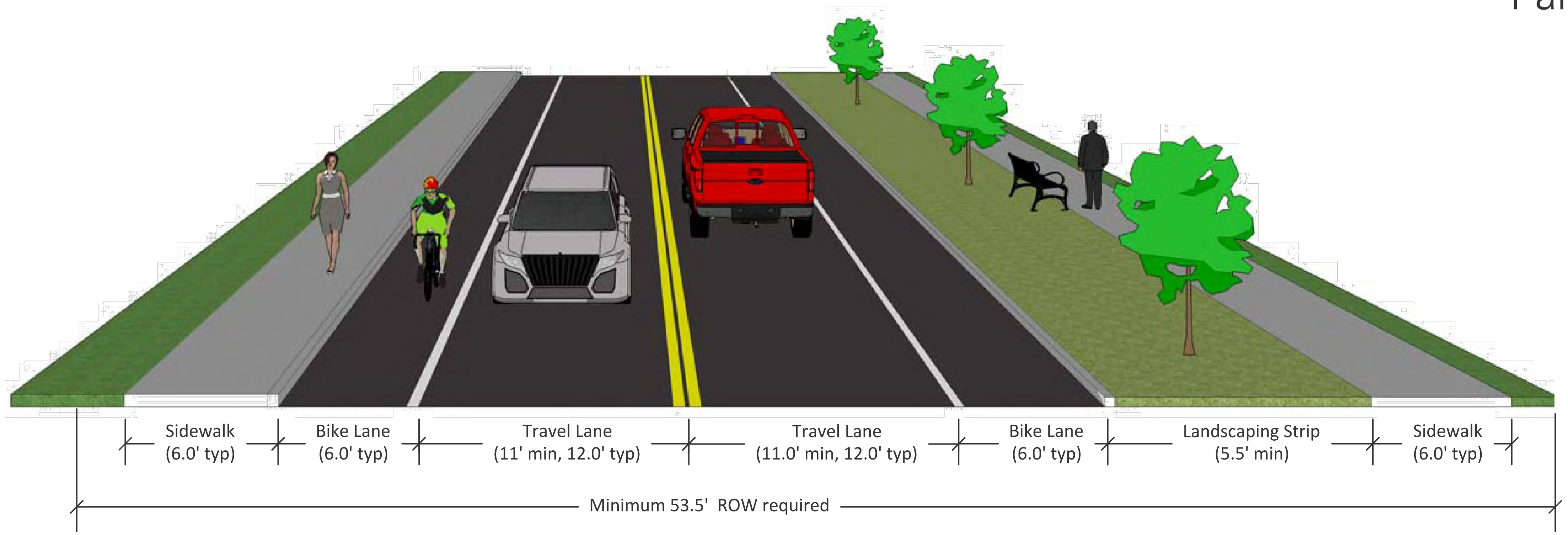
Both alternatives propose sidewalk and bike lanes on both sides of the street. Alternative A is perhaps the most appealing to pedestrians, with the incorporation of a separated sidewalk on the west side of the street.

Segment 2 - Linn Avenue: Park Drive to Leland Road

Typical Section - Alternative A

NTS

Section View Looking South



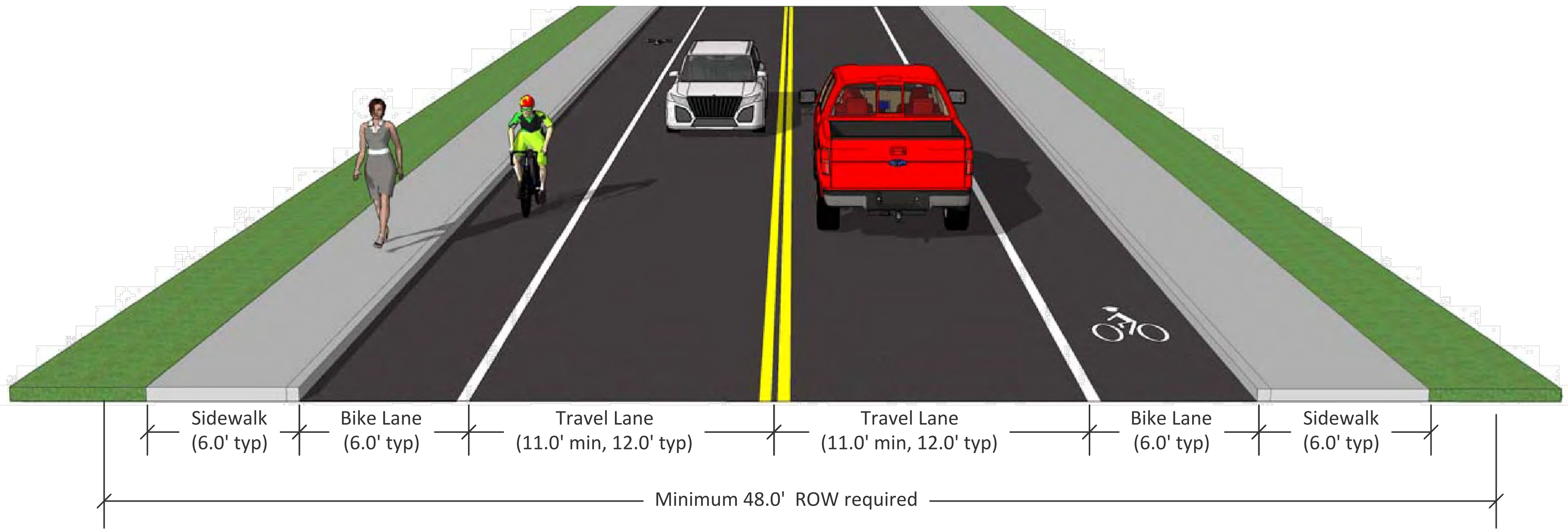
Key Elements - Alternative A

- Section matches the developed ROW for a portion of Segment 2 (approx. 425 ft)
- Separated sidewalk is more appealing to pedestrians
- Area shown as landscaping strip provides opportunities for plantings, benches, and street furniture
- Alternately, area shown as landscaping strip could provide on-street parking.

Typical Section - Alternative B

NTS

Section View Looking South



Key Elements - Alternative B

- Section matches the developed ROW for a portion of Segment 2 (approx. 1,300 ft)
- Developing a narrower section of ROW will be less costly and minimize impacts on residential use of existing ROW (driveways, landscaping, etc.)
- Landscaping and street furniture opportunities are available behind proposed sidewalk, with more flexibility to avoid existing use of ROW

Figure 4-2: Segment 2 Concept Plan Alternatives

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Segment 3 - Leland Road:
Linn Avenue to Meyers Road

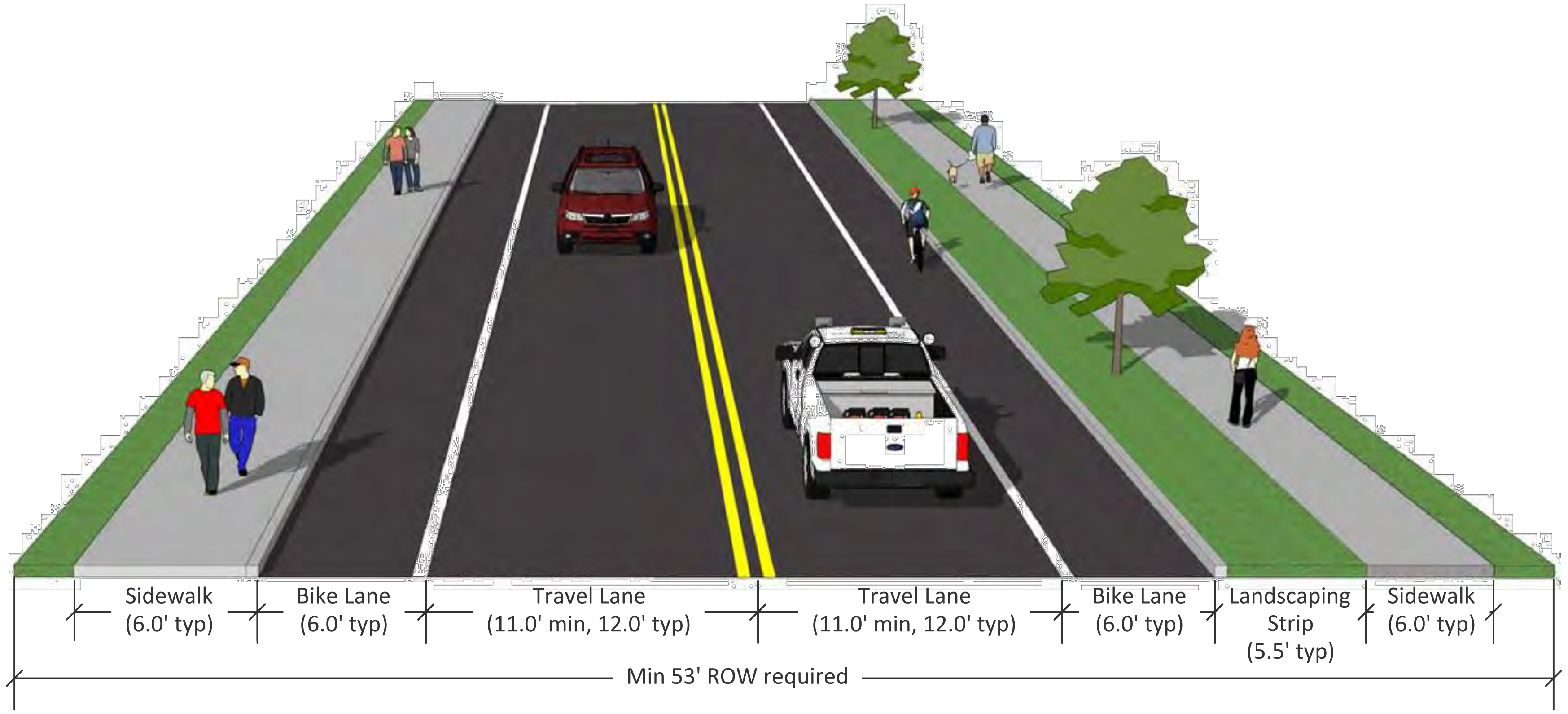
Option for Left Side of Street: widen sidewalk to 7.5 ft

- Wider sidewalks are more appealing to pedestrians
- Additional space to add street trees or landscaping, street furniture, etc.

Typical Section - Alternative A

NTS

Section View Looking South



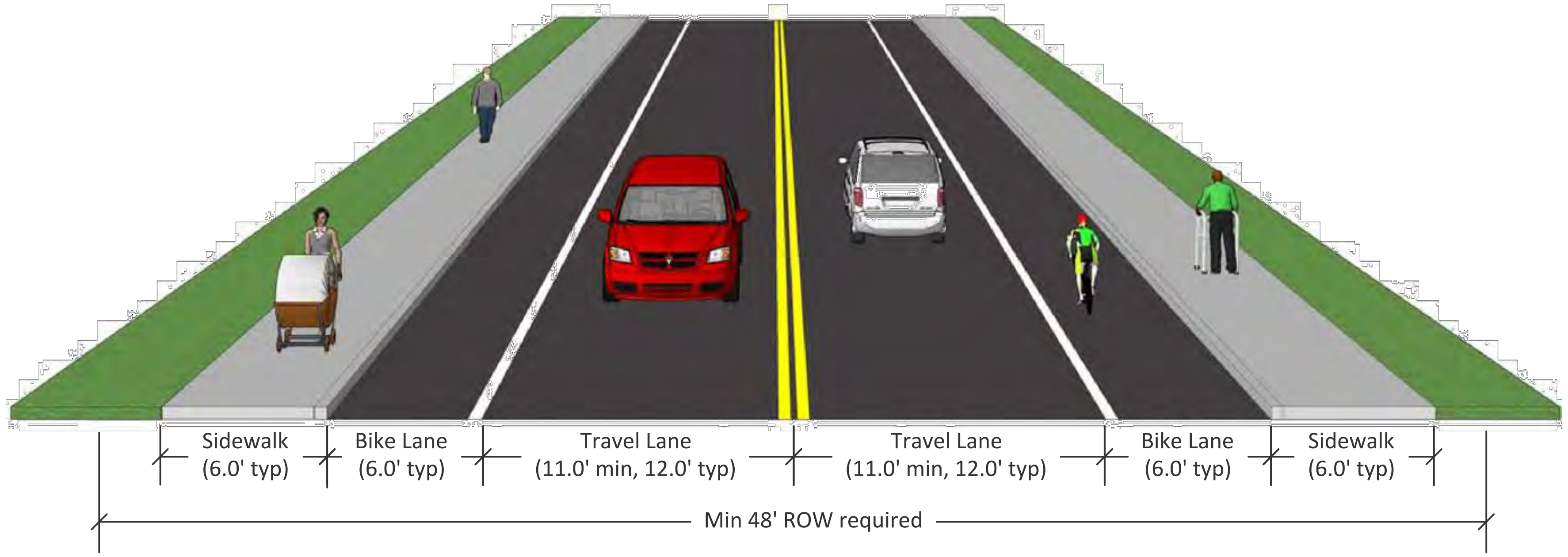
Key Elements - Alternative A

- Section matches the developed ROW for a portion of Segment 3 (approx. 750 ft)
- Separated sidewalk is more appealing to pedestrians
- Area shown as landscaping strip could provide opportunities for plantings, benches, and street furniture
- Alternately, area shown as landscaping strip could provide on-street parking
- Widened developed ROW could provide stormwater treatment for currently untreated runoff

Typical Section - Alternative B

NTS

Section View Looking South



Key Elements - Alternative B

- Section matches the developed ROW for a portion of Segment 3 (approx. 250 ft)
- Developing a narrower section of ROW will be less costly and minimize impacts on residential use of existing ROW (driveways, landscaping, etc.)
- Landscaping and street furniture opportunities are available behind proposed sidewalk, with more flexibility to avoid existing use of ROW

Figure 4-3: Segment 3 Concept Plan Alternatives

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
August 2014

Segment 4 - Meyers Road: Leland Road to Moccasin Way

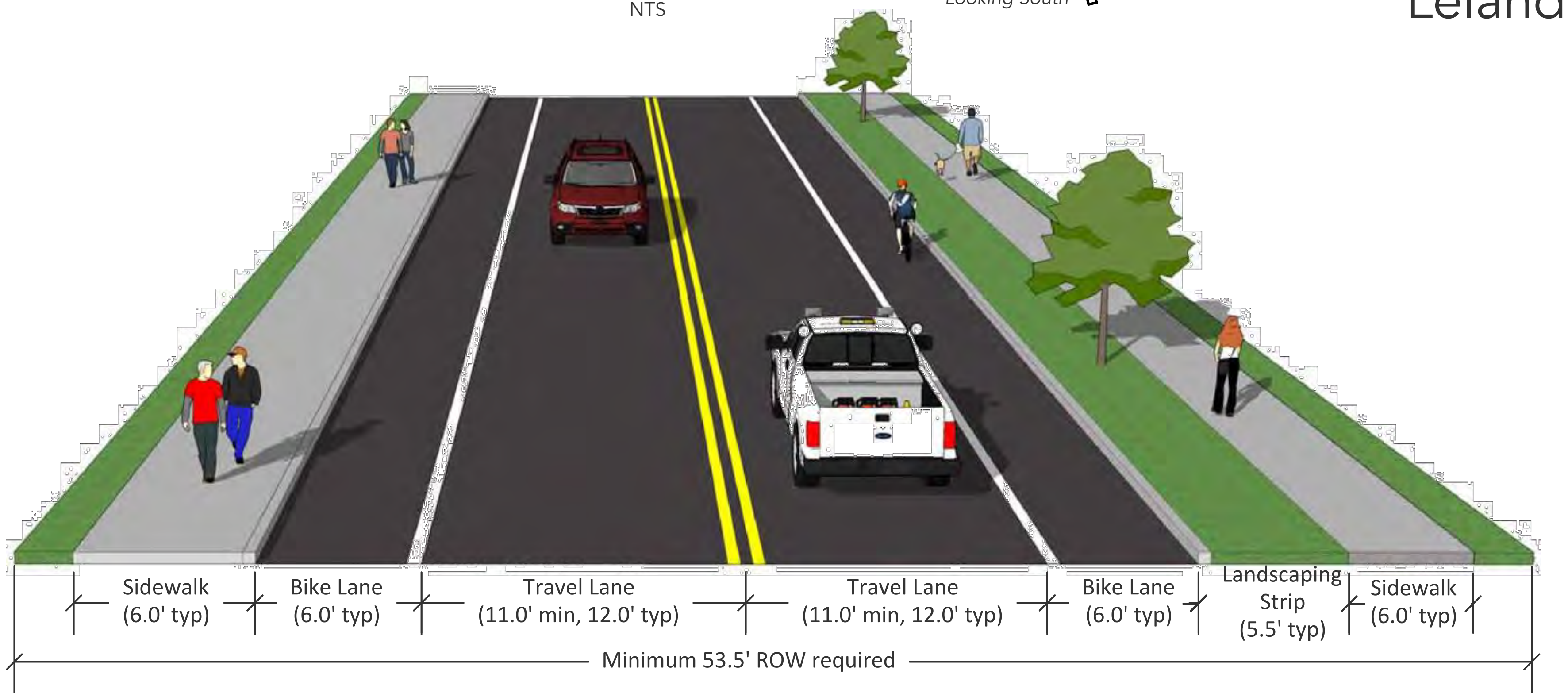
Option for Left Side of Street: widen sidewalk to 7.5 ft

- Wider sidewalks are more appealing to pedestrians
- Additional space to add street trees or landscaping, street furniture, etc.
- This option matches the developed ROW on the right side of the street

Typical Section - Alternative A

NTS

Section View Looking South



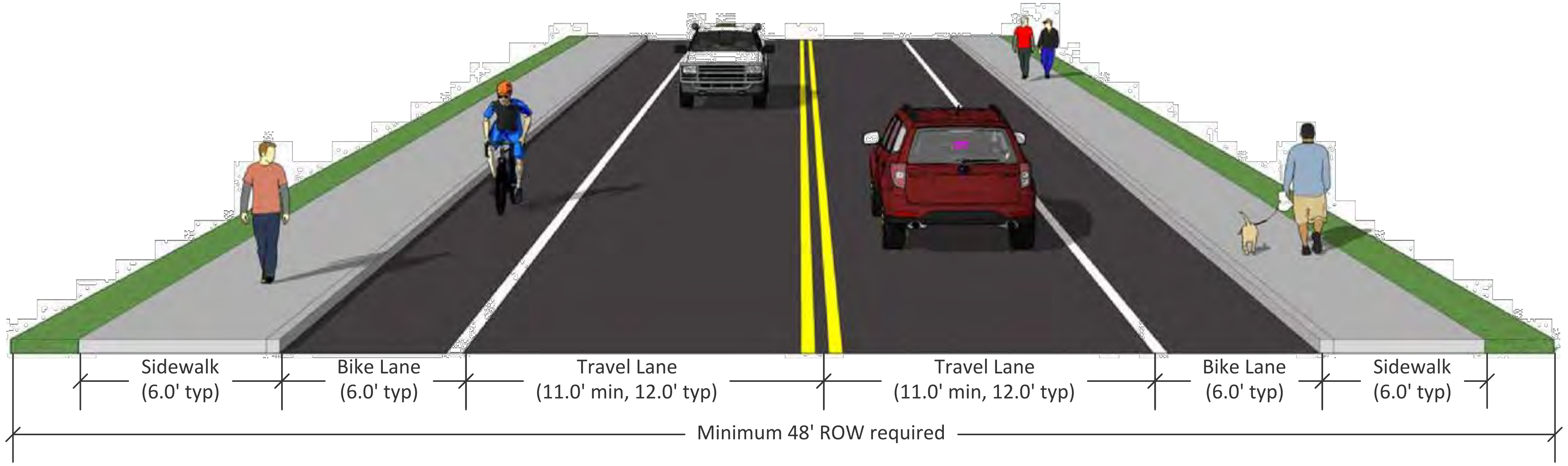
Key Elements - Alternative A

- Section matches the developed ROW for a portion of Segment 3 (approx. 750 ft)
- Separated sidewalk is more appealing to pedestrians
- Area shown as landscaping strip could provide opportunities for plantings, benches, and street furniture
- Alternately, area shown as landscaping strip could provide on-street parking
- Widened developed ROW could provide stormwater treatment for currently untreated runoff

Typical Section - Alternative B

NTS

Section View Looking South



Key Elements - Alternative B

- Developing a narrower section of ROW will be less costly and minimize impacts on residential use of existing ROW (driveways, landscaping, etc.)
- Landscaping and street furniture opportunities are available behind proposed sidewalk, with more flexibility to avoid existing use of ROW (driveways, landscaping, etc.)

Figure 4-4: Segment 4 Concept Plan Alternatives

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
August 2014

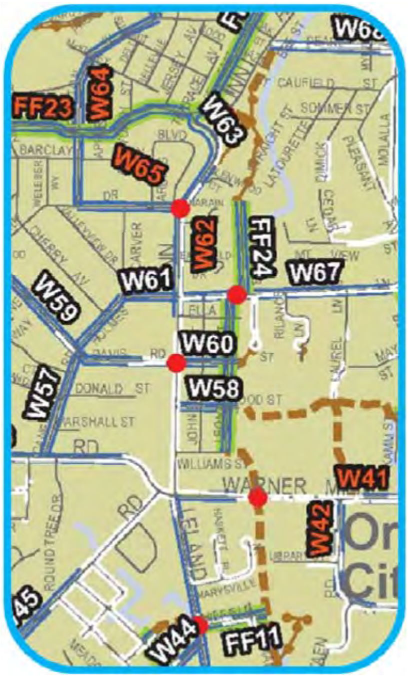
ADDITIONAL CORRIDOR IMPROVEMENT OBJECTIVES

In addition to the planning objectives of providing a complete multi-modal route through the corridor and improving safety for all users, a number of other improvement objectives were included in this planning effort. These include the incorporation of projects described in City planning documents, improving access and connectivity outside the corridor but within the study area, and addressing stormwater issues within the corridor.

Incorporating Planned City Projects

A number of projects within the corridor are described in other City planning documents, including the Transportation System Plan, the Trails Master Plan, and the Sewer Master Plan. Some transportation-related projects were used to develop the alternative concepts included in this Chapter – in particular the addition of sidewalks and bicycle lanes throughout the corridor. Other transportation projects described in planning documents are discussed further in Chapter 5 included in the complete final Concept Plan.

Among these projects is the Central Point Road/Warner Parrott Road Operational Enhancement roundabout project, which is described in the Transportation System Plan (TSP). At the City's request, conceptual planning was completed for the proposed roundabout. Two options were generated during this planning effort: a four-leg roundabout at the Linn Avenue/ Warner Parrott Road intersection which would restrict turning movements to and from Central Point Road, and a five-leg roundabout that included Central Point Road and did not restrict road access. Traffic analyses were performed and preliminary concept plans were drawn for the two conceptual options. A memorandum summarizing the roundabout analysis and making recommendations is included in *Appendix D*. Preliminary concept plans for the roundabout options are included as *Figures 4-5* and *4-6*.



Planned walking and biking improvement projects shown on Figure 19 of the 2013 TSP

Multi-modal Routes Parallel to Linn Avenue and to Gardiner Middle School

There are a number of deficiencies with existing connectivity and access through neighborhoods east and west of Linn Avenue, and to Gardiner Middle School. These deficiencies are discussed in Chapter 2. Both the TSP and the Trails Master Plan include projects which would make specific improvements to the pedestrian and bicycle routes in these neighborhoods. At the City's request, potential solutions to the existing deficiencies were developed based on these specific projects and the planning criteria and constraints described in the previous sections. Potential improvements to neighborhood connectivity and access include the addition of multi-modal routes and wayfinding.

Potential multi-modal routes parallel to Linn Avenue through the neighborhoods east and west of the corridor were developed. Many of these routes have been described in projects included in the TSP and the Trails Master Plan. Multiple opportunities for improving access and connectivity through these neighborhoods are illustrated in *Figure 4-7*. Many of these opportunities include connections to existing parks, including Singer Creek Park, Waterboard Park, and Rivercrest Park. These parks constitute valuable and underutilized City assets, but have incomplete multi-modal connections from the surrounding neighborhoods.

Rivercrest Park

Access and connectivity for pedestrians and bicyclists to and from public schools is a valuable part of City infrastructure. As discussed in Chapter 2, there are no continuous multi-modal routes to Gardiner Middle School, and a number of deficiencies associated with the limited routes to the school. Based on an assessment of these conditions and the criteria discussed in the previous section, a number of opportunities for improving connectivity and access to Gardiner Middle School were generated. These potential improvements are illustrated in *Figure 4-8*.

Stormwater Improvement Options

A number of stormwater improvement options were investigated as part of the corridor planning process. There is limited space within the corridor basins for the addition of new stormwater treatment facilities due to the built-out nature of the surrounding neighborhoods. However, a number of potential sites were identified that could provide space for treatment. In addition, the concept alternatives described in this Chapter incorporate some space for stormwater treatment in the landscaping strip. These options are illustrated in *Figures 4-9* and *4-10*.

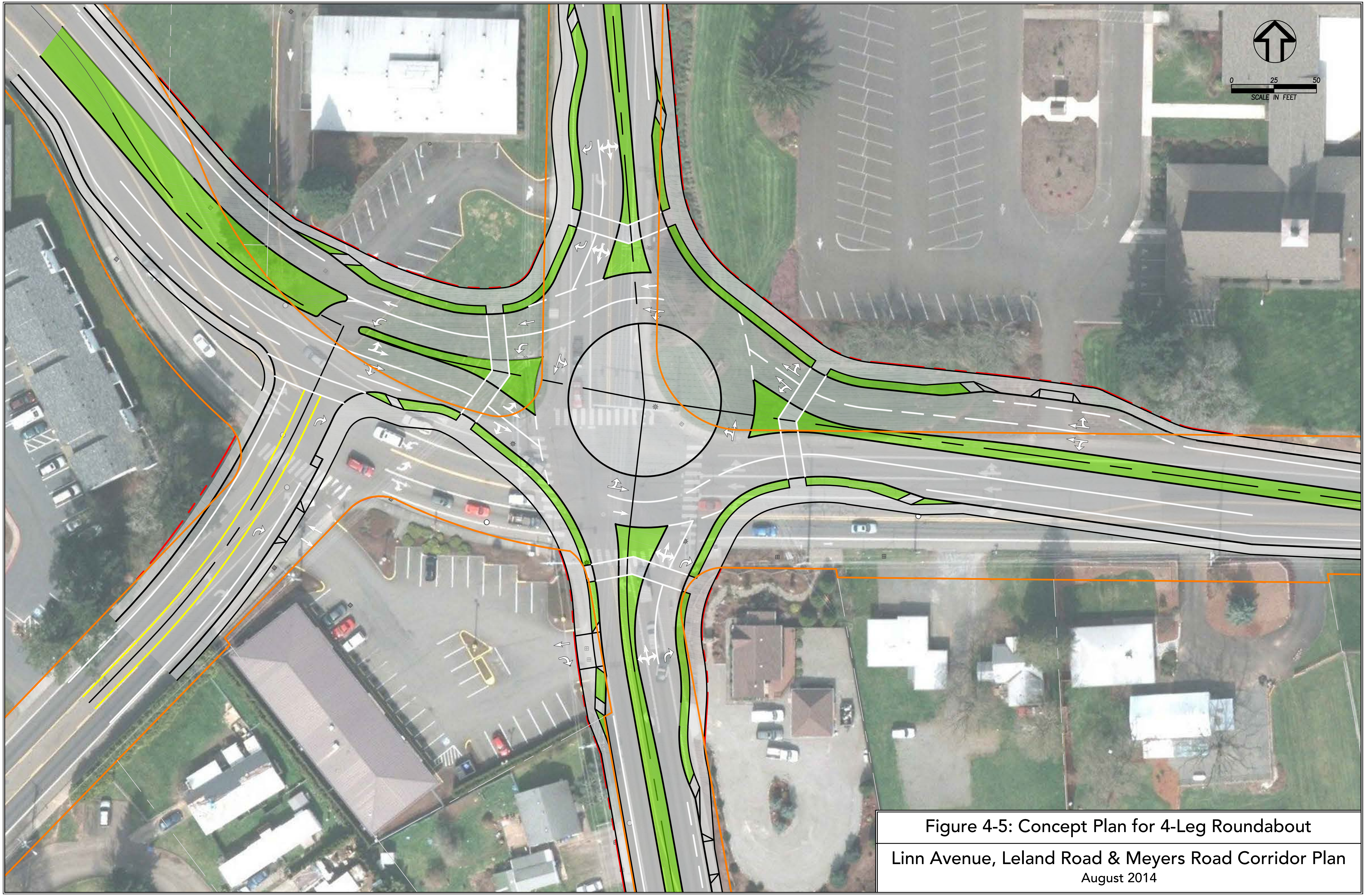


Figure 4-5: Concept Plan for 4-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014

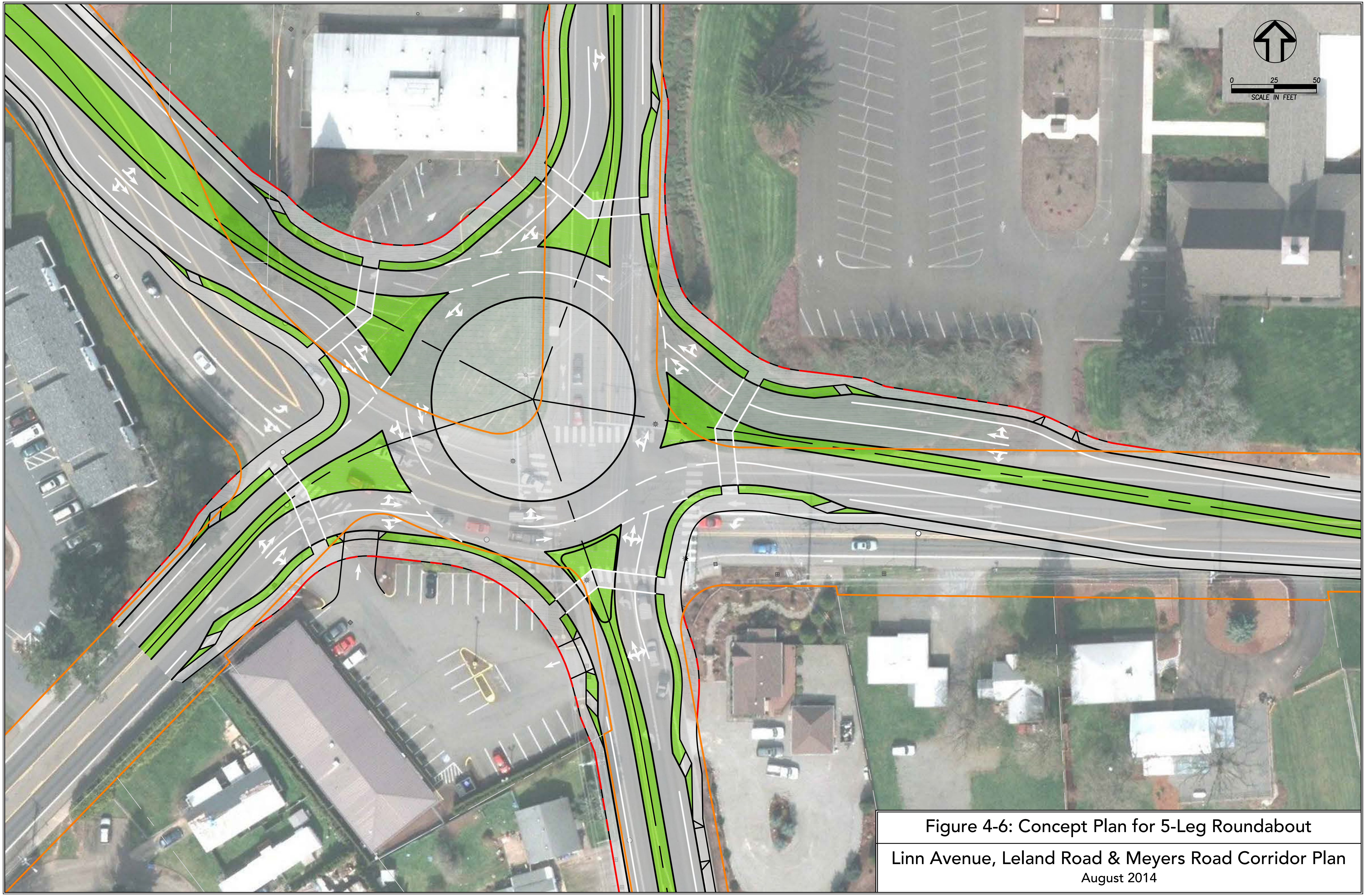
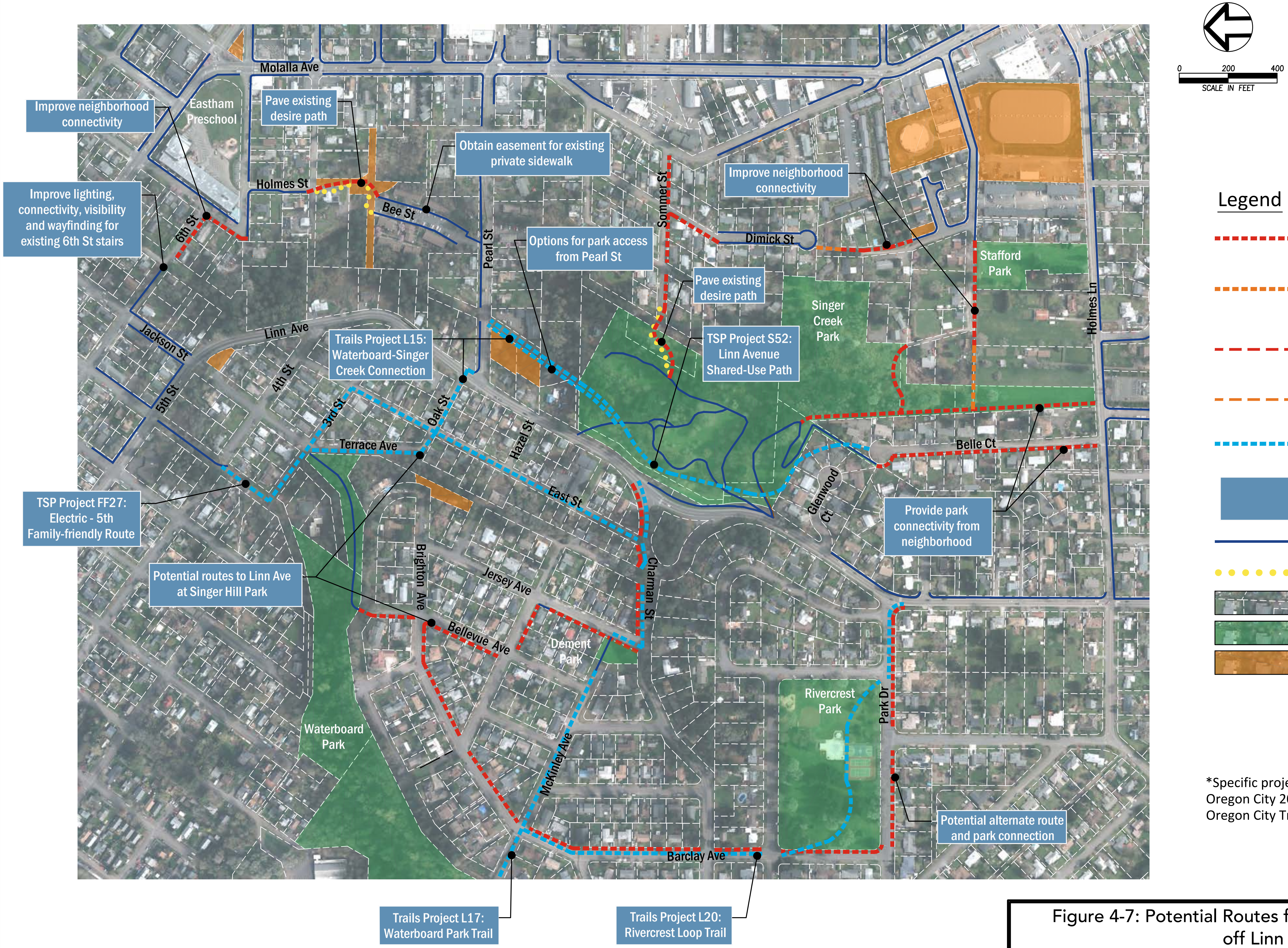


Figure 4-6: Concept Plan for 5-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014



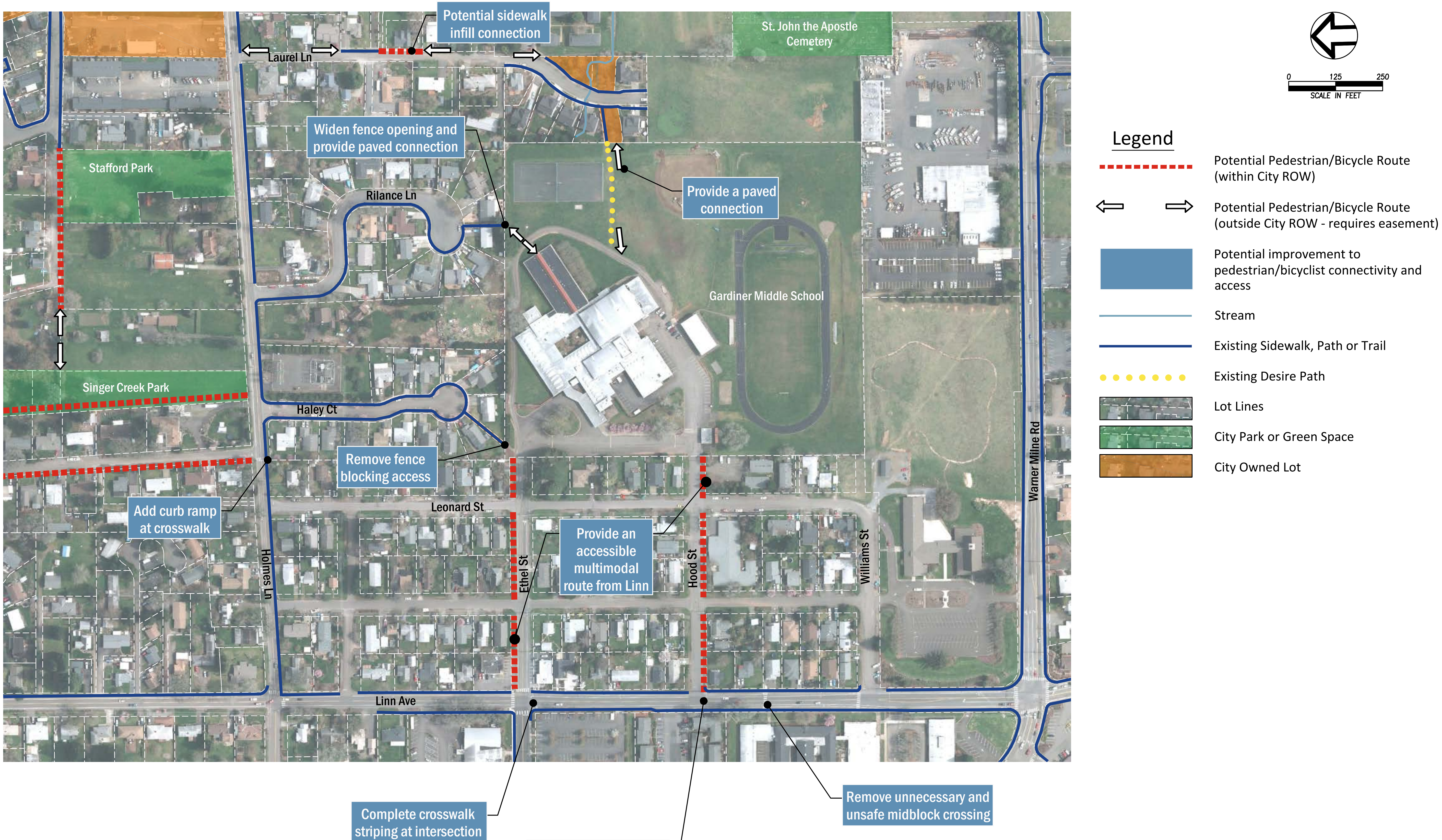
Legend

🟥	Potential Pedestrian/Bicycle Route (within City ROW)
🟧	Potential Pedestrian/Bicycle Route (outside City ROW - requires easement)
🟥	Potential Gravel Trail (within City ROW)
🟧	Potential Gravel Trail (outside City ROW - requiring easement)
🟦	Proposed Project identified in Oregon City Planning Document*
🟦	Potential improvement to connectivity and access
🟦	Existing Sidewalk, Path or Trail
🟨	Existing Desire Path
▨	Lot Lines
🟩	City Park or Green Space
🟧	City Owned Lot

*Specific projects have been identified within the Oregon City 2004 Trails Master Plan and the 2013 Oregon City Transportation System Plan

Figure 4-7: Potential Routes for Pedestrians and Bicyclists off Linn Avenue

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014



Potential sidewalk infill connection

Widen fence opening and provide paved connection

Provide a paved connection

Remove fence blocking access

Add curb ramp at crosswalk

Provide an accessible multimodal route from Linn

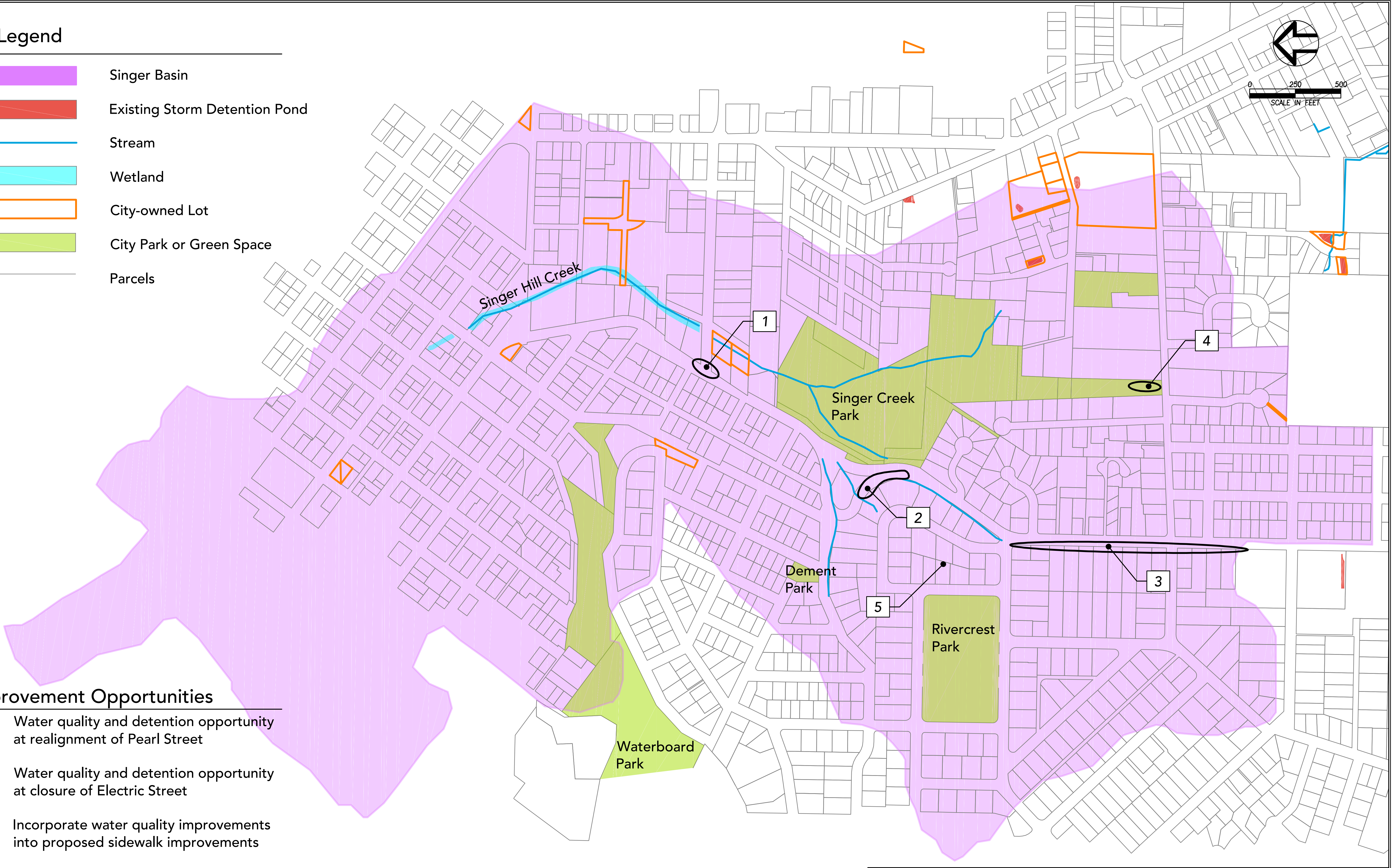
Complete crosswalk striping at intersection

Add crosswalk and pedestrian-activated signal to facilitate safe street crossing

Remove unnecessary and unsafe midblock crossing

Figure 4-8: Potential Routes to Gardiner Middle School

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014



Legend

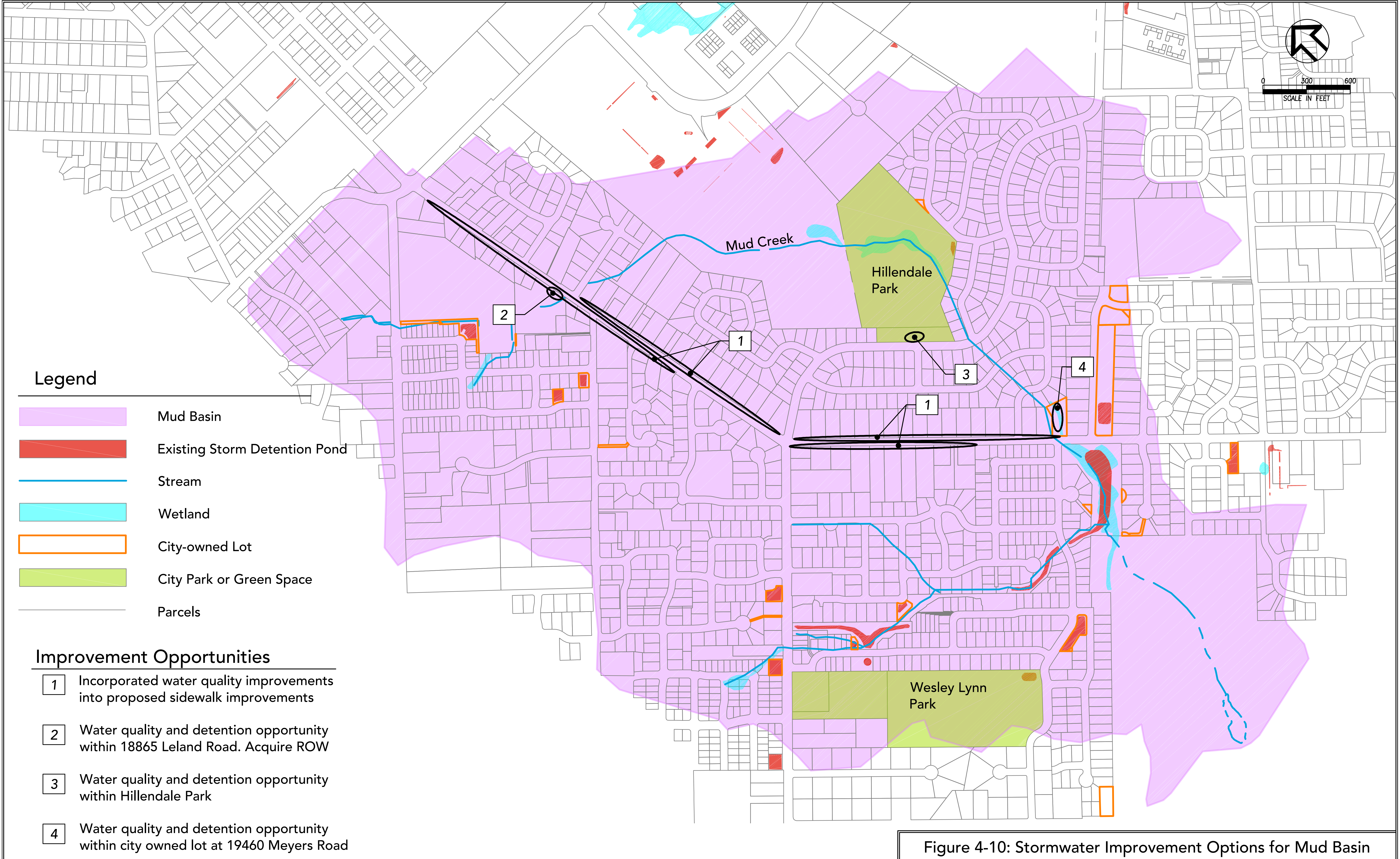
🟪	Singer Basin
🟥	Existing Storm Detention Pond
—	Stream
🟦	Wetland
☐	City-owned Lot
🟩	City Park or Green Space
—	Parcels

Improvement Opportunities

1	Water quality and detention opportunity at realignment of Pearl Street
2	Water quality and detention opportunity at closure of Electric Street
3	Incorporate water quality improvements into proposed sidewalk improvements
4	Water quality and detention opportunity at entrance to Singer Creek Park
5	Connect 4-5 existing catch basins tied to sanitary to storm system

Figure 4-9: Stormwater Improvement Options for Singer Basin

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014



Improvement Opportunities

1 Incorporated water quality improvements into proposed sidewalk improvements

2 Water quality and detention opportunity within 18865 Leland Road. Acquire ROW

3 Water quality and detention opportunity within Hillendale Park

4 Water quality and detention opportunity within city owned lot at 19460 Meyers Road

Figure 4-10: Stormwater Improvement Options for Mud Basin

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014

ALTERNATIVE CONCEPT PLAN SELECTION

The concept plan alternatives and options for each segment of the corridor were submitted to the City for selection and refinement. Two meetings were held with City staff to discuss the available options and select preferred alternatives. City staff also conducted internal discussions within the Public Works, Planning and Parks Departments to arrive at a preferred plan.

Segment 1 - Linn Avenue: 5th Street to Park Drive

In order to select either Alternative A or Alternative B for Segment 1, the City determined that public input would be necessary. The City preferred Alternative A, with the option to maintain travel lanes at an 11-ft minimum width where feasible, and expand the shared-use path to 12-feet wide. However, they noted that if this alternative were selected, there would be no designated pedestrian facility on the east side of Linn Avenue. In that case, implementation of this alternative should include the addition of a pedestrian route parallel to Linn Avenue to Singer Creek Park (east of Linn Avenue). Part of this parallel route is described by two distinct projects in City planning documents - in the Transportation System Plan, and the Trails Master Plan.

Segment 2 - Linn Avenue: Park Drive to Leland Road

The east side of Linn Avenue is fully-developed with sidewalk and bike lanes throughout Segment 2. The City determined that the addition of a landscaping strip to provide stormwater treatment (as proposed by Alternative A) would be preferable, though it may not be feasible in some locations due to homeowner’s private use of public right-of-way, and other considerations. The selected alternative was Alternative B (the addition of a curb-tight sidewalk and bike lanes), with an option to incorporate a landscaping strip and curb-detached sidewalk where feasible. The existing roadway would remain unaltered where developed with sidewalk and bike lanes.

Segment 3 - Leland Road: Linn Avenue to Meyers Road
Segment 4 - Meyers Road: Leland Road to Moccasin Way

The City determined that the addition of a landscaping strip to provide stormwater treatment was a necessary improvement on Leland Road and Meyers Road. However, they recognized that in some locations, the addition of a landscaping strip might not be achievable within the available right-of-way. Therefore, the selected alternative for Segments 3 and 4 is Alternative B (sidewalk and bike lanes on both sides of the road), with the option to add a landscaping strip to both sides of the road in order to provide stormwater treatment where right-of-way is available and easements are obtainable.

PLAN REFINEMENT PROCESS

The selected alternatives for each segment were refined through public involvement, a series of meetings with the City and other stakeholders, and a legislative process.

The public involvement process for this project included an introduction to the project with the neighborhood associations within the corridor, an online survey and an open-house meeting. Legislative process in order to adopt the plan required additional public involvement, as discussed in the following section.

Comments from the neighborhood associations were limited. Comments specific to the project included support of continuous sidewalks along Linn Avenue, and an interest in slowing vehicular speeds and improving safety.

The City discussed the project with the Oregon City School District, who supports the addition of sidewalks and other walking and biking improvements to Gardiner Middle School. The School District stated that they would look at completing improvements within their property in conjunction with the proposed improvements to pedestrian access.

The City requested input from TriMet on the corridor plan. TriMet responded with interest in prioritizing sidewalk infill at bus stops, and adding or improving crosswalks (with more visible treatments) at locations where bus stops are located across from one another on Linn Avenue.

The construction of a proposed roundabout at Linn Avenue/Leland Road and Warner Parrott Road/Warner Milne Road and Central Point Road affects a number of property owners. The City has spoken with three of them. A summary of this interaction is included in *Appendix G*. Only one of the three property owners is opposed to the acquisition of property for this project.

The full results of the online survey are included in *Appendix G*. The survey was completed by a total of 172 members of the public. A few specific items are included here for reference:

- While 81% said they currently do not bike along this corridor (Q2), 48% said they would if bike lanes were improved (Q5).
- While 50% said they currently walk along this corridor (Q6), 78% said they would if sidewalks were constructed (Q9).
- 87% agreed with the corridor planning priorities (Q10).
- Speed was mentioned as an additional priority in several comments (Q13)
- 57% preferred sidewalks on both sides of Segment 1 (Q14).
- 76% were in favor of closing Electric Avenue (Q15)
- Safe pedestrian access routes to Gardiner Middle School were a priority (Q16)
- The roundabout generated a large number of comments. Comments were approximately 2:1 against the roundabout. (Q18)

The City met with the City's Transportation Advisory Committee (TAC) during the draft process, and after finalizing the plan. The TAC was particularly interested in the project, and expressed support for improving connections to parks and schools, adding sidewalks through the corridor, and providing stormwater solutions that minimized maintenance costs. The TAC was supportive of the proposed roundabout at Linn Avenue/Leland Road and Warner Parrott Road/Warner Milne Road and Central Point Road.

Full documentation of the public and stakeholder involvement effort, including meeting graphics and meeting notes are included in *Appendix G*.

LEGISLATIVE PROCESS

The formal adoption of the final plan by the City required legislative process, which included an intensive public notification effort by the City and a series of workshops and public hearings before the Planning Commission and the City Commission.

A workshop to present a draft version of the plan and address concerns was conducted for the Planning Commission. The Planning Commission expressed interest and support of the improvements outlined in the plan. Specifically, they were interested in prioritizing improvements to access and safety for pedestrians and bicyclists, slowing vehicular speeds through the corridor, and improving the Linn Avenue/Leland Road and Warner Parrott Road/Warner Milne Road and Central Point Road with the proposed five-leg roundabout. The Commission expressed concern as to the impacts to access and private property that would result from construction of the roundabout.

The comments made during this workshop were incorporated into the Plan, which was finalized and submitted to the Planning Commission. The Planning Commission reviewed the Plan and made recommendations for adoption to the City Commission.

The City Commission held a meeting on September 17, 2014 in which they heard public testimony on the subject of the Plan, which largely centered on the proposed roundabout project. A member of the public, the COO of Plaid Pantry, the owner of the Plaid Pantry property and the pastor of the Presbyterian Church expressed their opinions as to the negative impacts of the proposed work on their properties and the intersection in general. The public testimony is available on the City’s website, as referenced in *Appendix G*.

In light of access and property concerns regarding the proposed roundabout, the City requested a continuance for the Plan from the City Commission to do more detailed analyses. The Commission made a motion to continue the plan at the request of the City.

An Intersection Control Analysis was completed for the location of the proposed roundabout project at the request of the City in order to evaluate the various intersection alternatives in light of their anticipated operations, safety and cost. This document is included in the Appendices as *Appendix K*. Based on the results of this work, the City moved forward with legislative process.

The Draft Corridor Plan with the Intersection Control Analysis was presented to the Transportation Advisory Committee (TAC). Project stakeholders, Clackamas County, and members of the public were also present and participated in the meeting on February 9, 2015. Opinions were expressed as to concerns about pedestrian safety, traffic safety and property impacts. Private property owners in the area of the proposed roundabout expressed mixed support and concerns about impacts to their properties, including impacts to access and parking.. The TAC expressed their desire to work with private property owners and developers during the refinement of the proposed roundabout project, as at this point the roundabout is at a concept or preliminary stage.

Chapter 5: Final Corridor Plan

INTRODUCTION

The corridor planning effort described in the previous Chapters of this report culminated in the identification and refinement of a number of preferred improvements to the corridor. This chapter describes these improvements by segment or location within the corridor. A number of the improvements described within this Plan are not included in the Transportation System Plan TSP or in other City planning documents.

Improvements were developed with the primary objective of improving safety for all users, and completing the pedestrian and bicycle routes through the corridor. Public input through the planning process emphasized the importance of improving pedestrian facilities, in particular access to Gardiner Middle School and City parks. Public input through the planning process also emphasized the importance of improving facilities and safety for bicyclists. Responses to the City’s online opinion poll demonstrated that a large number of respondents who did not walk or bike through the corridor would walk or bike if continuous and safe facilities were provided. This input supported the corridor planning objective to complete the multimodal route through the addition of new sidewalks, bike lanes, and crossing improvements.

ROADWAY IMPROVEMENTS

A number of roadway improvements are proposed by this Plan, including preferred cross-sections and intersection modifications which meet the identified needs and planning objectives of the corridor. The preferred sections will provide a complete multimodal route through the corridor, while meeting the existing constraints such as limited ROW and steep topography. These projects attempt to address safety and speeding concerns identified by engineering judgment, City staff, concerned stakeholders, and the general public.

Segment 1 - Linn Avenue: 5th Street to Park Drive

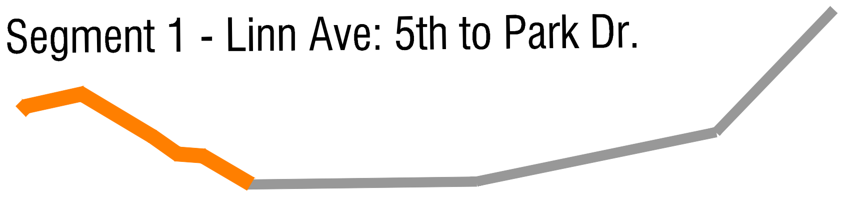
The majority of Segment 1 lacks complete pedestrian and bicycle facilities, and is constrained by steep topography and limited right-of-way. The proposed improvements would add these facilities, while meeting the constraints of existing conditions. A graphic illustration of these improvements and the proposed roadway cross-section is shown on *Figure 5-1*.

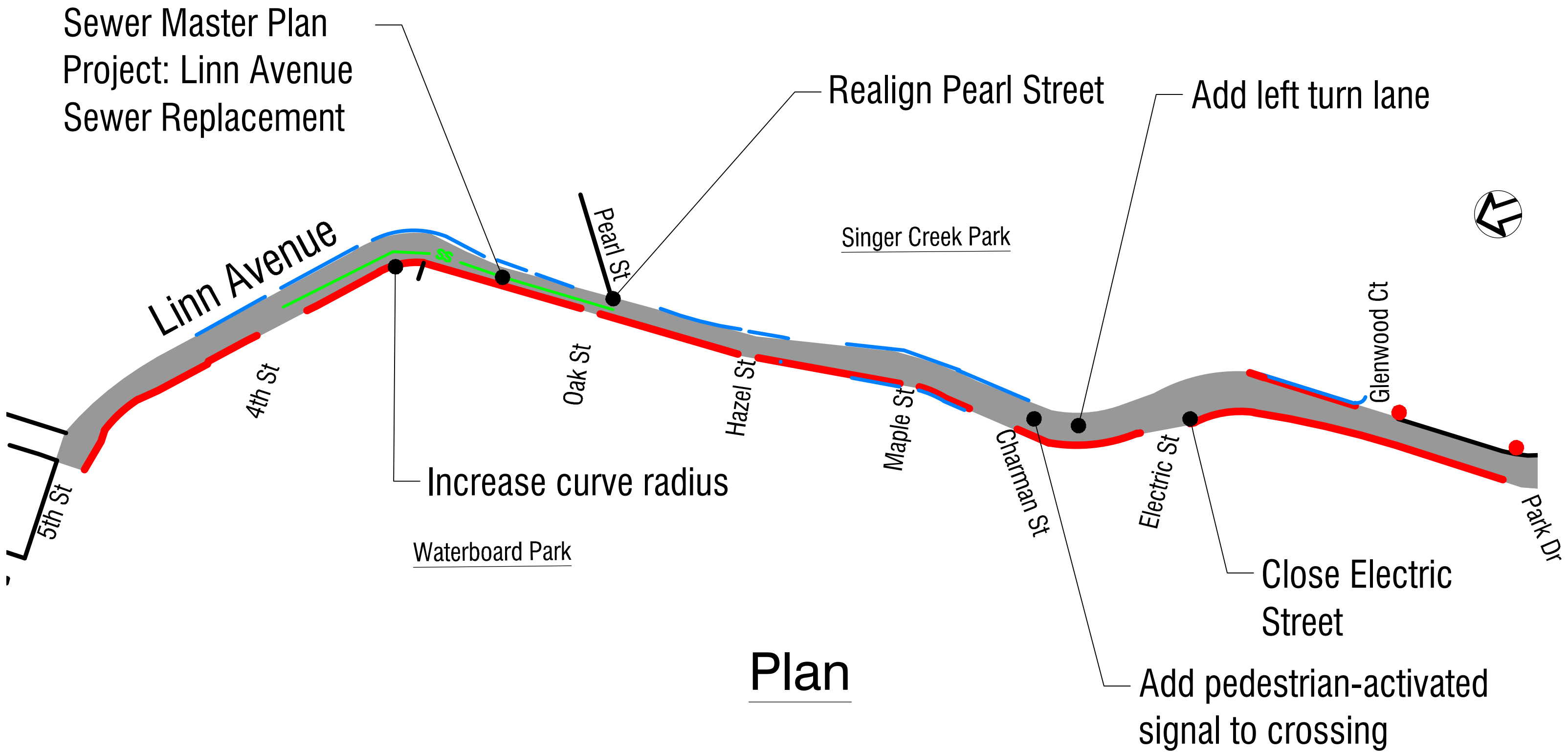
Preferred Roadway Cross-sections

The preferred roadway cross-section for Segment 1 includes a 10-foot wide shared-use path on the west side of Linn Avenue, two 11 to 12-foot wide travel lanes, and a widened shoulder on the east side of Linn Avenue. A section of sidewalk would be added to the east side of Linn Avenue between Glenwood Court and Singer Creek Park, providing a currently absent connection for pedestrians to this public park.

This work would require the acquisition of some right-of-way to expand the existing roadway width and accommodate a shared-use path. Retaining walls and modifications to existing retaining walls will be necessary along some portions of the segment with steep topography.

Segment 1 - Linn Ave: 5th to Park Dr.

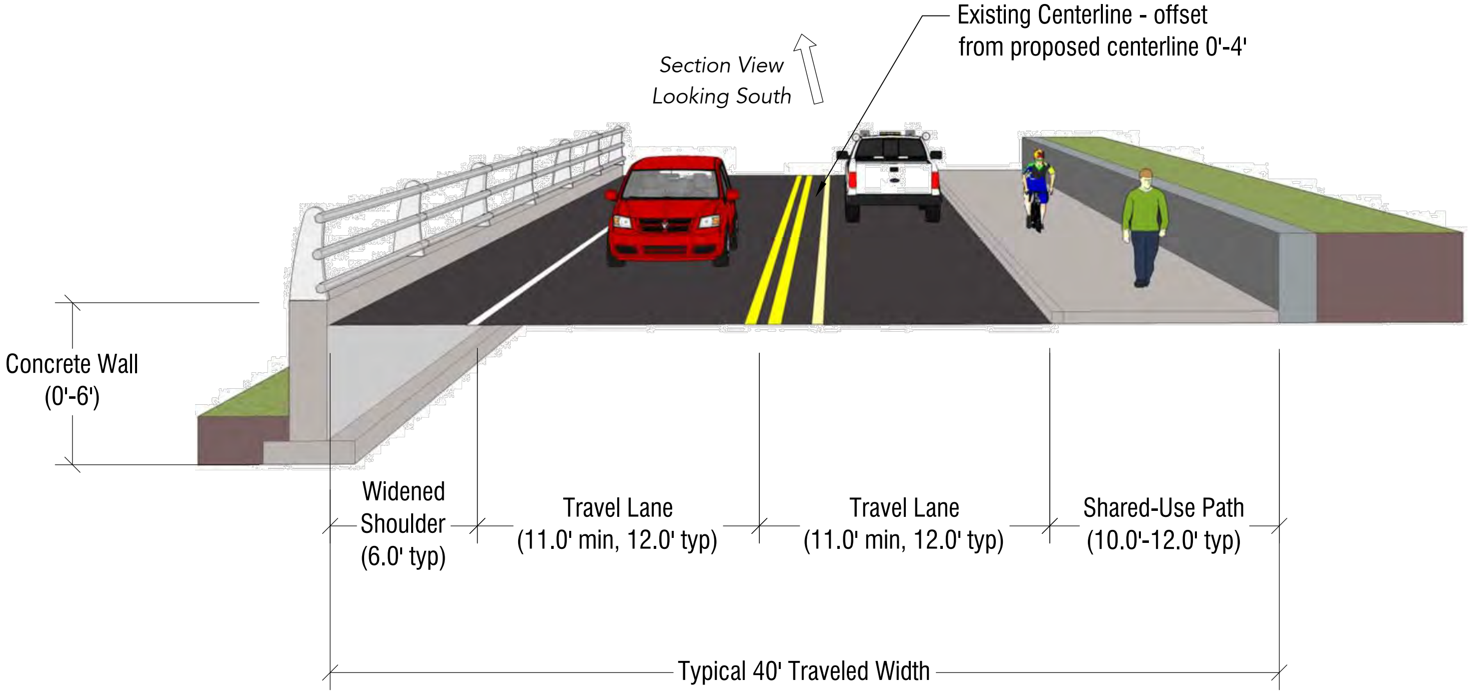




Plan

Legend

—	Existing Sidewalk and Bike Lanes
🟥	Proposed Wide Shared-Use Path or Sidewalk
●	Proposed Curb Ramp Improvement
—	Proposed Retaining Wall
Add ●	Proposed Improvement



Cross-section

Figure 5-1: Segment 1 Improvements

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
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Intersection Improvements

A number of intersection improvements are proposed for Segment 1 of the corridor. It should be noted that these improvements have not been previously identified in the Transportation System Plan or other City planning documents.

Increase Curve Radius of Linn Avenue between 3rd Street and 4th Street

Linn Avenue at 3rd and 4th Streets would be realigned in order to improve safety as well as traffic operation. Linn Avenue at this location currently has limited sight distance and presents safety concerns for all modes of travel in light of field observations, City staff input, public comments, and historical crash data.

This road modification shifts the roadway west, and requires some new asphalt pavement and modifications to existing retaining walls.

Realignment of Pearl Street at Linn Avenue

Pearl Street would be realigned to align with Oak Street at Linn Avenue in order to improve traffic operation and safety. Linn Avenue at this location currently has limited sight distance and presents safety concerns for all modes of travel in light of field observations, City staff and stakeholder input, and historical crash data.

This road modification shifts Pearl Street north, and requires the acquisition of right-of-way. Realignment could allow the area south of the realigned Pearl Street to be used for stormwater quality treatment.

Closure of Electric Street between Charman Street and Linn Avenue

Electric Street would be closed between Charman Street and Linn Avenue in order to improve safety, eliminate maintenance of this relatively-unused pavement, and provide other benefits.

As discussed in Chapter 2, the intersection of Electric Street and Linn Avenue is redundant and presents safety concerns. Public opinion and input from the Planning Commission agreed with the closure of this street.

Closure of Electric Street could provide any number of alternate benefits. For instance, the street could be repurposed as a pocket park, be used for stormwater treatment, or provide parking for adjacent Singer Creek Park (currently only accessible by vehicle from Belle Court, located north of the park in a residential neighborhood).

Singer Creek Connectivity Improvements

The proposed improvements would complete a non-vehicular route between the existing trail system in Singer Creek Park and the existing sidewalk system downtown by the addition of an asphalt-paved shared-use path and cement concrete sidewalk infill. A graphic illustrating these improvements is included as *Figure 5-2*.

A complete pedestrian route along Linn Avenue between 5th Street and Park Drive is not proposed in any City planning documents. However, several pedestrian/bicycle routes parallel to Linn Avenue through this portion of the corridor have been proposed in the TSP and in the Trails Master Plan. These are shown graphically on *Figure 3-1* in Chapter 3.

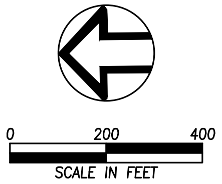
The multiple projects described in previous City planning documents would provide routes providing a parallel route and/or connectivity to Singer Creek Park reflect the incomplete pedestrian facilities along Linn Avenue, and the lack of connectivity to the park. Public and stakeholder input further identified a need for a parallel facility to Linn Avenue through this area. The most common concerns expressed have been that there is a lack of pedestrian routes along or parallel to Linn Avenue. The second-most common concern for this area has been that there is a lack of connectivity to the park. *Figure 4-7* in Chapter 4 shows multiple potential routes to the west and east of Linn Avenue. Completing a parallel connection to Singer Creek Park east of Linn Avenue would require the least amount of improvements, due to existing sidewalk, and was therefore prioritized over other potential routes.

Segment 2 - Linn Avenue: Park Drive to Leland Road

Complete pedestrian and bicycle facilities are present along the east side of Linn Avenue through Segment 2, with some pedestrian and bicycle facilities added where absent along the west side. The proposed improvements would add sidewalk and bike lanes where they are currently absent. No right-of-way acquisition appears to be necessary. *Figure 5-3* illustrates these improvements and the preferred roadway cross-section. *Appendix J* includes a large-scale plan view of these improvements.

Preferred Roadway Cross-sections

The preferred roadway cross-section for Segment 2 includes a sidewalk and bike lanes on both sides of the road, two travel lanes, and a landscaping strip on the west side of the road. Only ADA and radius improvements would be made to the existing bicycle lane and sidewalk (or the short section of parking lane).

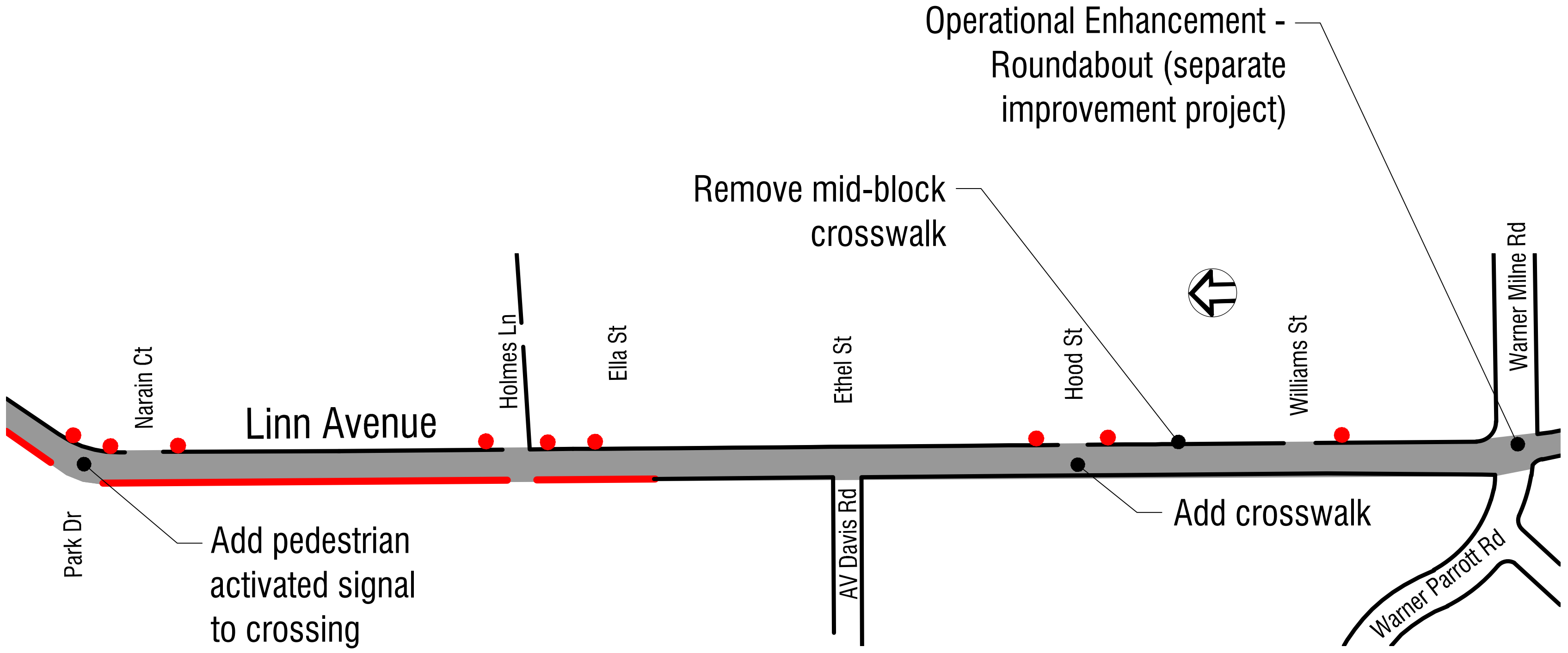


Legend

- 🟥 Proposed Pedestrian/Bicycle Route (within City ROW)
- 🟧 Proposed Pedestrian/Bicycle Route (outside City ROW - requires easement)
- 🟦 Proposed improvement to connectivity and access
- — Existing Sidewalk, Path or Trail
- ▨ Lot Lines
- 🟩 City Park or Green Space

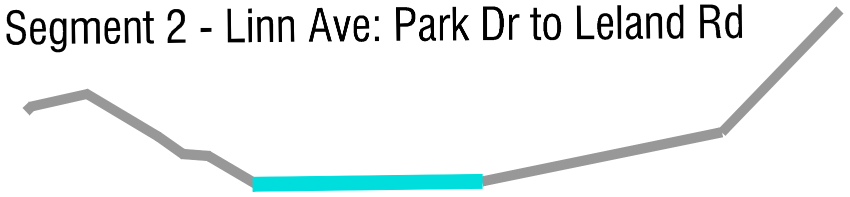
Figure 5-2: Singer Creek Connectivity Improvements

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014



Plan

Segment 2 - Linn Ave: Park Dr to Leland Rd



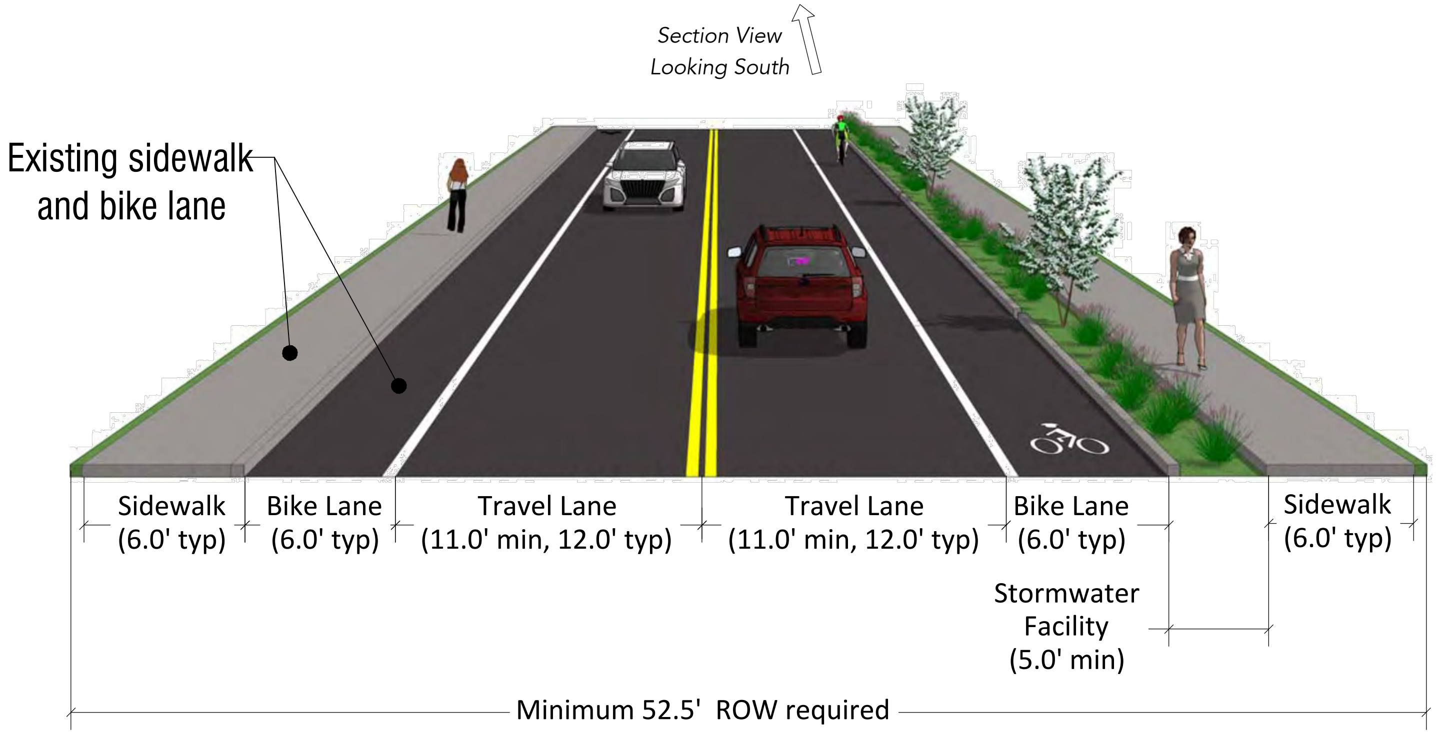
Legend

— Existing Sidewalk and Bike Lanes

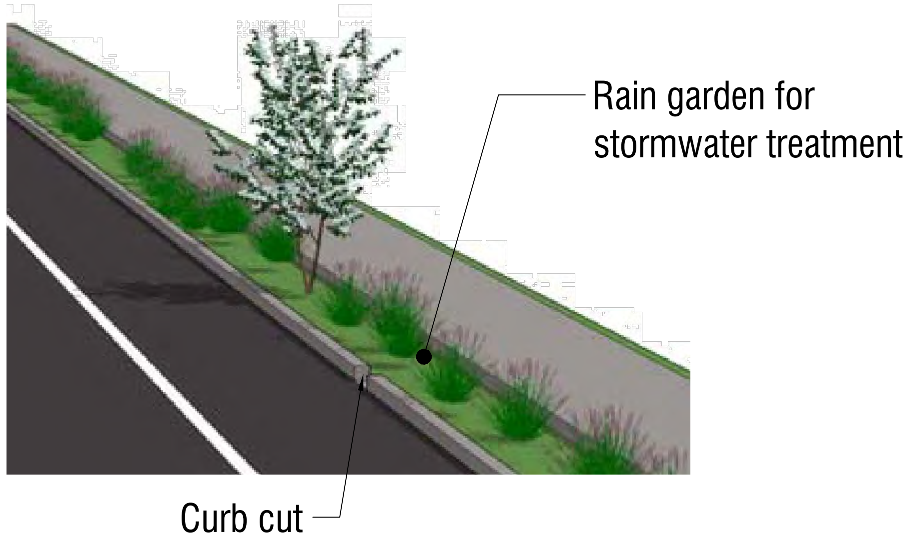
━ Proposed Sidewalk and Bike Lanes and Stormwater Treatments (see Cross-Section)

● Proposed Curb Ramp Improvement

Add ● Proposed Improvement



Cross-Section



Stormwater Facility

Figure 5-3: Segment 2 Improvements

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
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Gardiner Middle School Pedestrian Improvements

This corridor plan includes specific improvements to pedestrian access to Gardiner Middle School. These improvements include crossing improvements to Linn Avenue and the addition of sidewalk connections to Gardiner Middle School. Right-of-way acquisition on Laurel Lane would be necessary in order to complete the sidewalk at this location. A graphic illustrating these improvements is included as *Figure 5-4*.

Central Point Road Operational Enhancement (Roundabout)

A 5-leg roundabout would be constructed in order to address safety concerns and accommodate future traffic flows through the intersection of Linn Avenue and Leland Road at Warner Parrott Road/Warner Milne Road, and the intersection of Central Point Road and Warner Parrott Road. This project has been identified in the TSP, and refined as part of this corridor planning effort. This work would require extensive right-of-way acquisition, and would have significant impacts on private property access. Public and stakeholder concerns were raised regarding these impacts, and are included in *Appendix G*.

A graphic illustration of this intersection treatment is shown in *Figure 5-5*.

In addition to the analyses discussed in *Appendix D*, the City completed a more detailed evaluation in order to support the decision to construct a roundabout. An intersection control analysis at these intersections was completed and is included in *Appendix K*.

Segment 3 - Leland Road: Linn Avenue to Meyers Road

The preferred roadway cross-section for Segment 3 includes the addition of sidewalks, landscaping strips and bike lanes on both sides of the road. These improvements would require right-of-way acquisition in order to accommodate a widened paved width and sidewalk. A graphic illustration of this cross-section is included as *Figure 5-6*. A detailed plan view of these improvements can be found in *Appendix J*.

Intersection Improvements

One intersection improvement is proposed for Segment 3 of the corridor. It should be noted that this improvement is not previously identified in any other City planning documents.

Realignment of Pease Road at Leland Road

Pease Road would be realigned at its intersection with Leland Road in order to improve safety and traffic operation. This intersection has been the location of numerous crashes, most likely due to the roadway geometry and the limited sight distance.

Segment 4 - Meyers Road: Leland Road to Moccasin Way

The preferred roadway cross-section for Segment 4 includes the addition of sidewalks, landscaping strips and bike lanes on both sides of the road. These improvements would require right-of-way acquisition in order to accommodate a widened paved width and sidewalk. A graphic illustration of this cross-section is shown in *Figure 5-7*. A detailed plan view of these improvements can be found in *Appendix J*.

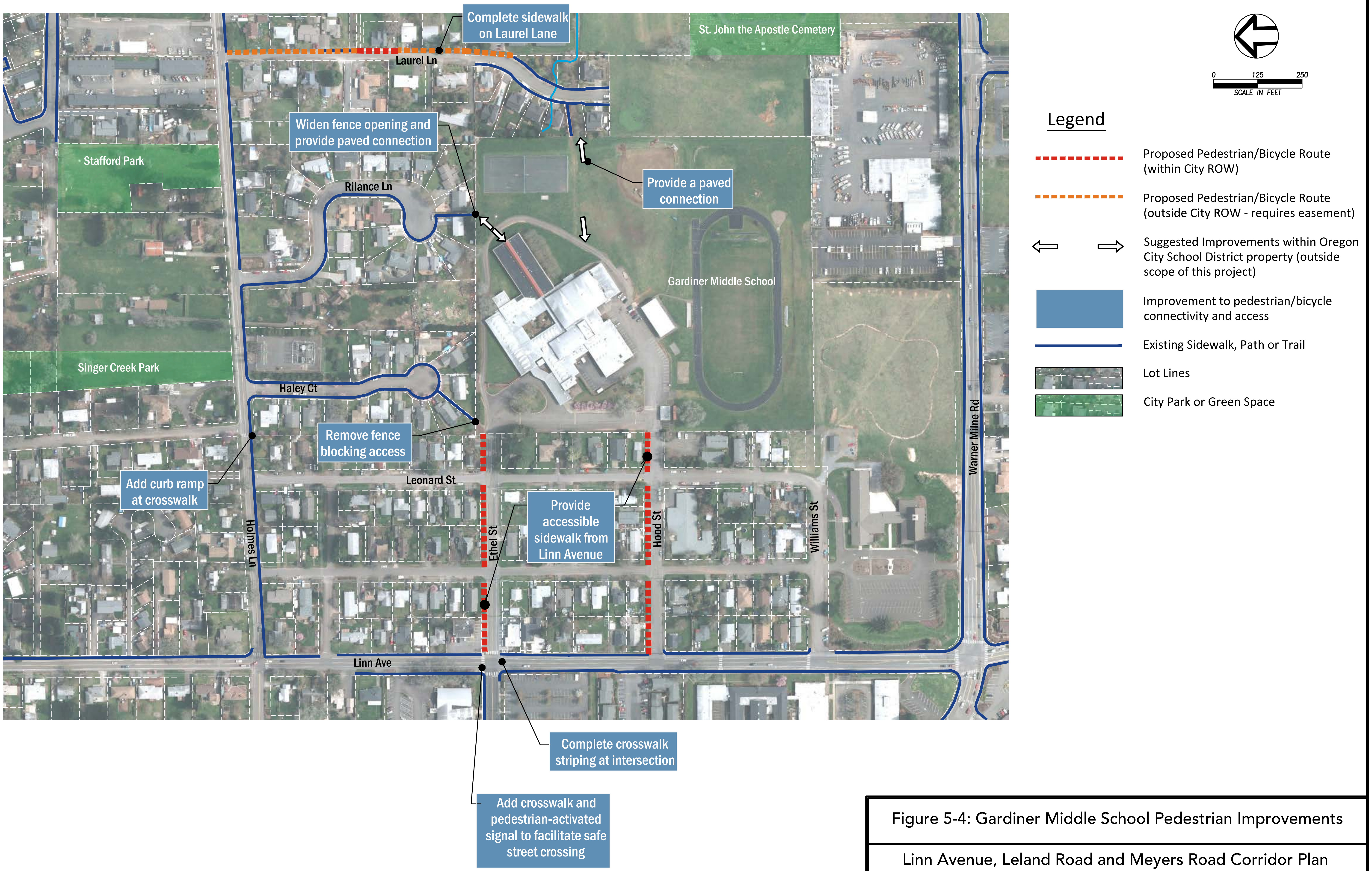


Figure 5-4: Gardiner Middle School Pedestrian Improvements

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014

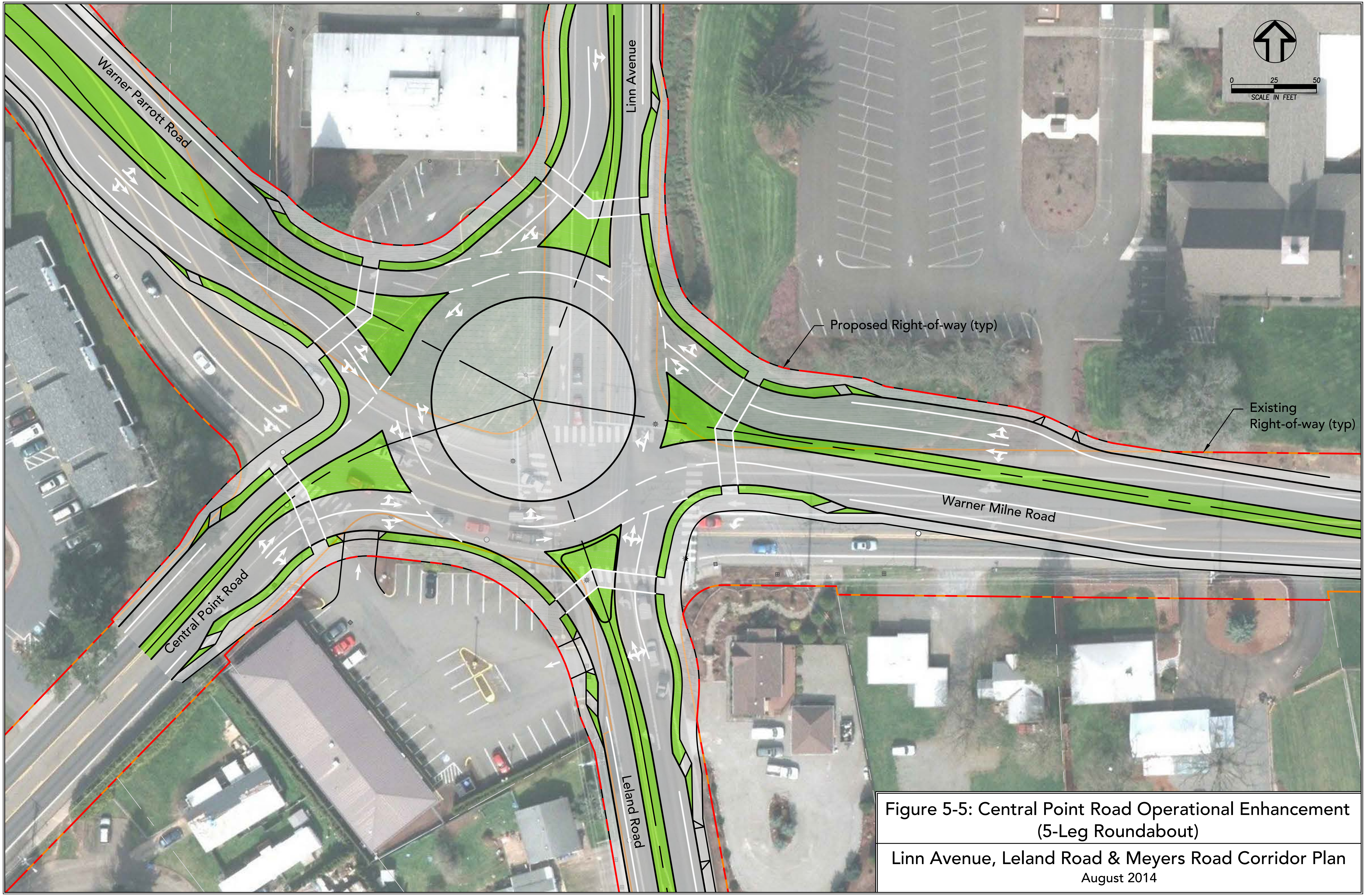
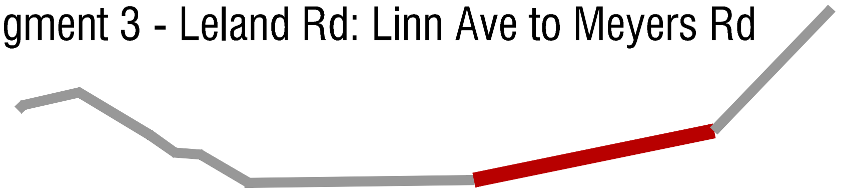


Figure 5-5: Central Point Road Operational Enhancement (5-Leg Roundabout)

Linn Avenue, Leland Road & Meyers Road Corridor Plan

August 2014

Segment 3 - Leland Rd: Linn Ave to Meyers Rd



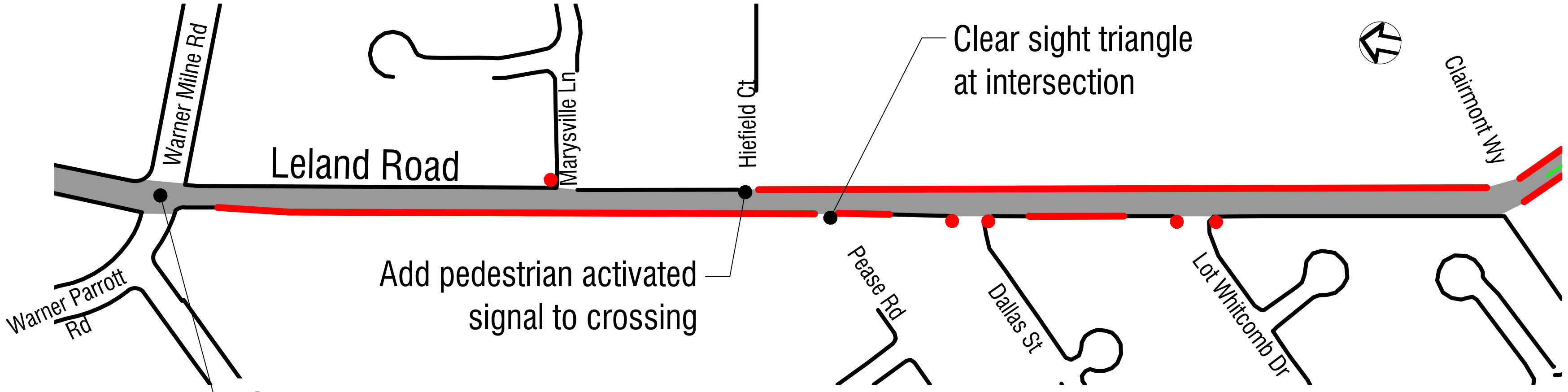
Legend

— Existing Sidewalk and Bike Lanes

🟥 Proposed Sidewalk and Bike Lanes (see Cross-section)

● Proposed Curb Ramp Improvement

Add ● Proposed Improvement

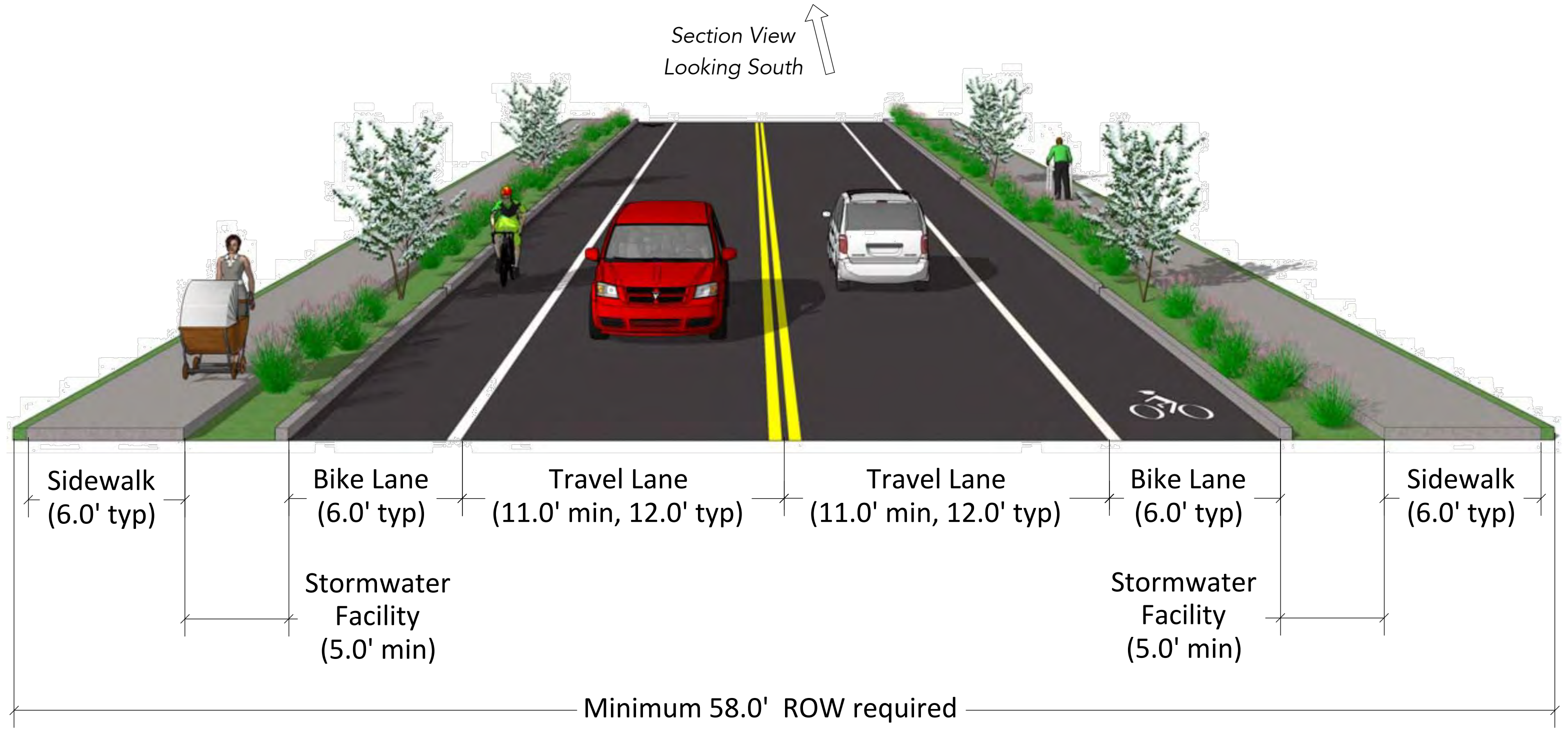


Clear sight triangle at intersection

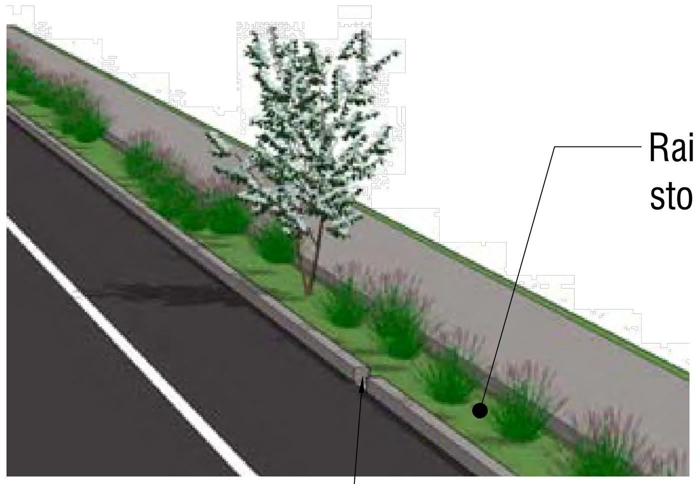
Add pedestrian activated signal to crossing

Operational Enhancement - Roundabout

Plan



Cross-Section



Rain garden for stormwater treatment

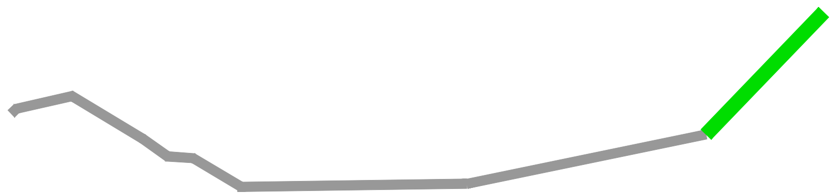
Curb cut

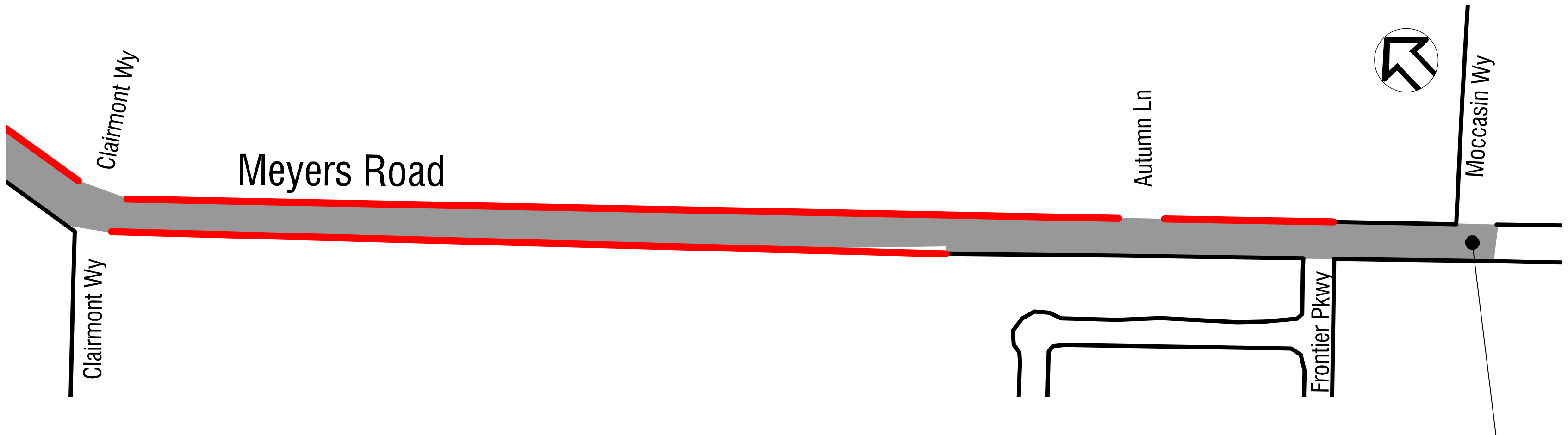
Stormwater Facility

Figure 5-6: Segment 3 Improvements

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
August 2014

Segment 4 - Meyers Rd: Leland Rd to Moccasin Wy





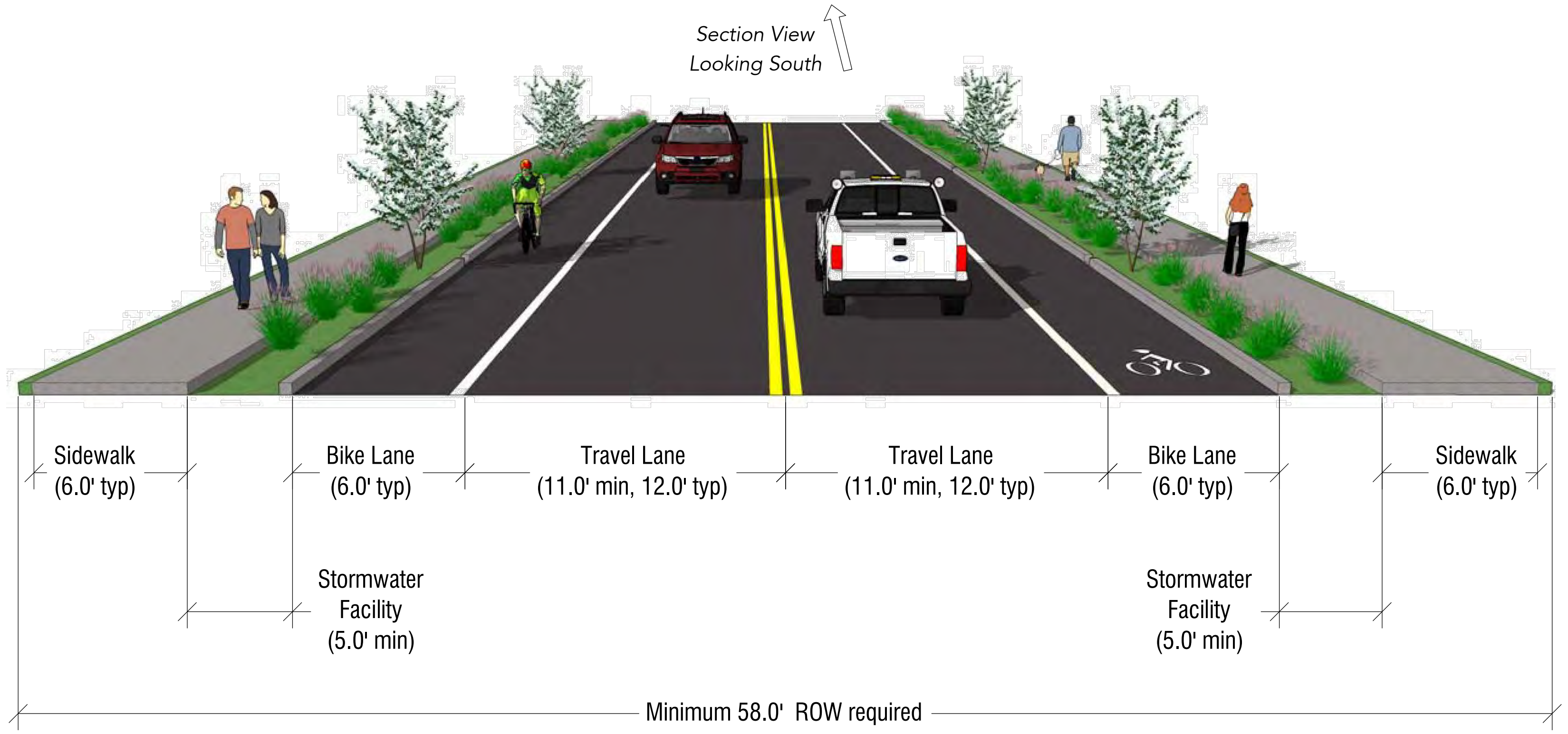
Plan

Legend

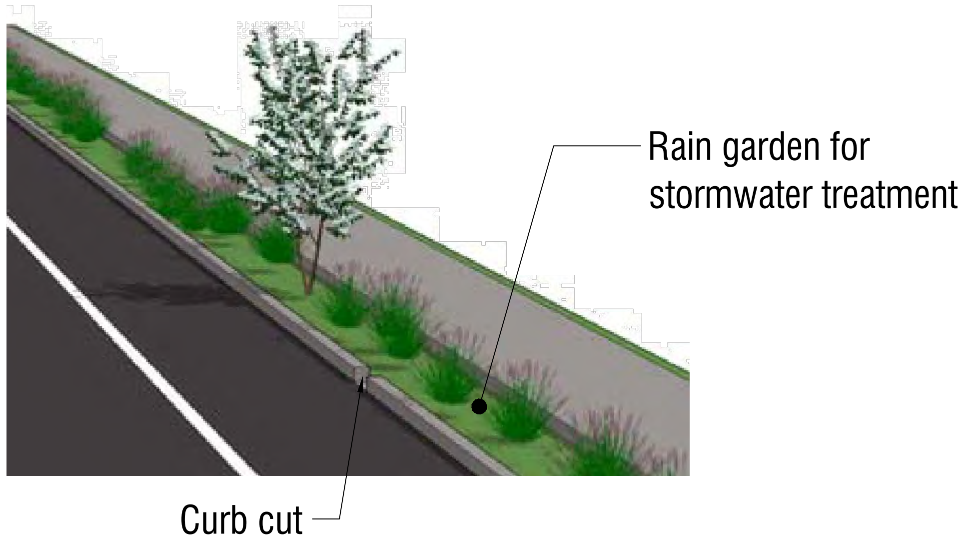
— Existing Sidewalk and Bike Lanes

━ Proposed Sidewalk and Bike Lanes (see Cross-Section)

Add ● Proposed Improvement



Cross-Section



Stormwater Facility

Figure 5-7: Segment 4 Improvements

Linn Avenue, Leland Road, and Meyers Road Corridor Plan
August 2014

GENERAL IMPROVEMENTS THROUGHOUT THE CORRIDOR

Transit System Improvements

Facilities for transit users will be greatly improved simply by the improvements to pedestrian and bicycle facilities along Linn Avenue. Transit user needs were an important consideration when developing these facilities, particularly with regard to providing designated crossings where parallel bus stops were located.

This plan also includes improvements that will specifically benefit transit users. TriMet warrants the installation of seating for bus riders at designated ridership frequencies for areas with sidewalks. Several of the stops along the corridor will receive seating installations based on this warrant - which will make waiting for the bus much more convenient.

Corridor Streetscape Improvements

The alternative plans that were developed in Chapter 4 did not include the inclusion of specific streetscape elements. There are however, a number of additional improvements that should be incorporated into these alternatives, including wayfinding, lighting, landscaping, and street furniture.

Wayfinding

The City's Transportation System Plan recommends the improvement of wayfinding facilities throughout Oregon City to orient and direct pedestrians and bicyclists. Currently, the City of Oregon City has no standard for wayfinding signage, though there are a number of different forms of wayfinding throughout the City.

As discussed in Chapter 3, there is a need for wayfinding improvements in order to direct street users to the various parks, schools, and other activity generators within the corridor.

Wayfinding Signage (Linn Avenue and Holmes Lane)

Lighting

Lighting along the corridor is currently sporadic and incomplete. Roadway improvements for each segment of the corridor should include the addition of new lighting where warranted.

Landscaping

Landscaping improvements are recommended throughout the corridor in the form of a landscaping strip between the bicycle lane and the sidewalk. This landscaping strip should provide an aesthetic and comfortable separation for pedestrians. Landscaping will include street trees, planted with careful consideration of sight distances at intersections and driveways.

The addition of street trees is known to contribute to safer roadways through the impression of a more “closed-in” roadway, which subconsciously cues drivers to pay more attention to their surroundings and slows traffic.

In addition to designated landscaping strips, street trees will be planted where right-of-way is available on Segment 1 (Linn Avenue between 5th Street and Park Drive). Reducing vehicular speeding has been identified as a key objective for this segment in particular, and the addition of street trees may help to slow speeds.

The landscaping strip may also be designed for stormwater treatment. Treatment will be necessary for runoff from the added impervious surfaces through the corridor. Plant selection for stormwater treatment should reflect sight distance concerns at driveways and intersections. Plants with larger growth radii that might interfere with traffic through the adjacent bicycle lane should be avoided.

Street Furniture

Street furniture is a useful and aesthetic addition to a walkable street. Given the nature of the corridor, street furniture such as seating is recommended for inclusion throughout the corridor. Benches encourage pedestrian traffic along the corridor, and are invaluable to senior and disabled pedestrians.

The addition of trash receptacles should be considered at certain locations to encourage proper disposal of waste, such as the sidewalk adjacent to Singer Creek Park, and at streets leading to Gardiner Middle School. The addition of bollards at the asphalt pathways entering Singer Creek Park may be considered to discourage vehicular traffic off the street at this location.

Street bench on Main Street (Oregon City)

We would recommend the addition of bicycle racks at certain locations in order to encourage bike travel and provide safe locations for bike storage while cyclists visit amenities along the corridor. In particular, the addition of a bike rack at Singer Creek Park may be warranted.

Drainage and Utility Improvements

Stormwater improvements will be necessary in order to accommodate addition of impervious surfaces through the corridor. Existing ditches conveying stormwater along Leland Road and Meyers Road will be replaced by sidewalks and the roadway. Stormwater solutions will include the addition of landscaping strips to provide stormwater treatment, as well as stormwater detention facilities where City right-of-way is available.

Two graphics which illustrate potential stormwater improvements throughout the corridor are included in Chapter 4 as *Figure 4-9* and *Figure 4-10*.

Pavement Improvements

As discussed in Chapter 3, the majority of the existing asphalt roadways within the project corridor have been identified as needing some rehabilitation. The improvements identified in this corridor plan will likely be constructed over the course of several years, and it is highly likely that pavement conditions will change from the time of this report. For the purposes of cost estimating and planning, existing roadway surfaces throughout the corridor are assumed to require a pavement grind and inlay. New asphalt pavement is assumed only in currently-unpaved locations, where the roadway is modified for geometric improvements, or widened in order to accommodate new bike lanes.

INTRODUCTION

The project corridor extends two miles, with many proposed improvements to the existing transportation and stormwater facilities. As such, the full cost of constructing all the improvements described by this plan is significant. The plan has been broken up into prioritized phases to allow the City to make improvements over time. This Chapter describes the work and planning-level cost estimates associated with each phase, as well as potential funding sources.

CORRIDOR IMPROVEMENT PHASING

The corridor improvements have been divided into a total of eight phases, and organized according to their level of priority. Phases were assigned priorities based on input from the following sources:

- Project stakeholders
- The public
- Planning Commission
- Transportation Advisory Committee (TAC)
- City staff

Consideration of previous prioritizations, the availability of funding sources, and the cost of phased improvements were also factors in determining phase priorities. Some of the projects included in these phases have been assigned priorities in other City planning documents, such as the Transportation System Plan (TSP), the Trails Master Plan, and the Sanitary Sewer Master Plan.

Other than the general assumption that phases would be constructed in roughly chronological order, there are no timelines associated with implementing the corridor improvements. The total costs of the projects far exceed the City’s financial resources, and will have to be phased in over the course of several years. This implementation plan divides the project into more manageably-sized portions and attempts to prioritize with the recognition that funding some projects will be easier than others.

It should be noted that the majority of these phases could be broken up into sub-phases in order to improve the ability to construct them over time. For example, improvements along Linn Avenue described by Phase III are costly due to topographic and right-of-way challenges. However, portions of Linn Avenue through this phase could be improved along each block over time without requiring the completion of the entire Phase of work at one time.

The locations and limits of the corridor improvements are shown on a vicinity map, included as *Figure 6-1* on the next page.

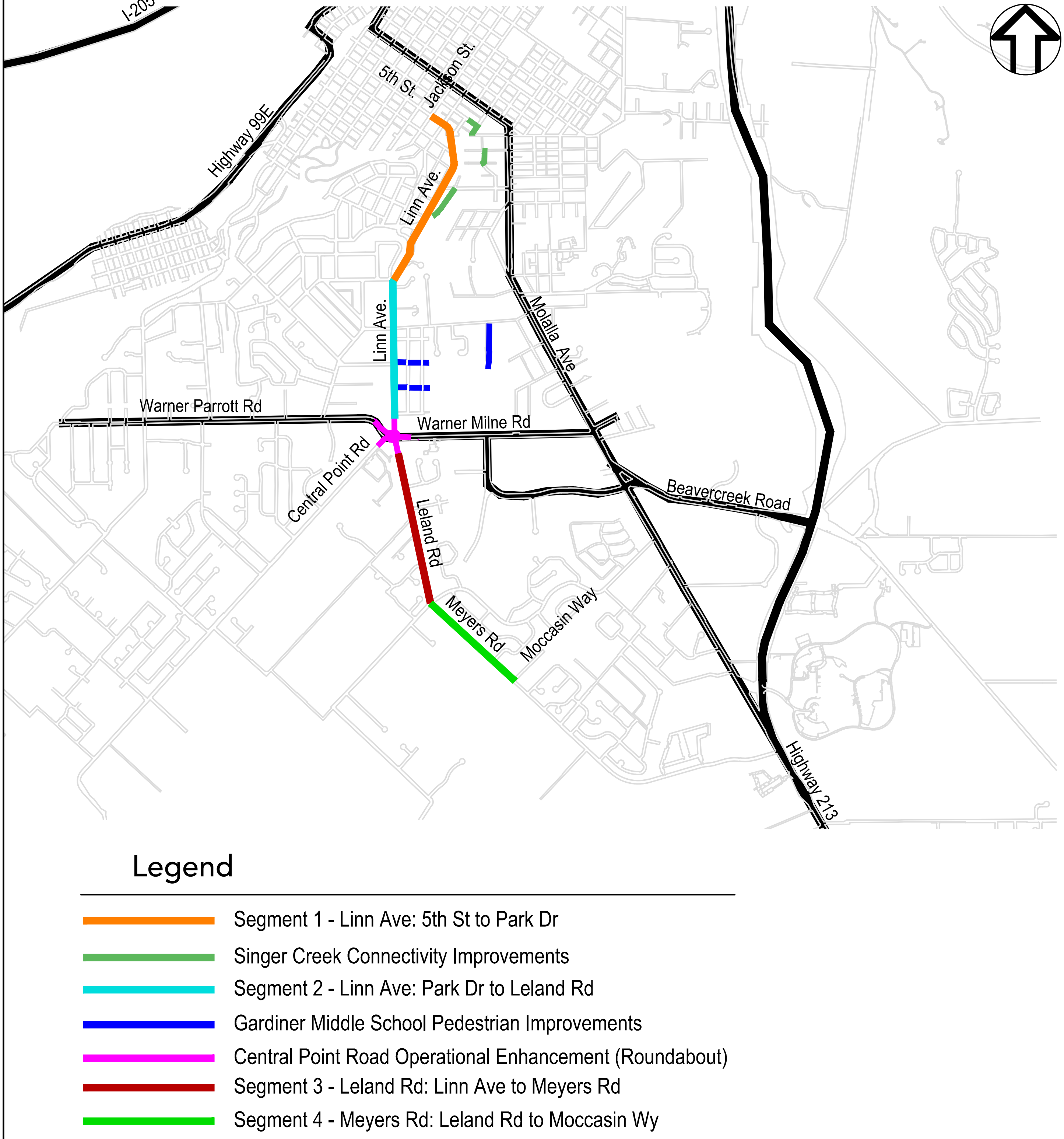


Figure 6-1: Corridor Plan Improvements

Linn Avenue, Leland Road & Meyers Road Corridor Plan
August 2014

Phase I: Gardiner Middle School Pedestrian Improvements

Pedestrian access improvements to Gardiner Middle School have been strongly supported by all project stakeholders and the general public. These improvements would be located within Segment 2, off of Linn Avenue, and could be constructed separately from Segment 2 improvements. A graphic illustrating these improvements is included as *Figure 5-4* in Chapter 5.

Phase I improvements are largely not described by other City planning documents. *Table 6.1* describes projects described by previous City plans which are included in this proposed phase.

Table 6.1: Previously City-Planned Projects included in Phase I

Project Name	**Description**	**Funding/Implementation**[1]
TSP Project C28: AV Davis Road Crossing	Install crosswalk and pedestrian-activated flasher on Linn Ave at AV Davis Rd	Not Likely to be Funded Long-term Phase 2 with an evaluation score of 69

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

This is a relatively small project compared to other phases of the corridor (approximately half the cost of Segment 2 improvements), and would be consequently easier to fund. For these reasons, access improvements to the school were separated from Segment 2, and are prioritized.

Phase II: Singer Creek Connectivity Improvements

The work associated with this phase would complete a parallel route to the east of Linn Avenue between the existing trail system in Singer Creek Park and the existing sidewalk system downtown through the addition of an asphalt-paved shared-use path and cement concrete sidewalk infill. *Figure 5-2* in Chapter 5 illustrates the proposed improvements.

Some of the improvements described by this phase have been described in other City planning documents, as shown below in *Table 6.2*.

Table 6.2: Previously City-Planned Projects included in Phase II

Project Name	**Description**	**Funding/Implementation**[1]
TSP Project S38: Singer Creek Park Shared-Use Path	Construct shared-use path east of Linn Ave from Electric St to Singer Creek Park	Not Likely to be Funded Long-term Phase 3 with an evaluation score of 66
TSP Project S52: Linn Avenue Shared-Use Path	Construct shared-use path east of Linn Ave from Pearl St to Electric St	Not Likely to be Funded Long-term Phase 2 with an evaluation score of 69
Trails Project L15: Waterboard-Singer Creek Connection	Construct trail east of Linn Ave between Oak St/Pearl St and Singer Creek Park	Tier 2 Priority: 10-25 years

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

As shown in *Table 6.2*, no other City planning documents propose a pedestrian route between Pearl Street and 6th Street west of Linn Avenue, as described in this Plan.

Though Segment 1 improvements (described in Phase III) would complete multimodal facilities on Linn Avenue, based on public and stakeholder input there would still be a need for this parallel path to provide connectivity between the surrounding neighborhoods and the park. In addition, constructing this parallel path would complete a route for pedestrians at a substantially lower cost than a route on Linn Avenue. For these reasons, these improvements were prioritized over Segment 1 improvements.

Phase III: Segment 1 Improvements (Linn Avenue: 5th Street to Park Drive)

The work associated with this phase of work would complete multimodal facilities between 5th Street and Park Drive on Linn Avenue (Segment 1). Currently there is no sidewalk or any other designated pedestrian facility along this portion of the corridor, and bicycle facilities are substandard. *Figure 5-1* in Chapter 5 illustrates the proposed improvements.

These improvements are largely not included in projects described by other City plans. *Table 6.3* describes the previously City-planned projects which are included this phase.

Table 6.3: Previously City-Planned Projects included in Phase III

Project Name	**Description**	**Funding/Implementation**[1]
Sewer Plan Project: Linn Avenue Sewer Replacement	Replace sanitary sewer gravity main on Linn Ave between 4th St and Maple St	Recommended CIP project with an estimated cost of $470,000
TSP Project C32: Electric Street Family Friendly Crossing[2]	Install crosswalk and pedestrian-activated flasher on Linn Ave at Electric St	Not Likely to be Funded Long-term Phase 2 with an evaluation score of 69
TSP Project W62: Linn Avenue Sidewalk Infill	Add sidewalk on Linn Ave between Charman St and Ella St (this project extends through both Segments 1 and 2)	Likely to be Funded with an evaluation score of 77

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

[2] This project has been partially completed with the addition of a crosswalk across Linn Ave. However, the crosswalk is at Charman St (adjacent to Electric St). This plan assumed completion of this project at Charman St rather than Electric St.

It should be noted that no other City planning documents propose the addition of pedestrian facilities between 5th Street and Charman Street. This plan proposes new facilities for both pedestrians and bicyclists through this entire segment.

As seen by the projects described in *Table 6.3*, the City’s Sewer Master Plan includes a project within Segment 1: Linn Avenue Sewer Replacement. This work would require pavement reconstruction along the trench. Depending on when this project is constructed, it may be of benefit for the City to construct complete this phase in conjunction with this sewer project.

This phase of work has considerable challenges due to topography and constrained right-of-way, which make the cost of improvements relatively high. However, public and project stakeholders have expressed numerous concerns about safety and access for all users, as well as the lack of complete pedestrian facilities. Based on these concerns, this phase of work has been prioritized over the other segments of the corridor.

Phase IV: Central Point Road Operational Enhancement (Roundabout)

A five-leg roundabout was selected for an intersection treatment at Warner Parrott/Warner Milne Road, Linn Avenue/Leland Road, and Central Point Road. A graphic showing the proposed roundabout is included in Chapter 5 as *Figure 5-5*. An Intersection Control Analysis (included in Appendix K) was completed for this area, and includes analyses for the five-leg roundabout.

This proposed improvement has been previously included in the TSP, as described below in *Table 6.4*. It should be noted that this project is defined in the TSP as "Not Likely to be Funded."

Table 6.4: Previously City-Planned Projects included in Phase IV

Project Name	**Description**	**Funding/Implementation[1]**
TSP Project D34: Central Point Road/Warner Parrott Road Operational Enhancement	Replace intersections of Linn Ave/Leland Road/Warner Parrott Rd/Warner Milne Rd and Warner Parrot Rd/Warner Milne Rd/Central Point Rd with a roundabout	Not Likely to be Funded Long-term Phase 4 with an evaluation score of 43

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

The City is in the process of purchasing property at the northwest corner of Linn Avenue and Warner Parrott Road for the construction of a new police station, and would like to move forward with additional right-of-way acquisition and design. In addition, there are a number of safety and operational concerns associated with the existing intersection at this location which would be ameliorated by this project.

The public involvement phases raised several concerns by the public and the City commission. During design phase of this project the designers are directed to minimize right of way impacts to the private property owners directly impacted by the roundabout envelope, address pedestrian safety concerns, address access concerns (especially for delivery vehicles accessing the Savage property location), and optimize the roundabout design to minimize construction impacts and cost while ensuring sufficient capacity for long term growth.

Phase V: Segment 3 Improvements (Leland Road: Linn Avenue to Meyers Road)

The addition of sidewalk, bike lanes and a landscaping strip for stormwater treatment is proposed for Segment 3. A graphic illustrating these improvements is included in Chapter 5 as *Figure 5-6.*

The majority of the improvements proposed for Segment 3 are described in previous City planning documents, as shown below in *Table 6.5*. It should be noted that the Segment 3

Improvements propose the completion of TSP Project C18 – which is defined in the TSP as “Not Likely to be Funded.”

Table 6.5: Previously City-Planned Projects included in Phase V

Project Name	**Description**	**Funding/Implementation**[1]
TSP Project W35: Leland Road Sidewalk Infill	Add sidewalk to both sides of Leland Rd between Marysville Lane and Meyers Rd	Likely to be Funded with an evaluation score of 77
TSP Project B33: Leland Road Bike Lanes	Add bike lanes to both sides of Leland Rd between Linn Ave and Meyers Rd	Likely to be Funded with an evaluation score of 77
TSP Project C18: Meyers Road Family Friendly Route Crossing	Install crosswalk and pedestrian-activated flasher on Leland Rd at Hiefield Ct	Not Likely to be Funded Long-term Phase 4 with an evaluation score of 59

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

The general public and other project stakeholders have expressed concerns with speeding, safety, and the lack of pedestrian and bicycle facilities through Segments 3 and 4. Of the two segments, crash data indicates a slightly greater number of vehicular incidents taking place on Leland Road (Segment 3). Meyers Road (Segment 4) has the least amount of existing sidewalks and bike lanes throughout the corridor, but Leland Road similarly does not provide a complete multimodal route. Right-of-way (ROW) acquisition is anticipated to be greater through Meyers Road as compared to Leland Road (more than twice as extensive). ROW acquisition may present a proportionally greater stumbling block to constructing improvements through this portion of the corridor. This is the predominant reason for prioritizing improvements on Segment 3 over Segment 4.

Phase VI: Segment 4 Improvements (Meyers Road: Leland Road to Moccasin Way)

The addition of sidewalks, bike lanes and a landscaping strip for stormwater treatment is proposed for Segment 4. *Figure 5-7* in Chapter 5 illustrates these improvements.

The majority of the improvements proposed for Segment 4 are described in previous City planning documents, as shown below in *Table 6.6*. However, the Segment 4 improvements include two TSP projects which have been defined as “Not Likely to be Funded” – the addition of sidewalk along Meyers Road, and the completion of a pedestrian crossing at Moccasin Way.

Table 6.6: Previously City-Planned Projects included in Phase VI

Project Name	Description	Funding/Implementation[1]
TSP Project W38: Meyers Road Sidewalk Infill	Add sidewalk to both sides of Meyers Rd from Leland Rd to Moccasin Wy	Not Likely to be Funded Long-term Phase 3 with an evaluation score of 66
TSP Project B35: Meyers Road Bike Lanes	Add bike lanes to both sides of Meyers Rd from Leland Rd to Autumn Ln	Likely to be Funded with an evaluation score of 77
Sewer Plan Project: Meyers Road C Sewer Extension	Add new sewer main to serve properties on Meyers Rd from Leland Rd to Autumn Ln	Recommended CIP Project Priority 1 with an estimated cost of $400,000 Proposed funding split of 75% Sewer SDC and 25% property owners
TSP Project C15: Meyers Road Shared-Use Path Crossing	Crosswalk and pedestrian-activated flasher on Meyers Rd at Moccasin Way	Not Likely to be Funded Long-term Phase 3 with an evaluation score of 66

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

As discussed, it is difficult to prioritize between Segments 3 and 4. It should be noted that the City's Sewer Master Plan includes a sewer project planned for Segment 4 - the Leland-Meyers Sewer Extension project – which would connect properties on Meyers Road to the sewer system, and complete a new section of sewer main along Meyers Road. This work would require pavement reconstruction along the trench for a considerable portion of Segment 4. Depending on when this sewer project is constructed, it may be of benefit for the City to construct improvements on Meyers Road in conjunction with this sewer project (regardless of phasing). This project was included in the cost estimate prepared for the Segment 4 improvements.

Phase VII: Segment 2 Improvements (Linn Avenue: Park Drive to Leland Road)

Facilities for pedestrians and bicyclists are largely complete through Segment 2 of the corridor. Sidewalk, bike lanes, and a landscaping strip for stormwater treatment are proposed for the undeveloped portions of Segment 2. These improvements are shown on *Figure 5-3* of Chapter 5.

The City's TSP proposes the addition of sidewalks where currently absent throughout Segment 2, as shown below in Table 6.7.

Table 6.7: Previously City-Planned Projects included in Segment 2 Improvements

Project Name	Description	Funding/Implementation
TSP Project W62: Linn Avenue Sidewalk Infill	Sidewalk infill for Linn Ave between Charman St and Ella St[2]	Likely to be Funded with an evaluation score of 77

Notes:

[1] Funding and implementation information is taken directly from the source planning document.

[2] This project extends through both Segments 1 and 2 of the corridor.

Though the TSP prioritized the addition of sidewalk through this portion of the project corridor, it appears that there is less of a need for improvements at this location compared to the rest of the corridor. In addition, there has been less concern expressed by the public and other project stakeholders with completing the absent facilities compared to other portions of the corridor. Therefore, improvements for this portion of Linn Avenue were considered less of a priority.

PHASING COST ESTIMATES

Preliminary cost estimates were developed for the improvements described in each phase. These are conservative, planning-level estimates which use 2014 dollar values. Detailed cost estimates are included in *Appendix H*.

A summary of the estimates is included below in *Table 6-8*. The total estimated costs of improvements include not only the cost of constructing each phase of improvements, but also the estimated costs associated with right-of-way acquisition, design engineering, construction engineering, and environmental permitting.

Table 6-8: Phased Improvements and Estimated Costs

Phase	**Estimated Cost**
Phase I: Access Improvements to Gardiner Middle School	$0.5 Million
Phase II: Access Improvements to Singer Creek Park	$0.5 Million
Phase III: Segment 1 Improvements (Linn Avenue)	$4.8 Million
Phase IV: Roundabout	$3.3 Million
Phase V: Segment 3 Improvements (Leland Road)	$2.6 Million
Phase VI: Segment 4 Improvements (Meyers Road)	$3.3 Million
Phase VII: Segment 2 Improvements (Linn Avenue)	$1.2 Million
Grand Total Cost of Corridor Improvements	*$16.2 Million*

Specific assumptions associated with each phase of improvement are included in the detailed estimates in *Appendix H.* There are a number of general assumptions which were used to develop these cost estimates, including assumptions associated with pavement rehabilitation, right-of-way, and environmental permitting.

It is likely that the needs for pavement rehabilitation for the corridor roadways will change between the time of this Plan and the time the phased improvements are implemented. Without knowing exactly the pavement condition at the time of implementing improvements, some basic assumptions were made for pavement rehabilitation for purposes of producing planning-level cost estimates. A grind and inlay of the existing pavement was assumed for all roadway within Segments 1, 2, 3 and 4. Given the largely built-out condition of the corridor, it was assumed that the roadway would not widen between the time of this Plan and the time improvements would be constructed. Therefore, construction of pavement necessary to accommodate standard-width bike lanes through Segments 1, 2, 3 and 4 was assumed as part of these cost estimates.

It should be noted that costs associated with right-of-way (ROW) acquisition are difficult to estimate due to the variable nature of property values and individual property owner motivations. Costs for ROW acquisition included in these estimates assume that compensation will be based on conservative planning-level values per square feet, rather than on assessed values (which are lower). No relocation or condemnation has been assumed for any of the properties associated with the improvements described in this Plan.

A basic lump sum cost was assumed for environmental permitting based on the relative size of the project; this cost will likely vary. Environmental permitting costs will depend in part upon the source of funds for construction. For example, the use of federal funds for improvements will require a more extensive environmental permitting process than the use of local funds only. However, some environmental permitting on a local level will be necessary for most of the improvements due to the presence of environmentally-sensitive areas throughout the corridor.

POTENTIAL FUNDING SOURCES

There are a variety of funding sources available at the City, County, Regional and State level. These are summarized in the paragraphs below.

Federal Funding Sources

Allocation of federal funds is managed through Metro, the City of Oregon City's Metropolitan Planning Organization. Metro generally programs federal funding for regional and local programs that affect the state transportation system, though some funds are made available directly for local projects.

- *Transit Expansion and Livable Communities Grants* – Projects that could be eligible for funding include those which foster multimodal systems, provide transportation options, improve access, and reduce emissions.
- *Federal Highway Trust Fund (HTF)*

State Funding Sources

State funds are distributed via the Oregon Transportation Commission (OTC). The State Highway Fund is the most significant source of funding for the programs described below. To be eligible for funding, projects must be programmed through the STIP.

- *State Highway Fund*
- *ConnectOregon* – ConnnectOregon funds are lottery-backed bonds distributed to multimodal projects statewide.
- *DEQ Nonpoint Source Implementation 319 Grants* - Projects that could be eligible for funding include applications of pervious pavements, stormwater detention and other low-impact stormwater development tactics. A minimum 40% match is required for these funds.
- *Oregon Parks and Recreation Local Government Grants* – The Oregon Parks and Recreation Department (OPRD) administers lottery-backed funds for development and major rehabilitation of public parks and recreation facilities. A minimum 20% match is required for these funds.
- *Oregon Parks and Recreation Recreational Trails Grant* - The OPRD provides funding for recreational trail projects to build new trails, including bridges, wayfinding, trail restoration, and easement acquisition. A minimum 20% match is required for these funds.
- *Statewide Transportation Improvement Program (STIP).*
  The STIP for 2012-2015 has been reorganized into two broad categories: "Fix-It" and "Enhance." The capital projects identified in the Plan will work well with both categories of improvements.
  - *"Fix-It" Activities* – Projects that fix or preserve the current transportation system. "Fix-It" activities include:
    - Illumination, signs and signals
    - Safety
    - Stormwater retrofit
  - *"Enhance" Activities* – Projects that enhance, expand, or improve the transportation system. Under this new STIP organization, there will be one application for all projects eligible under the "Enhance" program. Communities will apply for the "Enhance" projects that best serve their community and ODOT will determine the appropriate funding mechanism. "Enhance" activities include:
    - Bicycle and/or Pedestrian facilities
    - Most projects previously eligible for Transportation Enhancement Funds
    - Projects eligible for Flex Funds program previously
    - Safe Routes to Schools (infrastructure projects)
    - Modernization (projects that add capacity to the system)

Regional Funding Sources

Metro manages the allocation of regional federal flexible funds. These funds come from two sources: the Surface Transportation Program (STP) and the Congestion Mitigation/Air Quality Program (CMAQ). These funds can be spent on a variety of projects and could be used for improvements identified in the Plan.

Local Funding Sources

The majority of the projects described in this Plan will be constructed through largely developed neighborhoods, and are consequently not eligible for funding from Transportation System Development Charges (SDCs).

The City could also fund these projects through their Street Fund, Transportation Utility Fee Fund, or General Fund. However, as discussed in the Transportation System Plan, there are numerous projects competing for funding from these sources.

The City could also look at creating a Local Improvement District (LID) to help fund improvements. LIDs are created by property owners within a district of a city to raise revenues for constructing improvements within the district boundaries. LIDs may be used to assess property owners for improvements that benefit properties and are secured by property liens. LIDs are an option if the City feels that public support of these projects is sufficiently extensive to create a LID.

Appendices

Appendix A

Existing Conditions – Plan Sheets

LEGEND

——— — — ———	EXISTING RIGHT OF WAY
——— — ———	EXISTING CENTERLINE
— — — — — — —	EXISTING EDGE OF PAVEMENT
═ ═ ═ ═	EXISTING CURB
▨	EXISTING CONCRETE SIDEWALK
— — —SD— — — — —SD— — —	EXISTING STORM, SIZE NOTEO IF KNOWN
——— < ——— < ———	EXISTING DITCH
— — —SS— — — — —SS— — —	EXISTING SANITARY, SIZE NOTED IF KNDWN
——— — —W— — — —W— ———	EXISTING WATER, SIZE NOTED IF KNOWN
— — —G— — — — —G— — —	EXISTING GAS
——— —OHT— — —OHT— ———	EXISTING OVERHEAD TELEPHONE
——— —UGT— — —UGT— ———	EXISTING UNDERGROUND TELEPHONE
——— —OHP— — —OHP— ———	EXISTING OVERHEAD POWER
——— —UGP— — —UGP— ———	EXISTING UNDERGROUND POWER
——— —OHC— — —OHC— ———	EXISTING OVERHEAD CABLE TV
——— —UGC— — —UGC— ———	EXISTING UNDERGROUND CABLE TV
——— —OHW— — —OHW— ———	EXISTING OVERHEAD WIRE
——— x ——— x ——— x ———	EXISTING FENCE
═══════	EXISTING WALL
○	EXISTING MANHOLE
▥	EXISTING CATCH BASIN
∘	EXISTING AREA DRAIN
○	EXISTING CLEANOUT
⊞	EXISTING WATER METER
◫	EXISTING IRRIGATION BOX
⊗	EXISTING CATE VALVE
△	EXISTING FIRE HYDRANT
⊠	EXISTING POWER METER
∅	EXISTING UTILITY POLE
⟵	EXISTING GUY WIRE
⊡	EXISTING TV PEDESTAL
✉	EXISTING MAILBOX
◫	EXISTING GAS VALVE
☼	EXISTING LUMINAIRE
⊥	EXISTING SIGN
☁ ✺ ✿	EXISTING TREE, SHRUB, OR ROOT SYSTEM

▨	EXISTING STRUCTURE
——— ——— ——— ———	EXISTING EASEMENT
——— — — ——— — — ———	EXISTING PROPERTY LINE
— — — — — —200'— — — — — —	EXISTING MAJOR CONTOUR
— — — — — — — — — — — — —	EXISTING MINOR CONTOUR
— — — — — — — — — — — — —	EXISTING POND
- - - - - - - - - - - - - - - - - -	EXISTING TOE
— — — — — — — — — — — — —	EXISTING TOP
——— ——— ——— ———	EXISTING EDGE OF CONCRETE
— · — · — · — · —	EXISTING SWALE
——— ——— ——— ———	EXISTING FOG LINE
—□—□—□—□—□—	EXISTING GUARDRAIL
	EXISTING EDGE OF GRAVEL
— — — — — — — — — — — — —	EXISTING GUTTER
┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼	EXISTING RAILROAD TRACKS
———————————	EXISTING STRIPING
——— — —E— — — —E— ———	EXISTING ELECTRICAL LINE
— —IRR— — —IRR— — —IRR— —	EXISTING IRRIGATION
≻———≺	EXISTING CULVERT
⋈	EXISTING VALVE
♂	EXISTING BLOW DFF VALVE
⊓	EXISTING CAP
#	EXISTING COUPLER
╪	EXISTING CROSS
⌐	EXISTING 45° BEND
┐	EXISTING 90° BEND
⊸	EXISTING HOSE BIBB
⊏	EXISTING PLUG
◎	EXISTING SPRINKLER
⊗	EXISTING VALVE
┴	EXISTING TEE
△	EXISTING T. BLOCK
⊕	EXISTING MONUMENT
●	EXISTING PROPERTY CORNER
∘	EXISTING BOLLARD

APPENDIX A INDEX &
LEGEND

PLAN

PLAN

DRAWING NO:
2
2 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO:	DATE:
1366A	01/2014

APPENDIX A
PLAN 1

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY:	DB/JW
DRAWN BY:	TS/KJ
REV:	BG

PLAN

PLAN

DRAWING NO:
3
3 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO:	DATE:
1366A	01/2014

APPENDIX A
PLAN 2

NO.	REVISION	BY	DATE

ONE INCH
0 ⊢ 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN

PLAN

DRAWING NO:
4
4 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO: 1366A
DATE: 01/2014

APPENDIX A
PLAN 3

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN

PLAN

DRAWING NO:
5
5 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO:	DATE:
1366A	01/2014

APPENDIX A
PLAN 4

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN

PLAN

DRAWING NO:
6
6 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

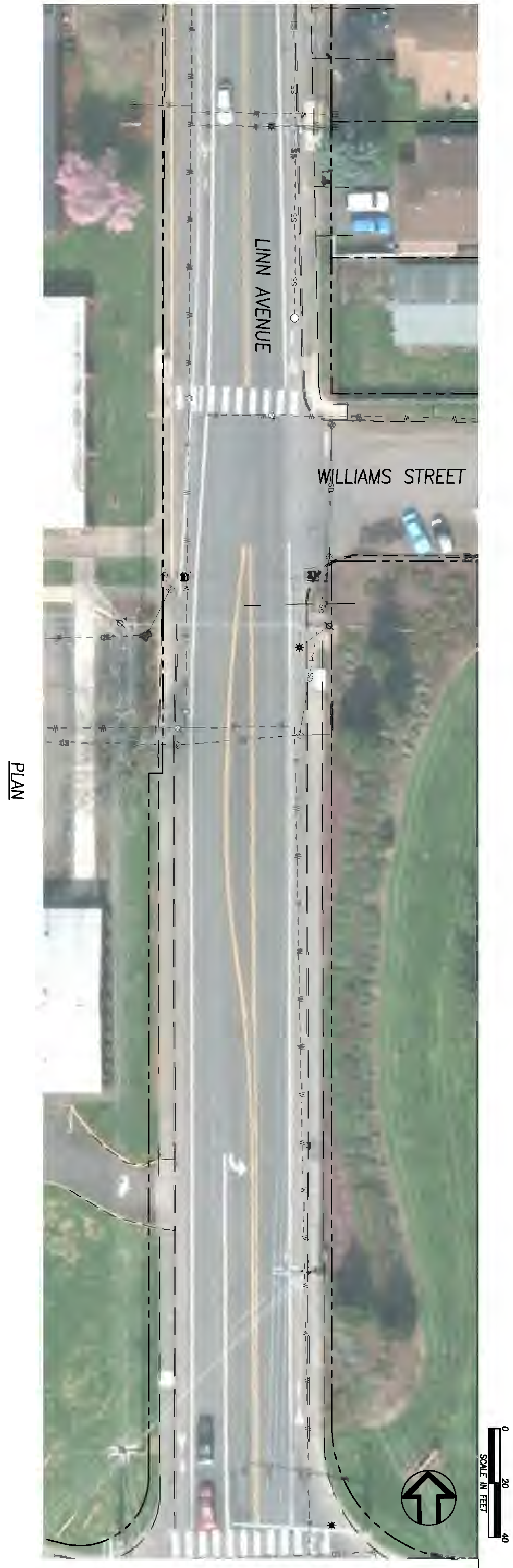
PROJECT NO:	DATE:
1366A	01/2014

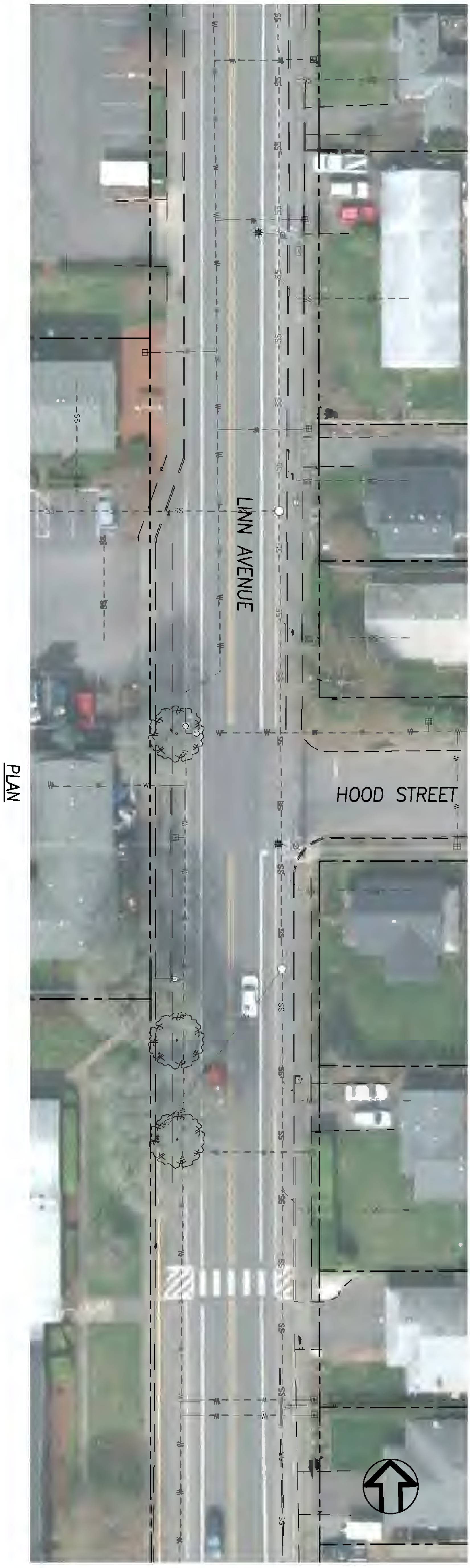
APPENDIX A
PLAN 5

NO.	REVISION	BY	DATE

ONE INCH
0 — 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY:	DB/JW
DRAWN BY:	TS/KJ
REV:	BG





DRAWING NO:
7
7 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO: 1366A
DATE: 01/2014

APPENDIX A
PLAN 6

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN

PLAN

DRAWING NO:

8

8 OF 12

LINN AVENUE, LELAND ROAD AND MEYERS ROAD CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO: 1366A

DATE: 01/2014

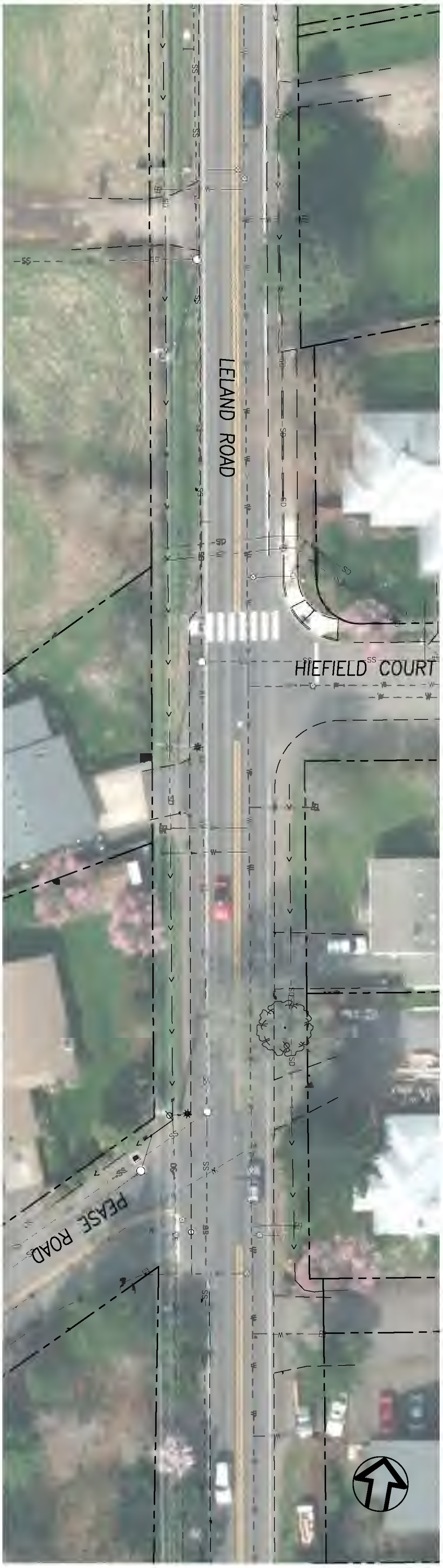
APPENDIX A
PLAN 7

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN



PLAN

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

APPENDIX A
PLAN 8

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO: 1366A
DATE: 01/2014

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

DRAWING NO:
C9
9 OF 12

PLAN

PLAN

DRAWING NO:
10
10 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO:	DATE:
1366A	01/2014

APPENDIX A
PLAN 9

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

DRAWING NO:
11
11 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO: 1366A
DATE: 01/2014

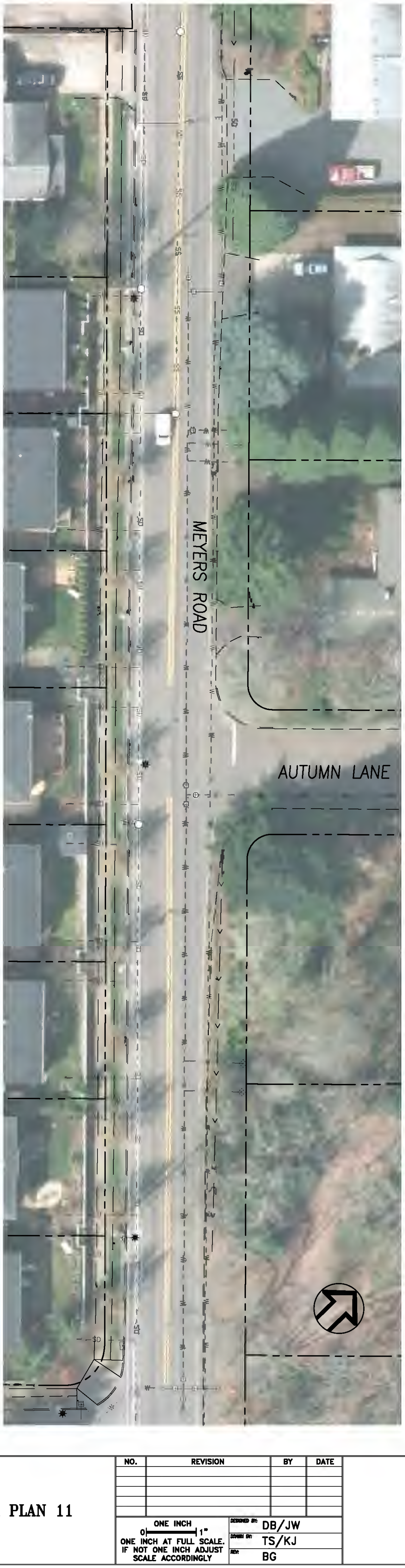
APPENDIX A
PLAN 9

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY: DB/JW
DRAWN BY: TS/KJ
REV: BG

PLAN



PLAN

DRAWING NO:
C12
12 OF 12

LINN AVENUE, LELAND ROAD
AND MEYERS ROAD
CORRIDOR CONCEPT PLAN

wallis engineering
215 W 4th Street, Suite 200
Vancouver, WA 98660
360.695.7041

PROJECT NO:	DATE:
1366A	01/2014

APPENDIX A PLAN 11

NO.	REVISION	BY	DATE

ONE INCH
0 1"
ONE INCH AT FULL SCALE.
IF NOT ONE INCH ADJUST
SCALE ACCORDINGLY

DESIGNED BY:	DB/JW
DRAWN BY:	TS/KJ
REV:	BG

Appendix B

ODOT Historical Crash Data for Corridor

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP ANOTHER VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF-ROAD
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS--RAG	DISREGARDED R-A-G TRAFFIC SIGNAL.
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST CLOTHING NOT VISIBLE
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1TURN	FROM OPPOSITE DIRECTION - ONE TURN, ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	FAILED TO DIM LIGHTS (UNTIL 4/1/97) / INATTENTION (AFTER 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY (DELIBERATELY TRAVELING ON WRONG SIDE)
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAYON RD	STANDING OR LYING IN ROADWAY
073	ELUDING	ELUDING
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVERCORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	PED INV	PEDESTRIAN INVOLVED (NON-PEDESTRIAN ACCIDENT)
005	SUB-PED	“SUB-PED”: PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	BIKE INV	TRICYCLE-BICYCLE INVOLVED
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE (OCCUPANTS ONLY)
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BARS OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING (ON BRIDGE AND APPROACH)
047	BR ABUT	BRIDGE ABUTMENT (APPROACH ENDS)
048	BR COLMN	BRIDGE PILLAR OR COLUMN (EVEN THOUGH STRUCK PROTECTIVE GUARD RAIL FIRST)
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE – TYPE UNKNOWN
053	POLE UTL	POLE – POWER OR TELEPHONE
054	ST LIGHT	POLE – STREET LIGHT ONLY
055	TRF SGNL	POLE – TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE – SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	SPEED BUMP, OTHER BUMP, POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	HOLE	CHUCKHOLE IN ROAD, LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ F MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY OTHER MOVING OR FLYING OBJECT
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTH ACDT	ACCIDENT RELATED TO ANOTHER SEPARATE ACCIDENT
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE (ON PAR OR REPORT)
093	CELL-POL	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL-WTN	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	UNKNOWN TYPE OF FIXED OBJECT
101	OTHER OBJ	OTHER OR UNKNOWN OBJECT, NOT FIXED
104	OUTSIDE V	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS AND/OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS AND/OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR/TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE
125	SHLDR	SHOULDER GAVE WAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

PEDESTRIAN LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
01	PSNGR CAR	PASSENGER CAR, PICKUP, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, MOTOR SCOOTER, OR MOTOR BICYCLE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

CDS380
07/08/2014
OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
CITY OF OREGON CITY, CLACKAMAS COUNTY
LINN AVE and Intersectional Crashes at LINN AVE, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013
Total crash records: 50

```
        S   D
        P   R S W                                                           INT-TYPE                                            SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL       OFFRD  WTHR   CRASH         TRLR QTY      MOVE                         A   S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-         RNDBT  SURF   COLL          OWNER         FROM          PRTC   INJ     G   E LICNS   PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL         DRVWY  LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E   X RES     LOC    ERROR        ACT EVENT        CAUSE
02903   N N N N N 08/17/2010       16     A V DAVIS RD          INTER      CROSS      N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                          07
NONE              TU           0          LINN AVE              N                     UNKNOWN       N      DRY    REAR          PRVTE         N -S                                                           000              00
                  11A                                           06         0                        N      DAY    PDO           PSNGR CAR                   01 DRVR   NONE   17  M  OR-Y           042          000              07
                                                                                                                                                                                     OR<25
                                                                                                                             02 NONE   0      STRGHT
                                                                                                                                PRVTE         N -S                                                           006              00
                                                                                                                                PSNGR CAR                   01 DRVR   NONE   45  M  OR-Y           000          000              00
                                                                                                                                                                                     OR<25
03387   N N N N N 09/14/2011       16     A V DAVIS RD          INTER      CROSS      N             N      CLD    PED        01 NONE   0      TURN-L                                                                          02
CITY              WE           0          LINN AVE              N                     STOP SIGN     N      DRY    PED           PRVTE         W -N                                                           015              00
                  8P                                            05         0                        N      DLIT   INJ           PSNGR CAR                   01 DRVR   NONE   74  F  OR-Y           029          000              02
                                                                                                                                                                                     OR<25

                                                                                                                                              -
                                                                                                                                              STRGHT     01 PED    INJC   23  F          I XWLK 000          034              00
                                                                                                                                              E    W
02813   N N N     08/10/2010       16     A V DAVIS RD          INTER      CROSS      N             N      CLD    ANGL-OTH   01 NONE   0      STRGHT                                                                          02
CITY              TU           0          LINN AVE              CN                    STOP SIGN     N      DRY    TURN          PRVTE         N -S                                                           000              00
                  1P                                            03         0                        N      DAY    PDO           PSNGR CAR                   01 DRVR   NONE   50  M  OR-Y           000          000              00
                                                                                                                                                                                     OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         W -N                                                           015              00
                                                                                                                                PSNGR CAR                   01 DRVR   NONE   76  F  OR-Y           028          000              02
                                                                                                                                                                                     OR<25
00001   N N N     01/01/2011       16     A V DAVIS RD          INTER      CROSS      N             N      CLD    ANGL-OTH   01 NONE   0      STRGHT                                                                          02
NONE              SA           0          LINN AVE              CN                    STOP SIGN     N      DRY    TURN          PRVTE         N -S                                                           000              00
                  2P                                            03         0                        N      DAY    INJ           PSNGR CAR                   01 DRVR   INJC   25  F  OR-Y           000          000              00
                                                                                                                                                                                     OR<25
                                                                                                                             01 NONE   0      STRGHT
                                                                                                                                PRVTE         N -S                                                           000              00
                                                                                                                                PSNGR CAR                   02 PSNG   NO<5   04  F                 000          000              00

                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         W -N                                                           015              00
                                                                                                                                PSNGR CAR                   01 DRVR   NONE   18  M  OR-Y           028          000              02
                                                                                                                                                                                     OR<25
00662   N N N N N 02/18/2009       16     LINN AVE              STRGHT                N             N      CLR    BIKE       01 NONE   0      STRGHT                                                                          02
CITY              WE           100        A V DAVIS RD          S          (NONE)     STOP SIGN     N      DRY    REAR          PRVTE         N -S                                                           000              00
                  5P                                            07                                  N      DAY    INJ           PSNGR CAR                   01 DRVR   NONE   56  F  OR-Y           027          000              02
                                                                           (02)                                                                                                      OR<25

                                                                                                                                              -
                                                                                                                                              STRGHT     01 BIKE   INJA   44  M          ROAD   000          000              00
                                                                                                                                              N    S
04271   Y N N N N 11/15/2010       16     LINN AVE              STRGHT                N             Y      RAIN   FIX OBJ    01 NONE   0      STRGHT                                                             124,062,053  32,01
CITY              MO           203        CHARMAN ST            N          (NONE)     UNKNOWN       N      WET    FIX           PRVTE         S -N                                                           000 124,062,053  00
                  10P                                           07                                  N      DLIT   INJ           PSNGR CAR                   01 DRVR   INJC   19  M  OR-Y           052,047,081  017              32,01
                                                                           (02)                                                                                                      OR<25
00238   Y N N     01/21/2010       16     LINN AVE              GRADE                 N             Y      RAIN   FIX OBJ    01 NONE   0      STRGHT                                                             045          32,30
CITY              TH           100        CHARMAN ST            N          (NONE)     UNKNOWN       N      WET    FIX           PRVTE         S -N                                                           000 045          00
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LINN AVE and Intersectional Crashes at LINN AVE, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 50

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       S   D
       P   R S W                                                   INT-TYPE                                           SPCL USE
       E A U C O DATE      CLASS     CITY STREET         RD CHAR    (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH        TRLR QTY     MOVE                        A   S
SER#   E L G H R DAY       DIST      FIRST STREET        DIRECT       LEGS    TRAF-        RNDBT  SURF   COLL         OWNER        FROM         PRTC   INJ     G   E LICNS  PED
INVEST D C S L K TIME      FROM      SECOND STREET       LOCTN      (#LANES)  CONTL        DRVWY  LIGHT  SVRTY     V# TYPE         TO        P# TYPE   SVRTY   E   X RES    LOC    ERROR      ACT EVENT      CAUSE
                 11A                                     08                                N      DAY    PDO          PSNGR CAR            01 DRVR   NONE   18  M OTH-Y         052,050    017            32,30
                                                                   (02)                                                                                               OR<25
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
95099  Y N N     12/29/2009      16  LINN AVE            GRADE                N            N      SNOW   O-STRGHT  01 NONE   0     STRGHT                                                         013,124    01,10
NO RPT           TU        175       CHARMAN ST          N          (NONE)    UNKNOWN      N      ICE    SS-M         PRVTE        S -N                                                       000                00
                 5P                                      07                                N      DARK   PDO          PSNGR CAR            01 DRVR   NONE   17  M OR-Y          000        000                00
                                                                   (02)                                                                                               OR<25
                                                                                                                   02 UNKN   9     STRGHT
                                                                                                                      PRVTE        N -S                                                       000 013,124        00
                                                                                                                      PSNGR CAR            01 DRVR   NONE   47  F OR-Y          047,080    017                01
                                                                                                                                                                      OR<25
                                                                                                                   03 NONE   0     STOP
                                                                                                                      PRVTE        N -S                                                       022                00
                                                                                                                      PSNGR CAR            01 DRVR   NONE   31  F OR-Y          009        000                10
                                                                                                                                                                      OR<25
                                                                                                                   03 NONE   0     STOP
                                                                                                                      PRVTE        N -S                                                       022                00
                                                                                                                      PSNGR CAR            02 PSNG   NO<5   03  M               000        000                00

                                                                                                                   03 NONE   0     STOP
                                                                                                                      PRVTE        N -S                                                       022                00
                                                                                                                      PSNGR CAR            03 PSNG   NO<5   03  F               000        000                00
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
02679  N N N N N 08/02/2010      16  ELECTRIC AVE        INTER     3-LEG      N            N      CLR    ANGL-OTH  01 NONE   0     STRGHT                                                                        02
CITY             MO        0         LINN AVE            CN                   STOP SIGN    N      DRY    TURN         PRVTE        NE-SW                                                      000                00
                 4P                                      01        0                       N      DAY    INJ          PSNGR CAR            01 DRVR   INJC   20  F OR-Y          000        000                00
                                                                                                                                                                      OR<25
                                                                                                                   01 NONE   0     STRGHT
                                                                                                                      PRVTE        NE-SW                                                      000                00
                                                                                                                      PSNGR CAR            02 PSNG   NO<5   01  F               000        000                00

                                                                                                                   02 NONE   0     TURN-L
                                                                                                                      PRVTE        W -NE                                                      015                00
                                                                                                                      PSNGR CAR            01 DRVR   INJC   20  M OR-Y          028        000                02
                                                                                                                                                                      OR<25
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
03320  N N N     09/06/2013      16  LINN AVE            STRGHT               N            N      CLR    S-1STOP   01 NONE   0     STRGHT                                                         013            07
NO RPT           FR        100       ELECTRIC AVE        SW         (NONE)    UNKNOWN      N      DRY    REAR         PRVTE        NE-SW                                                      001                00
                 3P                                      07                                N      DAY    PDO          PSNGR CAR            01 DRVR   NONE   59  F OR-Y          026        000                07
                                                                   (02)                                                                                               OR<25
                                                                                                                   02 NONE   0     STOP
                                                                                                                      PRVTE        NE-SW                                                      011 013            00
                                                                                                                      PSNGR CAR            01 DRVR   NONE   00  F OR-Y          000        000                00
                                                                                                                                                                      OR<25
                                                                                                                   03 NONE   0     STOP
                                                                                                                      UNKN         NE-SW                                                      022                00
                                                                                                                      UNKNOWN              01 DRVR   NONE   00 Unk UNK          000        000                00
                                                                                                                                                                      UNK
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
03547  N N N N N 09/22/2013      16  LINN AVE            CURVE                N            N      RAIN   O-STRGHT  01 NONE   0     STRGHT                                                                        05
CITY             SU        50        ELECTRIC AVE        SW         (NONE)    NONE         N      WET    SS-M         PRVTE        NE-SW                                                      000                00
                 2P                                      08                                N      DAY    INJ          PSNGR CAR            01 DRVR   INJB   34  M OR-Y          080        000                05
                                                                   (02)                                                                                               OR<25
                                                                                                                   01 NONE   0     STRGHT
```

```
        S   D
        P   R S W                                                        INT-TYPE                                  SPCL USE
        E A U C O DATE        CLASS     CITY STREET          RD CHAR     (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH        TRLR QTY      MOVE                        A  S
SER#    E L G H R DAY         DIST      FIRST STREET         DIRECT         LEGS   TRAF-        RNDBT  SURF   COLL         OWNER         FROM         PRTC   INJ     G  E LICNS  PED
INVEST  D C S L K TIME        FROM      SECOND STREET        LOCTN       (#LANES)  CONTL        DRVWY  LIGHT  SVRTY     V# TYPE          TO         P# TYPE   SVRTY   E  X RES    LOC     ERROR       ACT EVENT       CAUSE
                                                                                                                           PRVTE         NE-SW                                                       000             00
                                                                                                                           PSNGR CAR               02 PSNG   NO<5   04 M                 000         000             00

                                                                                                                        02 NONE   0      STRGHT
                                                                                                                           PRVTE         SW-NE                                                       000             00
                                                                                                                           PSNGR CAR               01 DRVR   INJB   50 M  OR-Y           000         000             00
                                                                                                                                                                          OR<25
02952   N N N N N 08/15/2011       16   LINN AVE             CURVE                 N            N      CLR    O-STRGHT  01 NONE   0      STRGHT                                                                      27,05
CITY              MO          105       ELECTRIC AVE         SW         (NONE)     UNKNOWN      N      DRY    SS-M         PRVTE         SW-NE                                                       000             00
                  8P                                         08                                 N      DUSK   INJ          PSNGR CAR               01 DRVR   INJB   18 F  OR-Y           016,080     038             27,05
                                                                        (02)                                                                                                              OR<25
                                                                                                                        02 NONE   0      STRGHT
                                                                                                                           PRVTE         NE-SW                                                       000             00
                                                                                                                           PSNGR CAR               01 DRVR   INJC   22 F  OR-Y           000         000             00
                                                                                                                                                                          OR<25
00417   Y N N N N 02/01/2010       16   LINN AVE             GRADE                 N            N      RAIN   S-1STOP   01 NONE   0      STRGHT                                                                      01,07
CITY              MO          135       ELECTRIC AVE         NE         (NONE)     NONE         N      WET    REAR         PRVTE         SW-NE                                                       000             00
                  3P                                         07                                 N      DAY    INJ          PSNGR CAR               01 DRVR   INJB   47 M  OR-Y           047,043,026 000             01,07
                                                                        (02)                                                                                                              OR<25
                                                                                                                        01 NONE   0      STRGHT
                                                                                                                           PRVTE         SW-NE                                                       000             00
                                                                                                                           PSNGR CAR               02 PSNG   INJB   12 M                 000         000             00

                                                                                                                        01 NONE   0      STRGHT
                                                                                                                           PRVTE         SW-NE                                                       000             00
                                                                                                                           PSNGR CAR               03 PSNG   INJB   12 M                 000         000             00

                                                                                                                        01 NONE   0      STRGHT
                                                                                                                           PRVTE         SW-NE                                                       000             00
                                                                                                                           PSNGR CAR               04 PSNG   INJB   10 M                 000         000             00

                                                                                                                        02 NONE   0      STOP
                                                                                                                           PRVTE         SW-NE                                                       011             00
                                                                                                                           OTH BUS                 01 DRVR   INJA   50 F  OR-Y           000         000             00
                                                                                                                                                                          OR<25
                                                                                                                        02 NONE   0      STOP
                                                                                                                           PRVTE         SW-NE                                                       011             00
                                                                                                                           OTH BUS                 02 PSNG   INJC   20 M                 000         000             00

                                                                                                                        02 NONE   0      STOP
                                                                                                                           PRVTE         SW-NE                                                       011             00
                                                                                                                           OTH BUS                 03 PSNG   INJC   59 M                 000         000             00

                                                                                                                        02 NONE   0      STOP
                                                                                                                           PRVTE         SW-NE                                                       011             00
                                                                                                                           OTH BUS                 04 PSNG   INJC   18 F                 000         000             00

                                                                                                                        02 NONE   0      STOP
                                                                                                                           PRVTE         SW-NE                                                       011             00
                                                                                                                           OTH BUS                 05 PSNG   INJC   18 M                 000         000             00

03432   Y N N N N 09/18/2011       16   LINN AVE             GRADE                 N            Y      RAIN   FIX OBJ   01 NONE   0      STRGHT                                                          124,079     01
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        S   D
        P   R S W                                                            INT-TYPE                                            SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL       OFFRD  WTHR    CRASH         TRLR QTY      MOVE                         A  S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-         RNDBT  SURF    COLL          OWNER         FROM          PRTC   INJ     G  E  LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL         DRVWY  LIGHT   SVRTY      V# TYPE          TO        P# TYPE   SVRTY   E  X  RES    LOC     ERROR       ACT  EVENT        CAUSE
CITY              SU           184        ELECTRIC AVE          SW         (NONE)     UNKNOWN       N      WET     FIX           PRVTE         SW-NE                                                        000  124,079      00
                  9A                                            07                                  N      DAY     INJ           PSNGR CAR                 01 DRVR   INJB   29 M   SUSP           047,080,081 017               01
                                                                           (02)                                                                                                   OR<25
                                                                                                                              01 NONE   0      STRGHT
                                                                                                                                 PRVTE         SW-NE                                                        000  124,079      00
                                                                                                                                 PSNGR CAR                 02 PSNG   INJB   30 F                  000         000               00

                                                                                                                              01 NONE   0      STRGHT
                                                                                                                                 PRVTE         SW-NE                                                        000  124,079      00
                                                                                                                                 PSNGR CAR                 03 PSNG   INJB   24 F                  000         000               00

03271   N N N     09/23/2009       16     LINN AVE              ALLEY                 N             N      CLR     ANGL-OTH   01 NONE   0      STRGHT                                                                          02
NO RPT            WE           170        ELLA ST               S          (NONE)     UNKNOWN       N      DRY     TURN          PRVTE         S -N                                                         000               00
                  11A                                           02                                  N      DAY     INJ           PSNGR CAR                 01 DRVR   NONE   37 M   OR-Y           000         000               00
                                                                           (02)                                                                                                   OR<25
                                                                                                                              01 NONE   0      STRGHT
                                                                                                                                 PRVTE         S -N                                                         000               00
                                                                                                                                 PSNGR CAR                 02 PSNG   INJC   04 F                  000         000               00

                                                                                                                              02 NONE   0      TURN-L
                                                                                                                                 PRVTE         W -N                                                         018               00
                                                                                                                                 PSNGR CAR                 01 DRVR   NONE   50 F   OR-Y           028         000               02
                                                                                                                                                                                  OR<25

00968   N N N Y   03/23/2010       16     ETHEL ST              INTER      CROSS      N             N      CLR     BIKE                                                                                              110          02
COUNTY            TU           0          LINN AVE              W                     NONE          N      DRY     ANGL                        -
                  7A                                            05         0                        N      DAY     INJ                         STRGHT     01 BIKE   INJC   65 M          I INRD  028         034               02
                                                                                                                                               N    S
                                                                                                                              01 NONE   0      STRGHT
                                                                                                                                 PRVTE         E -W                                                         015               00
                                                                                                                                 PSNGR CAR                 01 DRVR   NONE   45 F   OR-Y           000         000               00
                                                                                                                                                                                  OR<25

00999   N N N     03/16/2009       16     ETHEL ST              INTER      CROSS      N             N      RAIN    ANGL-OTH   01 NONE   0      STRGHT                                                                          02
NONE              MO           0          LINN AVE              CN                    STOP SIGN     N      WET     ANGL          PRVTE         S -N                                                         000               00
                  9P                                            04         0                        N      DLIT    PDO           PSNGR CAR                 01 DRVR   NONE   00 F   OR-Y           028         000               02
                                                                                                                                                                                  OR<25
                                                                                                                              02 NONE   0      STRGHT
                                                                                                                                 PRVTE         W -E                                                         000               00
                                                                                                                                 PSNGR CAR                 01 DRVR   NONE   81 M   OR-Y           000         000               00
                                                                                                                                                                                  OR<25

02003   N N N N N 05/31/2009       16     ETHEL ST              INTER      CROSS      N             N      CLR     ANGL-OTH   01 NONE   0      STRGHT                                                                          04
CITY              SU           0          LINN AVE              CN                    TRF SIGNAL    N      DRY     ANGL          PRVTE         W -E                                                         000               00
                  2P                                            04         0                        N      DAY     INJ           PSNGR CAR                 01 DRVR   INJC   61 F   OR-Y           020         000               04
                                                                                                                                                                                  OR<25
                                                                                                                              02 NONE   0      STRGHT
                                                                                                                                 PRVTE         S -N                                                         000               00
                                                                                                                                 PSNGR CAR                 01 DRVR   NONE   18 M   OR-Y           000         000               00
                                                                                                                                                                                  OR<25

00764   N N N N N 03/04/2011       16     ETHEL ST              INTER      CROSS      N             N      CLR     ANGL-OTH   01 NONE   0      STRGHT                                                                          02
CITY              FR           0          LINN AVE              CN                    STOP SIGN     N      DRY     TURN          PRVTE         N -S                                                         000               00
                  12P                                           03         0                        N      DAY     INJ           PSNGR CAR                 01 DRVR   NONE   41 M   OR-Y           000         000               00
                                                                                                                                                                                  OR<25
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       S   D
       P   R S W                                                     INT-TYPE                                        SPCL USE
       E A U C O DATE       CLASS     CITY STREET         RD CHAR    (MEDIAN) INT-REL     OFFRD  WTHR   CRASH        TRLR QTY    MOVE                      A   S
SER#   E L G H R DAY        DIST      FIRST STREET        DIRECT       LEGS   TRAF-       RNDBT  SURF   COLL         OWNER       FROM         PRTC  INJ    G   E LICNS  PED
INVEST D C S L K TIME       FROM      SECOND STREET       LOCTN      (#LANES) CONTL       DRVWY  LIGHT  SVRTY     V# TYPE        TO        P# TYPE  SVRTY  E   X RES    LOC    ERROR      ACT EVENT      CAUSE
                                                                                                                  02 NONE  0     TURN-L
                                                                                                                     PRVTE       E -S                                                     015            00
                                                                                                                     PSNGR CAR             01 DRVR  INJC  53  M  OR-Y          028        000            02
                                                                                                                                                                 OR<25
04953  N N N     12/24/2011     16   ETHEL ST            INTER     CROSS     N           N      CLR    ANGL-OTH  01 NONE  0     STRGHT                                                                  02
NO RPT           SA         0         LINN AVE            CN                  STOP SIGN   N      DRY    ANGL         PRVTE       S -N                                                     000            00
                 11A                                      02        0                     N      DAY    INJ          PSNGR CAR             01 DRVR  INJC  51  F  OR-Y          000        000            00
                                                                                                                                                                 OR<25
                                                                                                                  02 NONE  0     STRGHT
                                                                                                                     PRVTE       E -W                                                     015            00
                                                                                                                     PSNGR CAR             01 DRVR  NONE  66  F  OR-Y          028        000            02
                                                                                                                                                                 OR<25
03810  N N N     10/07/2013     16   ETHEL ST            INTER     3-LEG     N           N      CLD    ANGL-OTH  01 NONE  0     TURN-L                                                                  02
NONE             MO         0         LINN AVE            CN                  STOP SIGN   N      DRY    TURN         PRVTE       E -S                                                     015            00
                 4P                                       03        0                     N      DAY    PDO          PSNGR CAR             01 DRVR  NONE  52  F  OR-Y          028        000            02
                                                                                                                                                                 OR<25
                                                                                                                  02 NONE  0     STRGHT
                                                                                                                     PRVTE       N -S                                                     000            00
                                                                                                                     PSNGR CAR             01 DRVR  NONE  61  M  OR-Y          000        000            00
                                                                                                                                                                 OR<25
02462  N N N     07/09/2013     16   LINN AVE            STRGHT              N           N      CLR    S-1STOP   01 NONE  0     STRGHT                                                                  07
NONE             TU         50        HAZEL ST            SW         (NONE)   UNKNOWN     N      DRY    REAR         PRVTE       NE-SW                                                    000            00
                 9A                                       07                              N      DAY    PDO          PSNGR CAR             01 DRVR  NONE  18  F  OR-Y          026        000            07
                                                                     (02)                                                                                        OR<25
                                                                                                                  02 NONE  0     STOP
                                                                                                                     PRVTE       NE-SW                                                    011            00
                                                                                                                     PSNGR CAR             01 DRVR  NONE  61  M  OR-Y          000        000            00
                                                                                                                                                                 OR<25
00098  N N N N N 01/06/2009     16   HOLMES LN           INTER     CROSS     N           N      RAIN   S-1STOP   01 NONE  0     STRGHT                                                                  07
CITY             TU         0         LINN AVE            N                   FLASHBCN-R  N      WET    REAR         UNKN        N -S                                                     000            00
                 9P                                       06        0                     N      DLIT   INJ          PSNGR CAR             01 DRVR  NONE  00 Unk UNK           026        000            07
                                                                                                                                                                 UNK
                                                                                                                  02 NONE  0     STOP
                                                                                                                     PRVTE       N -S                                                     011            00
                                                                                                                     PSNGR CAR             01 DRVR  INJC  16  F  OR-Y          000        000            00
                                                                                                                                                                 OR<25
01218  N N N     04/11/2011     16   HOLMES LN           INTER     CROSS     N           N      CLD    S-1STOP   01 NONE  0     STRGHT                                                                  07
NONE             MO         0         LINN AVE            N                   FLASHBCN-R  N      WET    REAR         PRVTE       N -S                                                     000            00
                 3P                                       06        0                     N      DAY    INJ          PSNGR CAR             01 DRVR  NONE  32  M  OR-Y          026        000            07
                                                                                                                                                                 OR<25
                                                                                                                  02 NONE  0     STOP
                                                                                                                     PRVTE       N -S                                                     011            00
                                                                                                                     PSNGR CAR             01 DRVR  INJC  36  F  OR-Y          000        000            00
                                                                                                                                                                 OR<25
                                                                                                                  02 NONE  0     STOP
                                                                                                                     PRVTE       N -S                                                     011            00
                                                                                                                     PSNGR CAR             02 PSNG  INJC  17  F                000        000            00

                                                                                                                  02 NONE  0     STOP
                                                                                                                     PRVTE       N -S                                                     011            00
                                                                                                                     PSNGR CAR             03 PSNG  NO<5  02  M                000        000            00
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        S   D
        P   R S W                                                     INT-TYPE                                     SPCL USE
        E A U C O DATE        CLASS      CITY STREET          RD CHAR      (MEDIAN)  INT-REL      OFFRD  WTHR  CRASH       TRLR QTY       MOVE                               A   S
SER#    E L G H R DAY         DIST       FIRST STREET         DIRECT          LEGS   TRAF-        RNDBT  SURF  COLL        OWNER          FROM         PRTC   INJ        G   E  LICNS   PED
INVEST  D C S L K TIME        FROM       SECOND STREET        LOCTN        (#LANES)  CONTL        DRVWY  LIGHT SVRTY    V# TYPE           TO        P# TYPE   SVRTY      E   X  RES     LOC     ERROR        ACT  EVENT        CAUSE

                                                                                                                        02 NONE   0       STOP
                                                                                                                           PRVTE          N -S                                                             011              00
                                                                                                                           PSNGR CAR                04 PSNG   NO<5    02   M                  000          000              00

02519   N N N     07/14/2013    16       HOLMES LN            INTER        CROSS     N            N      CLR   S-1STOP  01 NONE   0       STRGHT                                                                            07
NONE              SU          0          LINN AVE             S                      STOP SIGN    N      DRY   REAR        PRVTE          S -N                                                             000              00
                  10A                                         06           0                      N      DAY   INJ         PSNGR CAR                01 DRVR   NONE    21   M  OR-Y            026          000              07
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STOP
                                                                                                                           PRVTE          S -N                                                             011              00
                                                                                                                           PSNGR CAR                01 DRVR   INJC    54   F  OR-Y            000          000              00
                                                                                                                                                                              OR<25

02353   N N N     07/08/2010    16       HOLMES LN            INTER        CROSS     N            N      CLR   ANGL-OTH 01 NONE   0       STRGHT                                                                            02
NONE              TH          0          LINN AVE             CN                     STOP SIGN    N      DRY   ANGL        PRVTE          W -E                                                             015              00
                  12P                                         04           0                      N      DAY   INJ         PSNGR CAR                01 DRVR   INJC    32   F  OR-Y            028          000              02
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STRGHT
                                                                                                                           PRVTE          S -N                                                             015              00
                                                                                                                           PSNGR CAR                01 DRVR   NONE    58   M  OR-Y            000          000              00
                                                                                                                                                                              OR<25

00562   N N N     02/12/2012    16       HOLMES LN            INTER        CROSS     N            N      CLR   ANGL-OTH 01 NONE   0       STRGHT                                                                            02
CITY              SU          0          LINN AVE             CN                     FLASHBCN-R   N      DRY   ANGL        PRVTE          W -E                                                             015              00
                  1P                                          04           0                      N      DAY   INJ         PSNGR CAR                01 DRVR   NONE    44   F  OR-Y            028          000              02
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STRGHT
                                                                                                                           PRVTE          S -N                                                             015              00
                                                                                                                           PSNGR CAR                01 DRVR   NONE    55   M  OR-Y            000          000              00
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STRGHT
                                                                                                                           PRVTE          S -N                                                             015              00
                                                                                                                           PSNGR CAR                02 PSNG   INJC    55   F                  000          000              00

01311   N N N N N 04/08/2012    16       HOLMES LN            INTER        CROSS     N            N      CLR   ANGL-OTH 01 NONE   0       STRGHT                                                                            03
CITY              SU          0          LINN AVE             CN                     STOP SIGN    N      DRY   ANGL        PRVTE          E -W                                                             000              00
                  12P                                         02           0                      N      DAY   INJ         PSNGR CAR                01 DRVR   NONE    74   M  OR-Y            021          000              03
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STRGHT
                                                                                                                           PRVTE          S -N                                                             015              00
                                                                                                                           PSNGR CAR                01 DRVR   INJC    27   F  OTH-Y           000          000              00
                                                                                                                                                                              OR<25

04084   N N N     10/30/2012    16       HOLMES LN            INTER        CROSS     N            N      RAIN  ANGL-OTH 01 NONE   0       STRGHT                                                                            02
NONE              TU          0          LINN AVE             CN                     STOP SIGN    N      WET   ANGL        PRVTE          S -N                                                             015              00
                  9A                                          04           0                      N      DAY   PDO         PSNGR CAR                01 DRVR   NONE    79   M  OR-Y            028          000              02
                                                                                                                                                                              OR<25
                                                                                                                        02 NONE   0       STRGHT
                                                                                                                           PRVTE          W -E                                                             015              00
                                                                                                                           PSNGR CAR                01 DRVR   NONE    43   F  OR-Y            000          000              00
                                                                                                                                                                              OR<25

01919   N N N     06/01/2013    16       HOLMES LN            INTER        CROSS     N            N      CLR   ANGL-OTH 01 NONE   0       TURN-R                                                                082          06,02
NONE              SA          0          LINN AVE             CN                     STOP SIGN    N      DRY   TURN        PRVTE          N -W                                                             015              00
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        S   D
        P   R S W                                                      INT-TYPE                                      SPCL USE
        E A U C O DATE        CLASS     CITY STREET         RD CHAR    (MEDIAN) INT-REL     OFFRD  WTHR   CRASH       TRLR QTY     MOVE                     A   S
SER#    E L G H R DAY         DIST      FIRST STREET        DIRECT       LEGS   TRAF-       RNDBT  SURF   COLL        OWNER        FROM        PRTC  INJ    G   E  LICNS  PED
INVEST  D C S L K TIME        FROM      SECOND STREET       LOCTN     (#LANES)  CONTL       DRVWY  LIGHT  SVRTY    V# TYPE         TO       P# TYPE  SVRTY  E   X  RES    LOC     ERROR      ACT EVENT     CAUSE
                  2P                                        01        0                     N      DAY    PDO         PSNGR CAR             01 DRVR  NONE  48  M   OR-Y          031,028    000 082       06,02
                                                                                                                                                                   OR<25
                                                                                                                   02 NONE   0     STRGHT
                                                                                                                      PRVTE        E -W                                                          015           00
                                                                                                                      PSNGR CAR             01 DRVR  NONE  71  M   OR-Y          000        000 082       00
                                                                                                                                                                   OR<25
03324   N N N     09/04/2009      16    LINN AVE            STRGHT              N           N      CLR    O-STRGHT 01 NONE   0     STRGHT                                                                      13
NONE              FR          1010      HOLMES LN           UN        (NONE)    UNKNOWN     N      DRY    SS-M        PRVTE        N -S                                                          000           00
                  5A                                        05                              N      DAWN   INJ         PSNGR CAR             01 DRVR  NONE  19  M   OR-Y          045        025           13
                                                                      (02)                                                                                         OR<25
                                                                                                                   02 NONE   0     STRGHT
                                                                                                                      PRVTE        S -N                                                          000           00
                                                                                                                      PSNGR CAR             01 DRVR  INJC  33  F   OR-Y          000        000           00
                                                                                                                                                                   OR<25
03206   N N N     08/30/2011      16    HOOD ST             INTER     3-LEG     N           N      CLR    S-1STOP  01 NONE   0     STRGHT                                                                      07
NONE              TU          0         LINN AVE            N                   UNKNOWN     N      DRY    REAR        PRVTE        N -S                                                          000           00
                  12P                                       06        0                     N      DAY    PDO         PSNGR CAR             01 DRVR  NONE  50  F   OR-Y          026        000           07
                                                                                                                                                                   OR<25
                                                                                                                   02 NONE   0     STOP
                                                                                                                      UNKN         N -S                                                          011           00
                                                                                                                      PSNGR CAR             01 DRVR  NONE  00  M   UNK           000        000           00
                                                                                                                                                                   UNK
03299   N N N     09/05/2013      16    HOOD ST             INTER     3-LEG     N           N      RAIN   ANGL-OTH 01 NONE   0     STRGHT                                                                      02
NONE              TH          0         LINN AVE            CN                  STOP SIGN   N      WET    TURN        PRVTE        S -N                                                          000           00
                  3P                                        02        0                     N      DAY    PDO         PSNGR CAR             01 DRVR  NONE  56  F   OR-Y          000        000           00
                                                                                                                                                                   OR<25
                                                                                                                   02 NONE   0     TURN-L
                                                                                                                      PRVTE        E -S                                                          015           00
                                                                                                                      PSNGR CAR             01 DRVR  NONE  00  M   UNK           028        000           02
                                                                                                                                                                   OR<25
04648   N N N     12/03/2012      16    LINN AVE            GRADE               N           Y      RAIN   FIX OBJ  01 NONE   0     STRGHT                                                                072,010     05,33
NO RPT            MO          146       OAK ST              NE        (NONE)    UNKNOWN     N      WET    FIX         PRVTE        NE-SW                                                         000 072,010   00
                  10P                                       07                              N      DLIT   INJ         PSNGR CAR             01 DRVR  INJC  26  F   OR-Y          081,051    000           05,33
                                                                      (02)                                                                                         OR<25
                                                                                                                   02 NONE   0     PRKD-P
                                                                                                                      PRVTE        SE-NW                                                         009           00
                                                                                                                      PSNGR CAR

                                                                                                                   03 NONE   0     PRKD-P
                                                                                                                      PRVTE        SE-NW                                                         009           00
                                                                                                                      PSNGR CAR

00353   N N N     01/29/2013      16    LINN AVE            INTER     3-LEG     N           N      RAIN   S-1STOP  01 NONE   0     STRGHT                                                                      07
NONE              TU          0         PARK DR             S                   UNKNOWN     N      WET    REAR        PRVTE        S -N                                                          000           00
                  4P                                        06        0                     N      DUSK   PDO         PSNGR CAR             01 DRVR  NONE  38  M   OTH-Y         026        000           07
                                                                                                                                                                   N-RES
                                                                                                                   02 NONE   0     STOP
                                                                                                                      PRVTE        S -N                                                          012           00
                                                                                                                      PSNGR CAR             01 DRVR  NONE  52  F   OR-Y          000        000           00
                                                                                                                                                                   OR<25
04192   Y N N     09/05/2009      16    LINN AVE            STRGHT              N           Y      RAIN   FIX OBJ  01 NONE   0     STRGHT                                                                053         01
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CITY OF OREGON CITY, CLACKAMAS COUNTY

LINN AVE and Intersectional Crashes at LINN AVE, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 50

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        S   D
        P   R S W                                                           INT-TYPE                                            SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL       OFFRD  WTHR   CRASH         TRLR QTY      MOVE                             A   S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-         RNDBT  SURF   COLL          OWNER         FROM          PRTC   INJ     G   E LICNS   PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL         DRVWY  LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E   X RES     LOC    ERROR        ACT EVENT    CAUSE
NONE              SA           100        PEARL ST              SW         (NONE)     UNKNOWN       N      WET    FIX           PRVTE         SW-NE                                                                      000 053      00
                  2A                                            01                                  N      DLIT   PDO           PSNGR CAR                  01 DRVR   NONE  22   F  OR-Y           047          017          01
                                                                           (02)                                                                                                                  OR<25
01698   N N N     05/16/2013       16     LINN AVE              GRADE                 N             N      RAIN   S-1STOP    01 NONE   0      STRGHT                                                                                  10
NONE              TH           100        PEARL ST              SW         (NONE)     UNKNOWN       N      WET    REAR          PRVTE         SW-NE                                                                      001          00
                  3P                                            08                                  N      DAY    PDO           PSNGR CAR                  01 DRVR   NONE  23   M  OR-Y           026          000          10
                                                                           (02)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SW-NE                                                                      011          00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE  65   F  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
04694   Y N N     12/05/2011       16     LINN AVE              INTER      CROSS      N             N      FOG    ANGL-STP   01 NONE   0      TURN-R                                                                         124      01,08
NONE              MO           0          WARNER-MILNE RD       N                     TRF SIGNAL    N      ICE    TURN          PRVTE         E -N                                                                       000 124      00
                  7A                                            05         0                        N      DAWN   PDO           PSNGR CAR                  01 DRVR   NONE  16   F  OR-Y           047,001      017          01,08
                                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         N -S                                                                       011          00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE  00   M  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
00711   N N N     02/27/2011       16     LINN AVE              INTER      CROSS      N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                                  06
NONE              SU           0          WARNER-MILNE RD       E                     TRF SIGNAL    N      DRY    SS-O          PRVTE         E -W                                                                       007          00
                  12P                                           06         0                        N      DAY    PDO           PSNGR CAR                  01 DRVR   NONE  27   M  OR-Y           031          000          06
                                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         E -W                                                                       011          00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE  49   F  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
03858   N N N N N 10/14/2011       16     LINN AVE              INTER      CROSS      N             N      CLD    O-1TURN    01 NONE   0      STRGHT                                                                                  08,02
CITY              FR           0          WARNER-MILNE RD       CN                    TRF SIGNAL    N      DRY    TURN          PRVTE         E -W                                                                       000          00
                  11A                                           02         0                        N      DAY    INJ           PSNGR CAR                  01 DRVR   INJC  17   F  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         W -N                                                                       000          00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE  16   F  OR-Y           006,028      000          08,02
                                                                                                                                                                                                 OR<25
02537   N N N     07/21/2010       16     LINN AVE              STRGHT                Y             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                                  07
NONE              WE           20         WARNER-MILNE RD       N          (NONE)     TRF SIGNAL    N      DRY    REAR          PRVTE         N -S                                                                       000          00
                  3P                                            06                                  N      DAY    INJ           PSNGR CAR                  01 DRVR   NONE  00 Unk UNK            026          000          07
                                                                           (02)                                                                                                                  UNK
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         N -S                                                                       011          00
                                                                                                                                PSNGR CAR                  01 DRVR   INJC  73   F  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
01973   N N N     05/30/2012       16     LINN AVE              STRGHT                N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                                  07
NO RPT            WE           95         WARNER-MILNE RD       N          (NONE)     UNKNOWN       N      DRY    REAR          PRVTE         N -S                                                                       000          00
                  3P                                            08                                  N      DAY    INJ           PSNGR CAR                  01 DRVR   NONE  00   F  OR-Y           026          000          07
                                                                           (02)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         N -S                                                                       011          00
                                                                                                                                PSNGR CAR                  01 DRVR   INJC  35   F  OR-Y           000          000          00
                                                                                                                                                                                                 OR<25
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```
        S   D
        P   R S W                                                         INT-TYPE                                          SPCL USE
        E A U C O DATE        CLASS      CITY STREET          RD CHAR      (MEDIAN) INT-REL      OFFRD  WTHR   CRASH         TRLR QTY     MOVE                        A   S
SER#    E L G H R DAY         DIST       FIRST STREET         DIRECT          LEGS   TRAF-        RNDBT  SURF   COLL          OWNER        FROM          PRTC  INJ     G   E  LICNS  PED
INVEST  D C S L K TIME        FROM       SECOND STREET        LOCTN        (#LANES) CONTL        DRVWY  LIGHT  SVRTY      V# TYPE         TO         P# TYPE  SVRTY   E   X  RES    LOC    ERROR       ACT EVENT        CAUSE
02866   N N N     08/04/2012      16     LINN AVE             STRGHT               N            N      CLR    S-1STOP    01 NONE   0     STRGHT                                                                         07
NONE              SA          100        WARNER-MILNE RD      N         (NONE)     UNKNOWN      N      DRY    REAR          UNKN         S -N                                                           000           00
                  12P                                         07                                N      DAY    PDO           PSNGR CAR               01 DRVR  NONE  00  M   OR-Y          026          000           07
                                                                        (02)                                                                                                       UNK
                                                                                                                         02 NONE   0     STOP
                                                                                                                            PRVTE        S -N                                                           011           00
                                                                                                                            PSNGR CAR               01 DRVR  NONE  64  F   OR-Y          000          000           00
                                                                                                                                                                                   OR<25
00639   N N N     02/23/2010      16     LINN AVE             INTER     CROSS      N            N      RAIN   ANGL-OTH   01 NONE   0     STRGHT                                                                         04
NONE              TU          0          WARNER-PARROTT RD    CN                   TRF SIGNAL   N      WET    ANGL          PRVTE        N -S                                                           000           00
                  11A                                         01        3                       N      DAY    INJ           PSNGR CAR               01 DRVR  INJC  56  M   OR-Y          020          000           04
                                                                                                                                                                                   OR<25
                                                                                                                         02 NONE   0     STRGHT
                                                                                                                            PRVTE        E -W                                                           000           00
                                                                                                                            PSNGR CAR               01 DRVR  INJC  24  F   OR-Y          000          000           00
                                                                                                                                                                                   OR<25
                                                                                                                         02 NONE   0     STRGHT
                                                                                                                            PRVTE        E -W                                                           000           00
                                                                                                                            PSNGR CAR               02 PSNG  NO<5  03  F                 000          000           00

02394   N N N     07/07/2010      16     LINN AVE             INTER     3-LEG      N            N      CLR    S-1STOP    01 NONE   0     STRGHT                                                                         07
NONE              WE          0          WILLIAMS ST          N                    UNKNOWN      N      DRY    REAR          PRVTE        N -S                                                           000           00
                  4P                                          06        0                       N      DAY    PDO           PSNGR CAR               01 DRVR  NONE  00  M   UNK           026          000           07
                                                                                                                                                                                   OR<25
                                                                                                                         02 NONE   0     STOP
                                                                                                                            PRVTE        N -S                                                           012           00
                                                                                                                            PSNGR CAR               01 DRVR  NONE  41  F   OR-Y          000          000           00
                                                                                                                                                                                   OR<25
02198   N N N N N 06/19/2012      16     LINN AVE             STRGHT               N            N      CLR    O-STRGHT   01 NONE   0     STRGHT                                                                         05,27
CITY              TU          70         3RD ST               SW        (NONE)     UNKNOWN      N      DRY    SS-M          PRVTE        NE-SW                                                          000           00
                  2P                                          07                                N      DAY    INJ           PSNGR CAR               01 DRVR  NONE  17  M   OR-Y          016,080      038           05,27
                                                                        (02)                                                                                                       OR<25
                                                                                                                         02 NONE   0     STRGHT
                                                                                                                            PRVTE        SW-NE                                                          000           00
                                                                                                                            PSNGR CAR               01 DRVR  INJB  76  F   OR-Y          000          000           00
                                                                                                                                                                                   OR<25
04080   Y N N N N 10/30/2012      16     LINN AVE             STRGHT               N            Y      RAIN   FIX OBJ    01 NONE   0     STRGHT                                                             088           01
CITY              TU          110        3RD ST               SW        (NONE)     NONE         N      WET    FIX           PRVTE        NE-SW                                                          000 088       00
                  6P                                          08                                N      DLIT   PDO           PSNGR CAR               01 DRVR  NONE  16  M   OR-Y          028,080      000           01
                                                                        (02)                                                                                                       OR<25
00002   N Y N N N 01/01/2012      16     LINN AVE             CURVE                N            N      CLD    O-STRGHT   01 NONE   0     STRGHT                                                                         05
CITY              SU          72         3RD ST               NE        (NONE)     UNKNOWN      N      DRY    SS-M          PRVTE        NE-SW                                                          000           00
                  1P                                          07                                N      DAY    INJ           PSNGR CAR               01 DRVR  NONE  28  M   SUSP          080          000           05
                                                                        (02)                                                                                                       OR<25
                                                                                                                         02 NONE   0     STRGHT
                                                                                                                            PRVTE        SW-NE                                                          000           00
                                                                                                                            PSNGR CAR               01 DRVR  INJB  52  F   OR-Y          000          000           00
                                                                                                                                                                                   OR<25
                                                                                                                         02 NONE   0     STRGHT
                                                                                                                            PRVTE        SW-NE                                                          000           00
                                                                                                                            PSNGR CAR               02 PSNG  INJC  15  M                 000          000           00
```

LINN AVE and Intersectional Crashes at LINN AVE, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 50

```
        S   D
        P   R S W                                                 INT-TYPE                                          SPCL USE
        E A U C O DATE      CLASS     CITY STREET        RD CHAR    (MEDIAN)  INT-REL     OFFRD  WTHR   CRASH       TRLR QTY      MOVE                        A   S
SER#    E L G H R DAY       DIST      FIRST STREET       DIRECT       LEGS    TRAF-       RNDBT  SURF   COLL        OWNER         FROM          PRTC  INJ     G   E LICNS  PED
INVEST  D C S L K TIME      FROM      SECOND STREET      LOCTN      (#LANES)  CONTL       DRVWY  LIGHT  SVRTY    V# TYPE          TO         P# TYPE  SVRTY   E   X RES    LOC    ERROR       ACT EVENT       CAUSE

04037   Y N N     10/27/2012      16  LINN AVE           CURVE              N           Y      RAIN   FIX OBJ  01 NONE   0      STRGHT                                                           079,010     01
CITY              SA        95        3RD ST             NE        (NONE)   UNKNOWN     N      WET    FIX         PRVTE         SW-NE                                                        000 079,010     00
                  1P                                     07                             N      DAY    INJ         PSNGR CAR                  01 DRVR  INJB    29  M OR-Y          047,080     017             01
                                                                   (02)                                                                                           OR<25
                                                                                                               01 NONE   0      STRGHT
                                                                                                                  PRVTE         SW-NE                                                        000 079,010     00
                                                                                                                  PSNGR CAR                  02 PSNG  INJB    24  M               000         000             00

                                                                                                               01 NONE   0      STRGHT
                                                                                                                  PRVTE         SW-NE                                                        000 079,010     00
                                                                                                                  PSNGR CAR                  03 PSNG  INJB    22  M               000         000             00

02595   N N N N N 07/19/2013      16  LINN AVE           STRGHT             N           N      CLR    O-STRGHT 01 NONE   0      STRGHT                                                                       33,16
CITY              FR        100       4TH ST             N         (NONE)   UNKNOWN     N      DRY    SS-M        PRVTE         N -S                                                         000             00
                  10P                                    08                             N      DLIT   PDO         PSNGR CAR                  01 DRVR  NONE    48  M OR-Y          080,051     025             33,16
                                                                   (02)                                                                                           OR<25
                                                                                                               02 NONE   0      STRGHT
                                                                                                                  PRVTE         S -N                                                         000             00
                                                                                                                  PSNGR CAR                  01 DRVR  NONE    61  M OR-Y          000         000             00
                                                                                                                                                                  OR<25
```

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

CITY OF OREGON CITY, CLACKAMAS COUNTY

WARNER-PARROTT RD at LINN AVE, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 1

```
       S   D
       P   R S W                                                    INT-TYPE                                       SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR    (MEDIAN) INT-REL     OFFRD  WTHR  CRASH        TRLR QTY    MOVE                      A  S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT         LEGS TRAF-       RNDBT  SURF  COLL         OWNER       FROM         PRTC  INJ    G  E  LICNS  PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN      (#LANES) CONTL       DRVWY  LIGHT SVRTY     V# TYPE        TO        P# TYPE  SVRTY  E  X  RES    LOC   ERROR      ACT EVENT      CAUSE
00639  N N N     02/23/2010    16     LINN AVE           INTER     CROSS     N           N      RAIN  ANGL-OTH  01 NONE  0     STRGHT                                                                 04
NONE             TU         0         WARNER-PARROTT RD  CN                  TRF SIGNAL  N      WET   ANGL         PRVTE       N -S                                                    000            00
                 11A                                     01        3                     N      DAY   INJ          PSNGR CAR             01 DRVR  INJC  56 M   OR-Y         020        000            04
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STRGHT
                                                                                                                   PRVTE       E -W                                                    000            00
                                                                                                                   PSNGR CAR             01 DRVR  INJC  24 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STRGHT
                                                                                                                   PRVTE       E -W                                                    000            00
                                                                                                                   PSNGR CAR             02 PSNG  NO<5  03 F                000        000            00
```

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

CITY OF OREGON CITY, CLACKAMAS COUNTY

LINN AVE and WARNER-MILNE RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 6

```
        S    D
        P    R S W                                                INT-TYPE                                            SPCL USE
        E A U C O DATE        CLASS      CITY STREET          RD CHAR    (MEDIAN) INT-REL      OFFRD  WTHR   CRASH       TRLR QTY      MOVE                       A   S
SER#    E L G H R DAY         DIST       FIRST STREET         DIRECT       LEGS   TRAF-        RNDBT  SURF   COLL        OWNER         FROM          PRTC   INJ    G   E  LICNS   PED
INVEST  D C S L K TIME        FROM       SECOND STREET        LOCTN     (#LANES)  CONTL        DRVWY  LIGHT  SVRTY    V# TYPE          TO         P# TYPE   SVRTY  E   X  RES     LOC     ERROR        ACT  EVENT        CAUSE
04694   Y N N     12/05/2011      16     LINN AVE             INTER      CROSS    N            N      FOG    ANGL-STP 01 NONE   0      TURN-R                                                           124          01,08
NONE              MO          0          WARNER-MILNE RD      N                   TRF SIGNAL   N      ICE    TURN        PRVTE         E -N                                                        000  124          00
                  7A                                          05         0                     N      DAWN   PDO         PSNGR CAR                  01 DRVR   NONE   16  F  OR-Y            047,001      017               01,08
                                                                                                                                                                        OR<25
                                                                                                                  02 NONE   0      STOP
                                                                                                                     PRVTE         N -S                                                        011               00
                                                                                                                     PSNGR CAR                  01 DRVR   NONE   00  M  OR-Y            000          000               00
                                                                                                                                                                        OR<25
00711   N N N     02/27/2011      16     LINN AVE             INTER      CROSS    N            N      CLR    S-1STOP  01 NONE   0      STRGHT                                                                            06
NONE              SU          0          WARNER-MILNE RD      E                   TRF SIGNAL   N      DRY    SS-O        PRVTE         E -W                                                        007               00
                  12P                                         06         0                     N      DAY    PDO         PSNGR CAR                  01 DRVR   NONE   27  M  OR-Y            031          000               06
                                                                                                                                                                        OR<25
                                                                                                                  02 NONE   0      STOP
                                                                                                                     PRVTE         E -W                                                        011               00
                                                                                                                     PSNGR CAR                  01 DRVR   NONE   49  F  OR-Y            000          000               00
                                                                                                                                                                        OR<25
03858   N N N N N 10/14/2011      16     LINN AVE             INTER      CROSS    N            N      CLD    O-1TURN  01 NONE   0      STRGHT                                                                            08,02
CITY              FR          0          WARNER-MILNE RD      CN                  TRF SIGNAL   N      DRY    TURN        PRVTE         E -W                                                        000               00
                  11A                                         02         0                     N      DAY    INJ         PSNGR CAR                  01 DRVR   INJC   17  F  OR-Y            000          000               00
                                                                                                                                                                        OR<25
                                                                                                                  02 NONE   0      TURN-L
                                                                                                                     PRVTE         W -N                                                        000               00
                                                                                                                     PSNGR CAR                  01 DRVR   NONE   16  F  OR-Y            006,028      000               08,02
                                                                                                                                                                        OR<25
02537   N N N     07/21/2010      16     LINN AVE             STRGHT              Y            N      CLR    S-1STOP  01 NONE   0      STRGHT                                                                            07
NONE              WE          20         WARNER-MILNE RD      N         (NONE)    TRF SIGNAL   N      DRY    REAR        PRVTE         N -S                                                        000               00
                  3P                                          06                               N      DAY    INJ         PSNGR CAR                  01 DRVR   NONE   00  Unk UNK            026          000               07
                                                                        (02)                                                                                                    UNK
                                                                                                                  02 NONE   0      STOP
                                                                                                                     PRVTE         N -S                                                        011               00
                                                                                                                     PSNGR CAR                  01 DRVR   INJC   73  F  OR-Y            000          000               00
                                                                                                                                                                        OR<25
01973   N N N     05/30/2012      16     LINN AVE             STRGHT              N            N      CLR    S-1STOP  01 NONE   0      STRGHT                                                                            07
NO RPT            WE          95         WARNER-MILNE RD      N         (NONE)    UNKNOWN      N      DRY    REAR        PRVTE         N -S                                                        000               00
                  3P                                          08                               N      DAY    INJ         PSNGR CAR                  01 DRVR   NONE   00  F  OR-Y            026          000               07
                                                                        (02)                                                                                            OR<25
                                                                                                                  02 NONE   0      STOP
                                                                                                                     PRVTE         N -S                                                        011               00
                                                                                                                     PSNGR CAR                  01 DRVR   INJC   35  F  OR-Y            000          000               00
                                                                                                                                                                        OR<25
02866   N N N     08/04/2012      16     LINN AVE             STRGHT              N            N      CLR    S-1STOP  01 NONE   0      STRGHT                                                                            07
NONE              SA          100        WARNER-MILNE RD      N         (NONE)    UNKNOWN      N      DRY    REAR        UNKN          S -N                                                        000               00
                  12P                                         07                               N      DAY    PDO         PSNGR CAR                  01 DRVR   NONE   00  M  OR-Y            026          000               07
                                                                        (02)                                                                                            UNK
                                                                                                                  02 NONE   0      STOP
                                                                                                                     PRVTE         S -N                                                        011               00
                                                                                                                     PSNGR CAR                  01 DRVR   NONE   64  F  OR-Y            000          000               00
                                                                                                                                                                        OR<25
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Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION

TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and WARNER-PARROTT RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 3

```
        S   D
        P   R S W                                                           INT-TYPE                                           SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH         TRLR QTY      MOVE                         A  S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-        RNDBT  SURF   COLL          OWNER         FROM          PRTC   INJ     G  E  LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL        DRVWY  LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E  X  RES    LOC    ERROR       ACT EVENT       CAUSE
00720   N N N     03/02/2013       16     LELAND RD             INTER     CROSS       N            N      RAIN   PED        01 NONE   0      TURN-R                                                                        02
CITY              SA           0          WARNER-PARROTT RD     SW                    TRF SIGNAL   N      WET    PED           PRVTE         W -S                                                          000          00
                  8P                                            06        0                        N      DUSK   INJ           PSNGR CAR                 01 DRVR   NONE   42 M   OR-Y          029         000          02
                                                                                                                                                                                OR<25

                                                                                                                                             -
                                                                                                                                             STRGHT     01 PED   INJB   14 M          I XWLK 000          035          00
                                                                                                                                             W     E
04120   N N N     10/26/2013       16     LELAND RD             INTER     CROSS       N            N      CLR    ANGL-OTH   01 NONE   0      STRGHT                                                                        04
NONE              SA           0          WARNER-PARROTT RD     CN                    TRF SIGNAL   N      DRY    ANGL          PRVTE         S -N                                                          000          00
                  5P                                            02        0                        N      DAY    PDO           PSNGR CAR                 01 DRVR   NONE   55 M   OR-Y          000         000          00
                                                                                                                                                                                OR<25
                                                                                                                            02 NONE   0      STRGHT
                                                                                                                               PRVTE         E -W                                                          000          00
                                                                                                                               PSNGR CAR                 01 DRVR   NONE   16 F   OR-Y          020         000          04
                                                                                                                                                                                OR<25
04405   Y N N N N 11/17/2012       16     LELAND RD             STRGHT                N            Y      RAIN   FIX OBJ    01 NONE   0      STRGHT                                                            088,093,053 33,27,01
CITY              SA           31         WARNER-PARROTT RD     S         (NONE)      UNKNOWN      N      WET    FIX           PRVTE         N -S                                                          000 010,040,037 00
                  8P                                            05                                 N      DLIT   INJ           PSNGR CAR                 01 DRVR   INJB   21 M   SUSP          051,016,081 038 093         33,27,01
                                                                          (02)                                                                                                  OR<25
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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION

TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and WARNER-MILNE RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 6

```
       S   D
       P   R S W
                                                                    INT-TYPE                                      SPCL USE
       E A U C O DATE      CLASS     CITY STREET         RD CHAR    (MEDIAN) INT-REL     OFFRD WTHR   CRASH       TRLR QTY     MOVE                     A  S
SER#   E L G H R DAY       DIST      FIRST STREET        DIRECT       LEGS   TRAF-       RNDBT SURF   COLL        OWNER        FROM        PRTC  INJ    G  E  LICNS  PED
INVEST D C S L K TIME      FROM      SECOND STREET       LOCTN      (#LANES) CONTL       DRVWY LIGHT  SVRTY    V# TYPE         TO        P# TYPE SVRTY  E  X  RES    LOC   ERROR      ACT EVENT      CAUSE
02086  N N N     06/12/2013    16    LELAND RD           INTER     CROSS     N           N     CLR    S-1STOP  01 NONE  0      STRGHT                                                                07
NONE             WE        0         WARNER-MILNE RD     S                   TRF SIGNAL  N     DRY    REAR        PRVTE        S -N                                                   000            00
                 7A                                      06        0                     N     DAY    PDO         PSNGR CAR              01 DRVR NONE  00  M  OR-Y          026        000            07
                                                                                                                                                              OR<25
                                                                                                               02 NONE  0      STOP
                                                                                                                  PRVTE        S -N                                                   011            00
                                                                                                                  PSNGR CAR              01 DRVR NONE  42  F  OR-Y          000        000            00
                                                                                                                                                              OR<25

00198  N N N     01/19/2010    16    LELAND RD           INTER     CROSS     N           N     CLR    S-1STOP  01 NONE  0      STRGHT                                                     030        07
NONE             TU        0         WARNER-MILNE RD     CN                  TRF SIGNAL  N     DRY    REAR        PRVTE        W -E                                                   000            00
                 6A                                      03        0                     N     DLIT   INJ         PSNGR CAR              01 DRVR NONE  18  M  OR-Y          026        000            07
                                                                                                                                                              OR<25
                                                                                                               02 NONE  0      STOP
                                                                                                                  PRVTE        W -E                                                   011 030        00
                                                                                                                  PSNGR CAR              01 DRVR INJC  40  M  OR-Y          000        000            00
                                                                                                                                                              OR<25

03835  N N N     10/15/2012    16    LELAND RD           INTER     CROSS     N           N     RAIN   ANGL-OTH 01 NONE  0      STRGHT                                                                04
NO RPT           MO        0         WARNER-MILNE RD     CN                  TRF SIGNAL  N     WET    ANGL        PRVTE        E -W                                                   000            00
                 5P                                      02        0                     N     DUSK   INJ         PSNGR CAR              01 DRVR INJC  48  M  OR-Y          000        000            00
                                                                                                                                                              OR<25
                                                                                                               01 NONE  0      STRGHT
                                                                                                                  PRVTE        E -W                                                   000            00
                                                                                                                  PSNGR CAR              02 PSNG INJC  16  F                000        000            00

                                                                                                               02 NONE  0      STRGHT
                                                                                                                  PRVTE        S -N                                                   000            00
                                                                                                                  PSNGR CAR              01 DRVR NONE  51  F  OR-Y          020        038            04
                                                                                                                                                              OR<25

03422  N N N     09/14/2012    16    WARNER-MILNE RD     STRGHT              N           N     CLR    S-1STOP  01 NONE  0      STRGHT                                                                27,07
NO RPT           FR        100       LELAND RD           E         (NONE)    UNKNOWN     N     DRY    REAR        PRVTE        W -E                                                   000            00
                 11A                                     07                              N     DAY    PDO         PSNGR CAR              01 DRVR NONE  78  M  OR-Y          016,026    038            27,07
                                                                   (02)                                                                                       OR<25
                                                                                                               02 NONE  0      STOP
                                                                                                                  PRVTE        W -E                                                   011            00
                                                                                                                  PSNGR CAR              01 DRVR NONE  85  F  OR-Y          000        000            00
                                                                                                                                                              OR<25

03511  N N N     09/28/2010    16    LELAND RD           STRGHT              N           N     CLR    S-1TURN  01 NONE  0      STRGHT                                                                08
NONE             TU        1000      WARNER-MILNE RD     SE        (NONE)    UNKNOWN     N     DRY    TURN        PRVTE        NW-SE                                                  000            00
                 1P                                      07                              N     DAY    PDO         PSNGR CAR              01 DRVR NONE  24  F  OR-Y          000        000            00
                                                                   (02)                                                                                       OR<25
                                                                                                               02 NONE  0      U-TURN
                                                                                                                  PRVTE        NW-NW                                                  051            00
                                                                                                                  PSNGR CAR              01 DRVR NONE  51  M  OR-Y          008        000            08
                                                                                                                                                              OR<25

01720  N N N     05/10/2012    16    LELAND RD           STRGHT              N           N     CLR    S-1STOP  01 NONE  0      STRGHT                                                                07
NONE             TH        137       WARNER-MILNE RD     S         (NONE)    UNKNOWN     N     DRY    REAR        PRVTE        S -N                                                   000            00
                 7A                                      08                              N     DAY    INJ         PSNGR CAR              01 DRVR NONE  51  M  OR-Y          026        000            07
                                                                   (02)                                                                                       OR<25
                                                                                                               02 NONE  0      STOP
                                                                                                                  PRVTE        S -N                                                   011            00
                                                                                                                  PSNGR CAR              01 DRVR INJC  43  M  OR-Y          000        000            00
```

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and WARNER-MILNE RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 6

```
       S   D
       P   R S W                                                      INT-TYPE                                          SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR     (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH         TRLR QTY     MOVE                           A   S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT        LEGS    TRAF-        RNDBT  SURF   COLL          OWNER        FROM         PRTC  INJ       G   E  LICNS  PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN       (#LANES)  CONTL        DRVWY  LIGHT  SVRTY      V# TYPE         TO        P# TYPE  SVRTY     E   X  RES    LOC    ERROR       ACT  EVENT       CAUSE
                                                                                                                                                                     OR<25
```

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

CENTRAL POINT RD and WARNER-PARROTT RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 9

```
        S   D
        P   R S W                                                           INT-TYPE                                             SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL       OFFRD  WTHR    CRASH         TRLR QTY      MOVE                         A  S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-         RNDBT  SURF    COLL          OWNER         FROM          PRTC   INJ     G  E  LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL         DRVWY  LIGHT   SVRTY      V# TYPE          TO          P# TYPE   SVRTY   E  X  RES    LOC     ERROR       ACT  EVENT       CAUSE
03639   N N N N N 10/01/2012       16     CENTRAL POINT RD      INTER      3-LEG      N             N      CLR     BIKE                                                                                           110         02
CITY              MO           0          WARNER-PARROTT RD     SW                    UNKNOWN       N      DRY     TURN                        -
                  3P                                            05         0                        N      DAY     INJ                         STRGHT     01 BIKE   INJB   47  M         I XWK?  000         034              00
                                                                                                                                               NW   SE
                                                                                                                              01 NONE   0      TURN-L
                                                                                                                                 PRVTE         SE-SW                                                         000  110         00
                                                                                                                                 PSNGR CAR                01 DRVR   NONE   28  M  OR-Y           027,008     000              02
                                                                                                                                                                                  OR<25

01439   N N N     04/16/2009       16     CENTRAL POINT RD      INTER      3-LEG      N             N      CLR     ANGL-OTH   01 NONE   0      TURN-R                                                                         02
NONE              TH           0          WARNER-PARROTT RD     CN                    STOP SIGN     N      DRY     TURN          PRVTE         SW-SE                                                         015              00
                  4P                                            04         0                        N      DAY     INJ           PSNGR CAR                01 DRVR   NONE   38  F  OR-Y           028         000              02
                                                                                                                                                                                  OR<25
                                                                                                                              02 NONE   0      STRGHT
                                                                                                                                 PRVTE         NW-SE                                                         000              00
                                                                                                                                 PSNGR CAR                01 DRVR   INJC   37  F  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
                                                                                                                              02 NONE   0      STRGHT
                                                                                                                                 PRVTE         NW-SE                                                         000              00
                                                                                                                                 PSNGR CAR                02 PSNG   INJC   14  F                 000         000              00


00083   N N N     01/09/2010       16     CENTRAL POINT RD      INTER      3-LEG      N             N      CLR     O-1TURN    01 NONE   0      STRGHT                                                                         02
NO RPT            SA           0          WARNER-PARROTT RD     CN                    TRF SIGNAL    N      DRY     TURN          PRVTE         NW-SE                                                         000              00
                  6P                                            03         0                        N      DLIT    INJ           PSNGR CAR                01 DRVR   INJC   72  M  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
                                                                                                                              01 NONE   0      STRGHT
                                                                                                                                 PRVTE         NW-SE                                                         000              00
                                                                                                                                 PSNGR CAR                02 PSNG   INJC   63  F                 000         000              00

                                                                                                                              02 NONE   0      TURN-L
                                                                                                                                 PRVTE         SE-SW                                                         000              00
                                                                                                                                 PSNGR CAR                01 DRVR   NONE   21  F  OR-Y           028,004     000              02
                                                                                                                                                                                  OR<25

02437   N N N     07/14/2010       16     CENTRAL POINT RD      INTER      3-LEG      N             N      CLR     ANGL-OTH   01 NONE   0      STRGHT                                                                         02
NO RPT            WE           0          WARNER-PARROTT RD     CN                    STOP SIGN     N      DRY     TURN          PRVTE         NW-SE                                                         000              00
                  2P                                            04         0                        N      DAY     PDO           PSNGR CAR                01 DRVR   NONE   27  M  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
                                                                                                                              02 NONE   0      TURN-L
                                                                                                                                 PRVTE         SW-NW                                                         015              00
                                                                                                                                 PSNGR CAR                01 DRVR   NONE   18  M  OR-Y           028         000              02
                                                                                                                                                                                  OR<25

03616   N N N     09/25/2013       16     CENTRAL POINT RD      INTER      3-LEG      N             N      CLD     ANGL-OTH   01 NONE   0      TURN-L                                                                         02
NONE              WE           0          WARNER-PARROTT RD     CN                    STOP SIGN     N      DRY     TURN          PRVTE         SW-NW                                                         015              00
                  4P                                            04         0                        N      DAY     PDO           PSNGR CAR                01 DRVR   NONE   00  M  OR-Y           028         000              02
                                                                                                                                                                                  UNK
                                                                                                                              02 NONE   0      STRGHT
                                                                                                                                 PRVTE         NW-SE                                                         000              00
                                                                                                                                 PSNGR CAR                01 DRVR   NONE   58  F  OR-Y           000         000              00
                                                                                                                                                                                  OR<25

01308   N N N N N 04/17/2013       16     WARNER-PARROTT RD     STRGHT                N             N      CLR     S-1STOP    01 NONE   0      STRGHT                                                              088,062     07
NONE              WE           100        CENTRAL POINT RD      E          (NONE)     UNKNOWN       N      DRY     SS-O          PRVTE         W -E                                                          007  088,062     00
                  2P                                            07                                  N      DAY     PDO           PSNGR CAR                01 DRVR   NONE   20  F  OR-Y           026         000              07
```

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

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        S   D
        P   R S W                                                      INT-TYPE                                 SPCL USE
        E A U C O DATE        CLASS     CITY STREET         RD CHAR    (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH        TRLR QTY     MOVE                       A   S
SER#    E L G H R DAY         DIST      FIRST STREET        DIRECT       LEGS    TRAF-        RNDBT  SURF   COLL         OWNER        FROM         PRTC   INJ    G   E LICNS  PED
INVEST  D C S L K TIME        FROM      SECOND STREET       LOCTN      (#LANES)  CONTL        DRVWY  LIGHT  SVRTY     V# TYPE         TO         P# TYPE   SVRTY  E   X RES    LOC    ERROR       ACT EVENT       CAUSE
                                                                      (02)                                                                                             OR<25
                                                                                                                      02 NONE   0     STOP
                                                                                                                         PRVTE        W -E                                                       011            00
                                                                                                                         PSNGR CAR              01 DRVR   NONE  66  F  OR-Y          000         000            00
                                                                                                                                                                       OR<25
                                                                                                                      03 NONE   0     PRKD-P
                                                                                                                         PRVTE        N -S                                                       032            00
                                                                                                                         PSNGR CAR

                                                                                                                      04 NONE   0     PRKD-P
                                                                                                                         PRVTE        N -S                                                       032            00
                                                                                                                         PSNGR CAR

02048   N N N     06/05/2013    16      WARNER-PARROTT RD   STRGHT               N            N      CLR    S-1STOP   01 NONE   0     STRGHT                                                         004        07
NONE              WE          500       CENTRAL POINT RD    NW        (NONE)     UNKNOWN      N      DRY    REAR         PRVTE        NW-SE                                                      000            00
                  3P                                        08                                N      DAY    PDO          PSNGR CAR              01 DRVR   NONE  00  M  OR-Y          026         000            07
                                                                      (02)                                                                                             OR<25
                                                                                                                      02 NONE   0     STOP
                                                                                                                         PRVTE        NW-SE                                                      011 004        00
                                                                                                                         PSNGR CAR              01 DRVR   NONE  16  M  OR-Y          000         000            00
                                                                                                                                                                       OR<25

04763   Y N N     12/13/2010    16      WARNER-PARROTT RD   CURVE                N            Y      RAIN   FIX OBJ   01 NONE   0     STRGHT                                                         079        01
NONE              MO          218       CENTRAL POINT RD    NW        (NONE)     UNKNOWN      N      WET    FIX          PRVTE        SE-NW                                                      000 079        00
                  7A                                        08                                N      DAY    PDO          PSNGR CAR              01 DRVR   NONE  54  F  OR-Y          047,080,081 017            01
                                                                      (02)                                                                                             OR>25

04652   Y N N Y N 12/01/2012    16      WARNER-PARROTT RD   CURVE                N            Y      CLD    FIX OBJ   01 NONE   0     STRGHT                                                         042,088    10
CITY              SA          473       CENTRAL POINT RD    NW        (NONE)     UNKNOWN      N      DRY    FIX          PRVTE        W -E                                                       000 042,088    00
                  1P                                        08                                N      DAY    INJ          MTRCYCLE               01 DRVR   INJC  30  M  OR-Y          047,080     000            10
                                                                      (02)                                                                                             OR<25
```

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION

TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

WARNER-MILNE RD at CENTRAL POINT RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 1

```
        S   D
        P   R S W                                                   INT-TYPE                                          SPCL USE
        E A U C O DATE       CLASS      CITY STREET         RD CHAR     (MEDIAN) INT-REL      OFFRD  WTHR   CRASH         TRLR QTY     MOVE                        A  S
SER#    E L G H R DAY        DIST       FIRST STREET        DIRECT        LEGS   TRAF-        RNDBT  SURF   COLL          OWNER        FROM          PRTC  INJ     G  E  LICNS  PED
INVEST  D C S L K TIME       FROM       SECOND STREET       LOCTN       (#LANES) CONTL        DRVWY  LIGHT  SVRTY      V# TYPE         TO         P# TYPE  SVRTY   E  X  RES    LOC    ERROR       ACT EVENT      CAUSE
01214   N N N     04/12/2010     17     CENTRAL POINT RD     INTER      3-LEG    N            N      CLR    ANGL-OTH   01 NONE   0     TURN-L                                                                      02
NONE              MO         0          WARNER-MILNE RD      CN                  STOP SIGN    N      DRY    TURN          PRVTE        SW-NW                                                      015          00
                  9A                                         04         0                     N      DAY    INJ           PSNGR CAR             01 DRVR  NONE  92  M  OR-Y          028         000          02
                                                                                                                                                                          OR<25
                                                                                                                        02 NONE   0     STRGHT
                                                                                                                           PRVTE        NW-SE                                                      000          00
                                                                                                                           PSNGR CAR             01 DRVR  NONE  54  M  OR-Y          000         000          00
                                                                                                                                                                          OR<25
                                                                                                                        02 NONE   0     STRGHT
                                                                                                                           PRVTE        NW-SE                                                      000          00
                                                                                                                           PSNGR CAR             02 PSNG  INJC  51  F                000         000          00

                                                                                                                        02 NONE   0     STRGHT
                                                                                                                           PRVTE        NW-SE                                                      000          00
                                                                                                                           PSNGR CAR             03 PSNG  NO<5  04  M                000         000          00
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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 20

```
        S   D
        P   R S W                                                           INT-TYPE                                            SPCL USE
        E A U C O DATE        CLASS       CITY STREET           RD CHAR     (MEDIAN) INT-REL       OFFRD  WTHR   CRASH         TRLR QTY      MOVE                         A   S
SER#    E L G H R DAY         DIST        FIRST STREET          DIRECT         LEGS   TRAF-         RNDBT  SURF   COLL          OWNER         FROM          PRTC   INJ     G   E LICNS   PED
INVEST  D C S L K TIME        FROM        SECOND STREET         LOCTN       (#LANES) CONTL         DRVWY  LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E   X RES     LOC    ERROR       ACT EVENT        CAUSE
04286   Y Y N     11/13/2011      16      LELAND RD             STRGHT                N             Y      RAIN   FIX OBJ    01 NONE   0      STRGHT                                                              062,010,088  01
CITY              SU          160         LOT WHITCOMB DR       NW         (NONE)     NONE          N      WET    FIX           PRVTE         SE-NW                                                          001 062,010,088  00
                  3A                                            08                                  N      DLIT   INJ           PSNGR CAR                  01 DRVR   INJB   25  M  OR-Y          047,080     000              01
                                                                           (02)                                                                                                 OR<25
                                                                                                                             01 NONE   0      STRGHT
                                                                                                                                PRVTE         SE-NW                                                          001 062,010,088  00
                                                                                                                                PSNGR CAR                  02 PSNG   INJB   27  M                000         000              00

04741   Y N N N N 12/09/2011      16      LELAND RD             STRGHT                N             Y      FOG    FIX OBJ    01 NONE   0      STRGHT                                                              124,053      01,05
CITY              FR          150         JESSIE AVE            SE         (NONE)     UNKNOWN       N      ICE    FIX           PRVTE         NW-SE                                                          000 124,053      00
                  8A                                            08                                  N      DAY    INJ           PSNGR CAR                  01 DRVR   INJC   61  F  OR-Y          047,083,081 017              01,05
                                                                           (02)                                                                                                 OR<25

03336   N N N     09/07/2012      16      DALLAS ST             INTER      3-LEG      N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                           07
NONE              FR           0          LELAND RD             S                     UNKNOWN       N      UNK    REAR          PRVTE         SE-NW                                                          000              00
                  11P                                           06         0                        N      DARK   PDO           PSNGR CAR                  01 DRVR   NONE   00  M  OR-Y          026         000              07
                                                                                                                                                                                 UNK
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SE-NW                                                          012              00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE   22  F  OR-Y          000         000              00
                                                                                                                                                                                 OR<25

03079   N N N     08/19/2012      16      LELAND RD             ALLEY                 N             N      CLR    O-1TURN    01 NONE   0      STRGHT                                                                           02
CITY              SU          110         REDDAWAY AVE          SW         (NONE)     UNKNOWN       N      DRY    TURN          PRVTE         SW-NE                                                          000              00
                  4P                                            08                                  N      DAY    INJ           MTRCYCLE                   01 DRVR   INJB   29  M  OR-Y          000         000              00
                                                                           (02)                                                                                                 OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         NE-SE                                                          019              00
                                                                                                                                PSNGR CAR                  01 DRVR   NONE   67  F  OR-Y          028,004     000              02
                                                                                                                                                                                 OR<25

04856   N N N     12/17/2011      16      CARMELITA DR          INTER      CROSS      N             N      FOG    ANGL-OTH   01 NONE   0      STRGHT                                                                           02
CITY              SA           0          LELAND RD             CN                    STOP SIGN     N      WET    TURN          PRVTE         NE-SW                                                          007              00
                  5P                                            04         0                        N      DARK   INJ           PSNGR CAR                  01 DRVR   NONE   25  F  OR-Y          000         000              00
                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         NW-NE                                                          000              00
                                                                                                                                PSNGR CAR                  01 DRVR   INJC   19  M  OTH-Y         028         000              02
                                                                                                                                                                                 N-RES
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         NW-NE                                                          000              00
                                                                                                                                PSNGR CAR                  02 PSNG   INJC   18  M                000         000              00

00238   N N N     01/20/2011      16      LELAND RD             INTER      4-LEG      N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                           07
NO RPT            TH           0          S MEYERS RD           SW                    STOP SIGN     N      DRY    REAR          PRVTE         SW-NE                                                          000              00
                  7A                                            06         0                        N      DAY    INJ           PSNGR CAR                  01 DRVR   NONE   16  F  OR-Y          026         000              07
                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SW-NE                                                          011              00
                                                                                                                                PSNGR CAR                  01 DRVR   INJC   18  F  OR-Y          000         000              00
                                                                                                                                                                                 OR<25

03638   N N N     10/01/2012      16      LELAND RD             INTER      4-LEG      N             N      CLR    ANGL-OTH   01 NONE   0      STRGHT                                                                           02
NONE              MO           0          S MEYERS RD           CN                    STOP SIGN     N      DRY    ANGL          PRVTE         SW-NE                                                          015              00
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CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 20

```
       S   D
       P   R S W                                                    INT-TYPE                                       SPCL USE
       E A U C O DATE      CLASS     CITY STREET         RD CHAR    (MEDIAN) INT-REL     OFFRD WTHR   CRASH        TRLR QTY    MOVE                      A  S
SER#   E L G H R DAY       DIST      FIRST STREET        DIRECT       LEGS   TRAF-       RNDBT SURF   COLL         OWNER       FROM         PRTC  INJ     G  E  LICNS PED
INVEST D C S L K TIME      FROM      SECOND STREET       LOCTN      (#LANES) CONTL       DRVWY LIGHT  SVRTY     V# TYPE        TO         P# TYPE  SVRTY  E  X  RES   LOC   ERROR       ACT EVENT       CAUSE
                 8P                                      01        0                     N     DLIT   PDO          PSNGR CAR            01 DRVR  NONE  00 Unk UNK         028         000             02
                                                                                                                                                               UNK
                                                                                                                02 NONE  0     STRGHT
                                                                                                                   PRVTE       N -S                                                   000             00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  36  M  OR-Y        000         000             00
                                                                                                                                                               OR<25
00798  N N N N N 03/01/2009    16    LELAND RD           ALLEY               N           N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
CITY             SU        0         S MEYERS RD         N         (NONE)    UNKNOWN     N     DRY    REAR         PRVTE       S -N                                                   000             00
                 12A                                     07                              N     DARK   INJ          PSNGR CAR            01 DRVR  NONE  00  M  UNK         026         000             07
                                                                   (02)                                                                                        UNK
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       S -N                                                   012             00
                                                                                                                   PSNGR CAR            01 DRVR  INJC  34  M  OR-Y        000         000             00
                                                                                                                                                               OR<25
04648  Y Y N N N 12/03/2011    16    LELAND RD           STRGHT              N           Y     CLR    FIX OBJ   01 NONE  0     TURN-R                                                     040,062,088 33,01,10
CITY             SA        300       S MEYERS RD         N         (NONE)    UNKNOWN     N     DRY    FIX          PRVTE       SE-N                                                   000 040,062,088 00
                 12A                                     08                              N     DARK   PDO          PSNGR CAR            01 DRVR  NONE  30  M  OR-Y        051,047,081 017             33,01,10
                                                                   (02)                                                                                        OR<25
01537  N N N     04/27/2009    16    LELAND RD           INTER     3-LEG     N           N     CLR    ANGL-OTH  01 NONE  0     TURN-L                                                                 02
NONE             MO        0         PEASE RD            CN                  UNKNOWN     N     DRY    TURN         PRVTE       SW-N                                                   000             00
                 1P                                      02        0                     N     DAY    PDO          PSNGR CAR            01 DRVR  NONE  00  F  OR-Y        028         000             02
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STRGHT
                                                                                                                   PRVTE       S -N                                                   000             00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  48  F  OR-Y        000         000             00
                                                                                                                                                               OR<25
00787  N N N N Y 03/05/2011    16    LELAND RD           INTER     3-LEG     N           N     CLR    ANGL-OTH  01 NONE  0     TURN-L                                                                 02
NO RPT           SA        0         PEASE RD            CN                  STOP SIGN   N     DRY    TURN         PRVTE       SW-N                                                   015             00
                 2P                                      03        0                     N     DAY    INJ          PSNGR CAR            01 DRVR  NONE  32  F  OR-Y        028         000             02
                                                                                                                                                               OR<25
                                                                                                                01 NONE  0     TURN-L
                                                                                                                   PRVTE       SW-N                                                   015             00
                                                                                                                   PSNGR CAR            02 PSNG  NO<5  01  M              000         000             00

                                                                                                                01 NONE  0     TURN-L
                                                                                                                   PRVTE       SW-N                                                   015             00
                                                                                                                   PSNGR CAR            03 PSNG  NO<5  04  M              000         000             00

                                                                                                                02 NONE  0     STRGHT
                                                                                                                   PRVTE       N -S                                                   000             00
                                                                                                                   PSNGR CAR            01 DRVR  INJC  18  M  OR-Y        000         000             00
                                                                                                                                                               OR<25
04534  N N N     11/21/2009    16    LELAND RD           STRGHT              Y           N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
NONE             SA        42        PEASE RD            S         (NONE)    NONE        N     DRY    REAR         PRVTE       S -N                                                   000             00
                 5P                                      06                              N     DARK   PDO          PSNGR CAR            01 DRVR  NONE  00  M  UNK         026,043     000             07
                                                                   (02)                                                                                        OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       S -N                                                   012             00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  48  F  OR-Y        000         000             00
                                                                                                                                                               OR<25
02086  N N N     06/12/2013    16    LELAND RD           INTER     CROSS     N           N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
```

```
        S   D
        P   R S W                                                          INT-TYPE                                             SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR    (MEDIAN)   INT-REL       OFFRD  WTHR   CRASH         TRLR QTY      MOVE                         A  S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT       LEGS     TRAF-         RNDBT  SURF   COLL          OWNER         FROM          PRTC   INJ     G  E  LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN      (#LANES)   CONTL         DRVWY  LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E  X  RES    LOC     ERROR        ACT  EVENT       CAUSE
NONE              WE           0          WARNER-MILNE RD       S                     TRF SIGNAL    N      DRY    REAR          PRVTE         S -N                                                           000             00
                  7A                                            06         0                        N      DAY    PDO           PSNGR CAR                01 DRVR   NONE   00  M  OR-Y           026          000             07
                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         S -N                                                           011             00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   42  F  OR-Y           000          000             00
                                                                                                                                                                                 OR<25

00198   N N N     01/19/2010       16     LELAND RD             INTER      CROSS      N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                              030        07
NONE              TU           0          WARNER-MILNE RD       CN                    TRF SIGNAL    N      DRY    REAR          PRVTE         W -E                                                           000             00
                  6A                                            03         0                        N      DLIT   INJ           PSNGR CAR                01 DRVR   NONE   18  M  OR-Y           026          000             07
                                                                                                                                                                                 OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         W -E                                                           011  030        00
                                                                                                                                PSNGR CAR                01 DRVR   INJC   40  M  OR-Y           000          000             00
                                                                                                                                                                                 OR<25

03835   N N N     10/15/2012       16     LELAND RD             INTER      CROSS      N             N      RAIN   ANGL-OTH   01 NONE   0      STRGHT                                                                         04
NO RPT            MO           0          WARNER-MILNE RD       CN                    TRF SIGNAL    N      WET    ANGL          PRVTE         E -W                                                           000             00
                  5P                                            02         0                        N      DUSK   INJ           PSNGR CAR                01 DRVR   INJC   48  M  OR-Y           000          000             00
                                                                                                                                                                                 OR<25
                                                                                                                             01 NONE   0      STRGHT
                                                                                                                                PRVTE         E -W                                                           000             00
                                                                                                                                PSNGR CAR                02 PSNG   INJC   16  F                 000          000             00

                                                                                                                             02 NONE   0      STRGHT
                                                                                                                                PRVTE         S -N                                                           000             00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   51  F  OR-Y           020          038             04
                                                                                                                                                                                 OR<25

03511   N N N     09/28/2010       16     LELAND RD             STRGHT                N             N      CLR    S-1TURN    01 NONE   0      STRGHT                                                                         08
NONE              TU           1000       WARNER-MILNE RD       SE         (NONE)     UNKNOWN       N      DRY    TURN          PRVTE         NW-SE                                                          000             00
                  1P                                            07                                  N      DAY    PDO           PSNGR CAR                01 DRVR   NONE   24  F  OR-Y           000          000             00
                                                                           (02)                                                                                                  OR<25
                                                                                                                             02 NONE   0      U-TURN
                                                                                                                                PRVTE         NW-NW                                                          051             00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   51  M  OR-Y           008          000             08
                                                                                                                                                                                 OR<25

01720   N N N     05/10/2012       16     LELAND RD             STRGHT                N             N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                         07
NONE              TH           137        WARNER-MILNE RD       S          (NONE)     UNKNOWN       N      DRY    REAR          PRVTE         S -N                                                           000             00
                  7A                                            08                                  N      DAY    INJ           PSNGR CAR                01 DRVR   NONE   51  M  OR-Y           026          000             07
                                                                           (02)                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         S -N                                                           011             00
                                                                                                                                PSNGR CAR                01 DRVR   INJC   43  M  OR-Y           000          000             00
                                                                                                                                                                                 OR<25

00720   N N N     03/02/2013       16     LELAND RD             INTER      CROSS      N             N      RAIN   PED        01 NONE   0      TURN-R                                                                         02
CITY              SA           0          WARNER-PARROTT RD     SW                    TRF SIGNAL    N      WET    PED           PRVTE         W -S                                                           000             00
                  8P                                            06         0                        N      DUSK   INJ           PSNGR CAR                01 DRVR   NONE   42  M  OR-Y           029          000             02
                                                                                                                                                                                 OR<25

                                                                                                                                              -
                                                                                                                                              STRGHT     01 PED    INJB   14  M          I XWLK 000          035             00
                                                                                                                                              W     E
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URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 20

```
       S   D
       P   R S W                                                    INT-TYPE                                       SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR    (MEDIAN) INT-REL     OFFRD WTHR  CRASH         TRLR QTY    MOVE                     A  S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT       LEGS   TRAF-       RNDBT SURF  COLL          OWNER       FROM         PRTC  INJ    G  E  LICNS  PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN      (#LANES) CONTL       DRVWY LIGHT SVRTY      V# TYPE        TO        P# TYPE  SVRTY  E  X  RES    LOC    ERROR      ACT EVENT      CAUSE
04120  N N N     10/26/2013     16    LELAND RD          INTER     CROSS     N           N     CLR   ANGL-OTH  01 NONE  0      STRGHT                                                                  04
NONE             SA         0         WARNER-PARROTT RD  CN                  TRF SIGNAL  N     DRY   ANGL          PRVTE       S -N                                                       000            00
                 5P                                      02        0                     N     DAY   PDO           PSNGR CAR             01 DRVR  NONE  55  M  OR-Y          000        000            00
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0      STRGHT
                                                                                                                   PRVTE       E -W                                                       000            00
                                                                                                                   PSNGR CAR             01 DRVR  NONE  16  F  OR-Y          020        000            04
                                                                                                                                                               OR<25

04405  Y N N N N 11/17/2012     16    LELAND RD          STRGHT              N           Y     RAIN  FIX OBJ   01 NONE  0      STRGHT                                                         088,093,053 33,27,01
CITY             SA         31        WARNER-PARROTT RD  S         (NONE)    UNKNOWN     N     WET   FIX           PRVTE       N -S                                                       000 010,040,037 00
                 8P                                      05                              N     DLIT  INJ           PSNGR CAR             01 DRVR  INJB  21  M  SUSP          051,016,081 038 093         33,27,01
                                                                   (02)                                                                                        OR<25
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CDS380                                     OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION                                     Page: 1
07/08/2014                                      TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
                                                                  URBAN NON-SYSTEM CRASH LISTING
CITY OF OREGON CITY, CLACKAMAS COUNTY        MEYERS RD and Intersectional Crashes at MEYERS RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013
                                                                     Total crash records: 56

        S   D
        P   R S W                                                   INT-TYPE                                            SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR     (MEDIAN)  INT-REL      OFFRD   WTHR   CRASH         TRLR QTY      MOVE                         A   S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-        RNDBT   SURF   COLL          OWNER         FROM          PRTC   INJ     G   E LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL        DRVWY   LIGHT  SVRTY      V# TYPE          TO         P# TYPE   SVRTY   E   X RES    LOC    ERROR       ACT EVENT       CAUSE
00271   N N N     01/21/2009       17     MEYERS RD             STRGHT                N            N       CLR    S-1STOP    01 NONE   0      STRGHT                                                                         07
NONE              WE           100        ANDREA ST             NW         (NONE)     UNKNOWN      N       UNK    REAR          PRVTE         NW-SE                                                         000              00
                  1P                                            08                                 N       DAY    PDO           PSNGR CAR                01 DRVR   NONE   22  F  OR-Y           026         000              07
                                                                           (02)                                                                                                   OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         NW-SE                                                         012              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   59  F  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
01470   N N N     04/20/2012       19     MEYERS RD             STRGHT                N            Y       CLR    FIX OBJ    01 NONE   0      STRGHT                                                            040,054      10
NONE              FR           260        HIGH SCHOOL AVE       E          (NONE)     UNKNOWN      N       DRY    FIX           PRVTE         E -W                                                          000 040,054      00
                  3P                                            08                                 N       DAY    PDO           PSNGR CAR                01 DRVR   NONE   17  M  OR-Y           080         017              10
                                                                           (02)                                                                                                   OR<25
03455   Y N N Y   09/15/2009       19     COAST REDWOOD AVE     INTER      3-LEG      N            Y       CLR    FIX OBJ    01 NONE   0      TURN-L                                                            040,053      30
CITY              TU           0          MEYERS RD             S                     STOP SIGN    N       DRY    FIX           PRVTE         E -S                                                          000 040,053      00
                  12P                                           05         0                       N       DAY    INJ           PSNGR CAR                01 DRVR   INJC   16  M  OR-Y           050,001,081 088              30
                                                                                                                                                                                  OR<25
00575   N N N     02/19/2013       19     COAST REDWOOD AVE     INTER      3-LEG      N            N       CLR    O-1TURN    01 NONE   0      STRGHT                                                                         02
NONE              TU           0          MEYERS RD             CN                    UNKNOWN      N       DRY    TURN          PRVTE         W -E                                                          000              00
                  3P                                            03         0                       N       DAY    PDO           PSNGR CAR                01 DRVR   NONE   16  M  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         E -S                                                          000              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   17  M  OR-Y           028,004     000              02
                                                                                                                                                                                  OR<25
00601   N N N     02/15/2012       19     EMERSON CT            INTER      3-LEG      N            N       CLR    S-1STOP    01 NONE   0      STRGHT                                                               004          07
NONE              WE           0          MEYERS RD             SW                    UNKNOWN      N       DRY    REAR          PRVTE         SW-NE                                                         000              00
                  2P                                            06         0                       N       DAY    INJ           PSNGR CAR                01 DRVR   NONE   18  M  OR-Y           026         000              07
                                                                                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SW-NE                                                         011 004          00
                                                                                                                                PSNGR CAR                01 DRVR   INJC   16  F  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
01690   N N N     05/08/2012       19     MEYERS RD             ALLEY                 N            N       CLR    ANGL-OTH   01 NONE   0      TURN-L                                                                         02
NONE              TU           266        SOPHIA CT             W          (NONE)     UNKNOWN      N       DRY    TURN          PRVTE         N -E                                                          018              00
                  7A                                            08                                 N       DAY    PDO           PSNGR CAR                01 DRVR   NONE   17  M  OR-Y           028         000              02
                                                                           (02)                                                                                                   OR<25
                                                                                                                             02 NONE   0      STRGHT
                                                                                                                                PRVTE         W -E                                                          000              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   37  M  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
01098   N N N     03/23/2012       16     S BEAVERCREEK RD      INTER      3-LEG      N            N       CLR    S-1STOP    01 NONE   0      STRGHT                                                                         07
NONE              FR           0          MEYERS RD             NW                    TRF SIGNAL   N       DRY    REAR          PRVTE         NW-SE                                                         000              00
                  10A                                           06         0                       N       DAY    INJ           PSNGR CAR                01 DRVR   NONE   00  F  UNK            026         000              07
                                                                                                                                                                                  UNK
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         NW-SE                                                         011              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE   57  M  OR-Y           000         000              00
                                                                                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         NW-SE                                                         011              00
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Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

```
       S   D
       P   R S W                                    INT-TYPE                                       SPCL USE
       E A U C O DATE      CLASS     CITY STREET         RD CHAR    (MEDIAN)  INT-REL     OFFRD WTHR  CRASH        TRLR QTY    MOVE                     A  S
SER#   E L G H R DAY       DIST      FIRST STREET        DIRECT       LEGS    TRAF-       RNDBT SURF  COLL         OWNER       FROM         PRTC INJ    G  E LICNS  PED
INVEST D C S L K TIME      FROM      SECOND STREET       LOCTN     (#LANES)  CONTL       DRVWY LIGHT SVRTY     V# TYPE        TO         P# TYPE SVRTY  E  X RES    LOC   ERROR      ACT EVENT      CAUSE
                                                                                                                   PSNGR CAR             02 PSNG INJC  46  F               000        000            00

00131  N N N     01/11/2013    16    S BEAVERCREEK RD    INTER     3-LEG     N           N     CLR    S-1STOP   01 NONE   0    STRGHT                                                                07
NONE             FR        0         MEYERS RD           NW                  TRF SIGNAL  N     DRY    REAR         PRVTE       NW-SE                                                  000            00
                 10A                                     06         0                    N     DAY    INJ          PSNGR CAR             01 DRVR NONE  68  F OR-Y          026        000            07
                                                                                                                                                             OR<25
                                                                                                                02 NONE   0    STOP
                                                                                                                   PRVTE       NW-SE                                                  011            00
                                                                                                                   PSNGR CAR             01 DRVR INJC  55  M OR-Y          000        000            00
                                                                                                                                                             OR<25

03618  N N N     10/07/2010    17    MEYERS RD           ALLEY               N           N     CLR    ANGL-OTH  01 NONE   0    STRGHT                                                                02
NO RPT           TH        250       S BEAVERCREEK RD    SW        (NONE)    UNKNOWN     N     DRY    TURN         PRVTE       NE-SW                                                  007            00
                 12P                                     07                              N     DAY    INJ          PSNGR CAR             01 DRVR INJC  18  F OR-Y          000        000            00
                                                                   (02)                                                                                      OR<25
                                                                                                                01 NONE   0    STRGHT
                                                                                                                   PRVTE       NE-SW                                                  007            00
                                                                                                                   PSNGR CAR             02 PSNG INJC  18  F               000        000            00

                                                                                                                01 NONE   0    STRGHT
                                                                                                                   PRVTE       NE-SW                                                  007            00
                                                                                                                   PSNGR CAR             03 PSNG INJC  18  M               000        000            00

                                                                                                                02 NONE   0    TURN-L
                                                                                                                   PRVTE       NW-NE                                                  018            00
                                                                                                                   PSNGR CAR             01 DRVR NONE  17  F OR-Y          028        000            02
                                                                                                                                                             OR<25

00380  N N N     02/04/2010    16    MEYERS RD           STRGHT              N           N     RAIN   S-1STOP   01 NONE   0    STRGHT                                                                07
NONE             TH        100       S BEAVERCREEK RD    SW        (NONE)    L-TURN REF  N     WET    REAR         PRVTE       SW-NE                                                  000            00
                 6P                                      08                              N     DLIT   PDO          PSNGR CAR             01 DRVR NONE  18  M OR-Y          026        000            07
                                                                   (03)                                                                                      OR<25
                                                                                                                02 NONE   0    STOP
                                                                                                                   PRVTE       SW-NE                                                  012            00
                                                                                                                   PSNGR CAR             01 DRVR NONE  35  M OR-Y          000        000            00
                                                                                                                                                             OR<25

01540  N N N     04/26/2012    19    MEYERS RD           STRGHT              N           N     UNK    S-OTHER   01 NONE   0    STRGHT                                                                02
NO RPT           TH        200       S BEAVERCREEK RD    SW        (NONE)    UNKNOWN     N     UNK    PARK         PRVTE       SW-NE                                                  000            00
                 2P                                      08                              N     DAY    PDO          PSNGR CAR             01 DRVR NONE  00  F UNK           000        000            00
                                                                   (02)                                                                                      UNK
                                                                                                                02 NONE   0    PARKNG
                                                                                                                   PRVTE       SW-NE                                                  008            00
                                                                                                                   PSNGR CAR             01 DRVR NONE  19  M OR-Y          013,028    000            02
                                                                                                                                                             OR<25

02508  N N N N N 07/10/2009    14    CASCADE HY SOUTH    INTER     3-LEG     N           N     CLR    S-1STOP   01 NONE   0    STRGHT                                                                07
STATE            FR                  MEYERS RD           SE                  TRF SIGNAL  N     DRY    REAR         PRVTE       SE-NW                                                  000            00
                 5P                                      06         0                    N     DAY    INJ          PSNGR CAR             01 DRVR INJB  59  F OR-Y          026,043    000            07
                                                                                                                                                             OR<25
                                                                                                                02 NONE   0    STOP
                                                                                                                   PRVTE       SE-NW                                                  011            00
                                                                                                                   PSNGR CAR             01 DRVR INJC  20  M OR-Y          000        000            00
                                                                                                                                                             OR<25
                                                                                                                02 NONE   0    STOP
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URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

MEYERS RD and Intersectional Crashes at MEYERS RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 56

```
        S   D
        P   R S W                                                            INT-TYPE                                             SPCL USE
        E A U C O DATE         CLASS      CITY STREET          RD CHAR      (MEDIAN)  INT-REL       OFFRD  WTHR    CRASH         TRLR QTY      MOVE                        A   S
SER#    E L G H R DAY          DIST       FIRST STREET         DIRECT          LEGS   TRAF-         RNDBT  SURF    COLL          OWNER         FROM          PRTC   INJ      G   E LICNS   PED
INVEST  D C S L K TIME         FROM       SECOND STREET        LOCTN        (#LANES)  CONTL         DRVWY  LIGHT   SVRTY      V# TYPE          TO         P# TYPE   SVRTY    E   X RES     LOC     ERROR        ACT EVENT        CAUSE
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  02 PSNG   INJC  46  F                  000          000              00

                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  03 PSNG   INJC  17  F                  000          000              00

03154   N N N     08/21/2009        14    CASCADE HY SOUTH      INTER       3-LEG      N             N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                          07
NONE              FR                      MEYERS RD             SE                     TRF SIGNAL    N      DRY     REAR          PRVTE         SE-NW                                                           000              00
                  2P                                            06          0                        N      DAY     INJ           PSNGR CAR                  01 DRVR   NONE  19  M  OR-Y            026          000              07
                                                                                                                                                                                  OR<25
                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  01 DRVR   INJC  21  M  OR-Y            000          000              00
                                                                                                                                                                                  OR<25
                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  02 PSNG   INJC  20  F                  000          000              00

03106   N N N     09/01/2010        14    CASCADE HY SOUTH      INTER       3-LEG      N             N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                          07
NONE              WE                      MEYERS RD             SE                     TRF SIGNAL    N      DRY     REAR          PRVTE         SE-NW                                                           000              00
                  6P                                            06          0                        N      DAY     INJ           PSNGR CAR                  01 DRVR   NONE  49  M  OR-Y            026          000              07
                                                                                                                                                                                  OR<25
                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  01 DRVR   INJC  33  M  OR-Y            000          000              00
                                                                                                                                                                                  OR<25
                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  02 PSNG   INJC  33  F                  000          000              00

                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  03 PSNG   NO<5  04  F                  000          000              00

                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  04 PSNG   NO<5  02  M                  000          000              00

03874   N N N     09/29/2010        14    CASCADE HY SOUTH      INTER       3-LEG      N             N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                          07
NONE              WE                      MEYERS RD             SE                     TRF SIGNAL    N      DRY     REAR          PRVTE         SE-NW                                                           000              00
                  6P                                            06          0                        N      DAY     INJ           PSNGR CAR                  01 DRVR   NONE  19  M  OR-Y            026          000              07
                                                                                                                                                                                  OR<25
                                                                                                                               02 NONE   0      STOP
                                                                                                                                  PRVTE         SE-NW                                                           011              00
                                                                                                                                  PSNGR CAR                  01 DRVR   INJC  36  M  OR-Y            000          000              00
                                                                                                                                                                                  OR<25
04005   N N N     10/31/2010        14    CASCADE HY SOUTH      INTER       3-LEG      N             N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                          07
NONE              SU                      MEYERS RD             SE                     L-TURN REF    N      DRY     REAR          PRVTE         SE-NW                                                           000              00
                  12P                                           06          0                        N      DAY     INJ           PSNGR CAR                  01 DRVR   NONE  37  M  OR-Y            026          000              07
                                                                                                                                                                                  OR<25
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```
       S   D
       P   R S W                                                    INT-TYPE                                        SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR    (MEDIAN) INT-REL      OFFRD WTHR   CRASH        TRLR QTY    MOVE                      A  S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT       LEGS   TRAF-        RNDBT SURF   COLL         OWNER       FROM         PRTC  INJ    G  E  LICNS PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN      (#LANES) CONTL        DRVWY LIGHT  SVRTY    V# TYPE        TO        P# TYPE  SVRTY  E  X  RES   LOC    ERROR      ACT EVENT     CAUSE
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   012            00
                                                                                                                    PSNGR CAR             01 DRVR  INJC  29 F   OR-Y         000        000            00
                                                                                                                                                                OR<25
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   012            00
                                                                                                                    PSNGR CAR             02 PSNG  NO<5  04 F                000        000            00

04318  N N N     11/16/2010     14    CASCADE HY SOUTH   INTER     CROSS     N            N     CLD    S-1STOP   01 NONE  0     STRGHT                                                                 27
NONE             TU                   MEYERS RD          SE                  TRF SIGNAL   N     WET    REAR         PRVTE       SE-NW                                                   000            00
                 6P                                      06        0                      N     DLIT   PDO          PSNGR CAR             01 DRVR  NONE  18 F   OR-Y         016        000            27
                                                                                                                                                                OR<25
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   011            00
                                                                                                                    PSNGR CAR             01 DRVR  NONE  00 Unk UNK          000        000            00
                                                                                                                                                                UNK

02526  N N N     07/16/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N            N     CLR    S-STRGHT  01 NONE  0     STRGHT                                                                 07
NONE             SA                   MEYERS RD          SE                  TRF SIGNAL   N     DRY    REAR         PRVTE       SE-NW                                                   000            00
                 4P                                      06        0                      N     DAY    PDO          PSNGR CAR             01 DRVR  NONE  00 M   OR-Y         042        000            07
                                                                                                                                                                UNK
                                                                                                                 02 NONE  0     STRGHT
                                                                                                                    PRVTE       SE-NW                                                   000            00
                                                                                                                    PSNGR CAR             01 DRVR  NONE  33 F   OR-Y         000        000            00
                                                                                                                                                                OR<25

02681  N N N N N 07/27/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N            N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
CITY             WE                   MEYERS RD          SE                  TRF SIGNAL   N     DRY    REAR         PRVTE       SE-NW                                                   000            00
                 9A                                      06        0                      N     DAY    INJ          PSNGR CAR             01 DRVR  INJB  49 M   OR-Y         026        000            07
                                                                                                                                                                OR<25
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   011            00
                                                                                                                    PSNGR CAR             01 DRVR  NONE  47 F   OR-Y         000        000            00
                                                                                                                                                                OR<25

04126  Y N Y N N 11/03/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N            N     CLD    S-1STOP   01 NONE  0     STRGHT                                                                 32,01
STATE            TH                   MEYERS RD          SE                  TRF SIGNAL   N     DRY    REAR         PRVTE       SE-NW                                                   000            00
                 12P                                     06        0                      N     DAY    INJ          PSNGR CAR             01 DRVR  INJB  60 F   OR-Y         052,047,026 000           32,01
                                                                                                                                                                OR<25
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   012            00
                                                                                                                    PSNGR CAR             01 DRVR  NONE  34 F   OR-Y         000        000            00
                                                                                                                                                                OR<25

04218  N N N     11/09/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N            N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
NONE             WE                   MEYERS RD          SE                  TRF SIGNAL   N     DRY    REAR         PRVTE       SE-NW                                                   000            00
                 2P                                      06        0                      N     DAY    PDO          PSNGR CAR             01 DRVR  NONE  17 M   OR-Y         026        000            07
                                                                                                                                                                OR<25
                                                                                                                 02 NONE  0     STOP
                                                                                                                    PRVTE       SE-NW                                                   011            00
                                                                                                                    PSNGR CAR             01 DRVR  NONE  44 F   OR-Y         000        000            00
                                                                                                                                                                OR<25

02133  N N N     06/13/2012     14    CASCADE HY SOUTH   INTER     3-LEG     N            N     CLR    S-1STOP   01 NONE  0     STRGHT                                                                 07
NONE             WE                   MEYERS RD          SE                  TRF SIGNAL   N     DRY    REAR         PRVTE       SE-NW                                                   000            00
                 5P                                      06        0                      N     DAY    INJ          PSNGR CAR             01 DRVR  NONE  29 M   OR-Y         026        000            07
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       S   D
       P   R S W                                                    INT-TYPE                                      SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR    (MEDIAN) INT-REL     OFFRD  WTHR  CRASH       TRLR QTY    MOVE                      A  S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT       LEGS   TRAF-       RNDBT  SURF  COLL        OWNER       FROM         PRTC  INJ    G  E  LICNS PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN      (#LANES) CONTL       DRVWY  LIGHT SVRTY    V# TYPE        TO         P# TYPE  SVRTY  E  X  RES   LOC    ERROR      ACT EVENT      CAUSE
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SE-NW                                                 011            00
                                                                                                                   PSNGR CAR             01 DRVR  INJC  37 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
03450  N N N     09/16/2012     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                                07
NONE             SU                   MEYERS RD          SE                  UNKNOWN     N      DRY   REAR        PRVTE       SE-NW                                                 000            00
                 6P                                      06        0                     N      DAY   PDO         PSNGR CAR             01 DRVR  NONE  72 F   OR-Y         026        000            07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SE-NW                                                 011            00
                                                                                                                   PSNGR CAR             01 DRVR  NONE  37 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
03069  N N N N N 08/18/2010     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                                07
CITY             WE                   MEYERS RD          SW                  TRF SIGNAL  N      DRY   REAR        PRVTE       SW-NE                                                 000            00
                 8P                                      06        0                     N      DUSK  PDO         PSNGR CAR             01 DRVR  NONE  00 Unk UNK         026        000            07
                                                                                                                                                               UNK
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SW-NE                                                 011            00
                                                                                                                   PSNGR CAR             01 DRVR  NONE  57 M   OR-Y         000        000            00
                                                                                                                                                               OR<25
00146  N N N     01/12/2012     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                    004        07
NONE             TH         0         MEYERS RD          SW                  TRF SIGNAL  N      DRY   REAR        PRVTE       SW-NE                                                 000            00
                 11A                                     06        0                     N      DAY   PDO         PSNGR CAR             01 DRVR  NONE  17 M   OR-Y         026        000            07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SW-NE                                                 011 004        00
                                                                                                                   PSNGR CAR             01 DRVR  NONE  48 M   OR-Y         000        000            00
                                                                                                                                                               OR<25
00406  N N N     02/04/2013     17    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                    013        07
NONE             MO         0         MEYERS RD          SW                  TRF SIGNAL  N      DRY   REAR        PRVTE       SW-NE                                                 000            00
                 5P                                      06        0                     N      DAY   INJ         PSNGR CAR             01 DRVR  NONE  18 M   OR-Y         026        000            07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SW-NE                                                 011 013        00
                                                                                                                   PSNGR CAR             01 DRVR  INJB  62 M   OR-Y         000        000            00
                                                                                                                                                               OR<25
                                                                                                                03 NONE  0     STOP
                                                                                                                   PRVTE       SW-NE                                                 022            00
                                                                                                                   PSNGR CAR             01 DRVR  NONE  44 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
00281  N N N     01/23/2009     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                                27,07
NONE             FR                   MEYERS RD          W                   TRF SIGNAL  N      DRY   REAR        PRVTE       W -E                                                  000            00
                 2P                                      06        0                     N      DAY   INJ         PSNGR CAR             01 DRVR  NONE  32 F   OR-Y         016,026    000            27,07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       W -E                                                  011            00
                                                                                                                   PSNGR CAR             01 DRVR  INJC  28 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
01597  N N N     04/25/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   S-1STOP  01 NONE  0     STRGHT                                                                07
NONE             MO                   MEYERS RD          NW                  TRF SIGNAL  N      DRY   REAR        PRVTE       NW-SE                                                 000            00
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       S   D
       P   R S W                                                    INT-TYPE                                       SPCL USE
       E A U C O DATE       CLASS     CITY STREET        RD CHAR    (MEDIAN) INT-REL     OFFRD  WTHR  CRASH        TRLR QTY    MOVE                      A  S
SER#   E L G H R DAY        DIST      FIRST STREET       DIRECT       LEGS   TRAF-       RNDBT  SURF  COLL         OWNER       FROM         PRTC  INJ    G  E  LICNS  PED
INVEST D C S L K TIME       FROM      SECOND STREET      LOCTN     (#LANES)  CONTL       DRVWY  LIGHT SVRTY   V# TYPE        TO        P# TYPE  SVRTY  E  X  RES    LOC   ERROR      ACT EVENT     CAUSE
                 UNK                                     06        0                    N      DAY   PDO          PSNGR CAR             01 DRVR  NONE  44 F   OR-Y         026        000            07
                                                                                                                                                               OR<25
                                                                                                                112 UNKN  0     STOP
                                                                                                                   UNKN        NW-SE                                                   011            00
                                                                                                                   UNKNOWN              01 DRVR  NONE  00 Unk UNK         000        000            00
                                                                                                                                                               UNK

01681  N N N N N 05/15/2013     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      RAIN  S-1STOP   01 NONE  0     STRGHT                                                                 07
CITY             WE                   MEYERS RD          NW                  TRF SIGNAL  N      WET   REAR         PRVTE       NW-SE                                                   000            00
                 11A                                     06        0                    N      DAY   INJ          PSNGR CAR             01 DRVR  NONE  59 F   OTH-Y        026        000            07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       NW-SE                                                   011            00
                                                                                                                   PSNGR CAR            01 DRVR  INJC  19 F   OR-Y         000        000            00
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       NW-SE                                                   011            00
                                                                                                                   PSNGR CAR            02 PSNG  INJC  23 F                000        000            00

00155  N N N N N 01/13/2011     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLD   S-1STOP   01 NONE  0     TURN-L                                                                 07
STATE            TH                   MEYERS RD          CN                  TRF SIGNAL  N      WET   REAR         PRVTE       SW-NW                                                   000            00
                 12P                                     02        0                    N      DAY   INJ          PSNGR CAR             01 DRVR  NONE  19 F   OR-Y         043,026    000            07
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     STOP
                                                                                                                   PRVTE       SW-NW                                                   013            00
                                                                                                                   PSNGR CAR            01 DRVR  INJC  25 M   OR-Y         000        000            00
                                                                                                                                                               OR<25

81696  N N N     02/16/2012     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      RAIN  ANGL-OTH  01 NONE  0     STRGHT                                                                 04
NO RPT           TH                   MEYERS RD          CN                  TRF SIGNAL  N      WET   TURN         PRVTE       N -S                                                    000            00
                 10P                                     03        0                    N      DLIT  PDO          PSNGR CAR             01 DRVR  NONE  17 M   OR-Y         020        000            04
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     TURN-L
                                                                                                                   PRVTE       W -N                                                    000            00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  58 M   OR-Y         000        000            00
                                                                                                                                                               OR<25

02761  N N N N N 07/30/2013     14    CASCADE HY SOUTH   INTER     3-LEG     N           N      CLR   O-1TURN   01 NONE  0     STRGHT                                                                 04
CITY             TU                   MEYERS RD          CN                  TRF SIGNAL  N      DRY   TURN         PRVTE       NW-SE                                                   000            00
                 11P                                     03        0                    N      DLIT  INJ          PSNGR CAR             01 DRVR  INJC  51 F   OR-Y         020        000            04
                                                                                                                                                               OR<25
                                                                                                                02 NONE  0     TURN-L
                                                                                                                   PRVTE       SE-SW                                                   000            00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  19 F   OTH-Y        000        000            00
                                                                                                                                                               OR<25

04946  N N N     12/19/2012     17    MEYERS RD          ALLEY               N           N      CLR   ANGL-OTH  01 NONE  0     TURN-L                                                                 02
NONE             WE         150       CASCADE HY SOUTH   SW        (NONE)    NONE        N      WET   TURN         PRVTE       NW-NE                                                   018            00
                 5P                                      08                             N      DLIT  PDO          PSNGR CAR             01 DRVR  NONE  18 M   OR-Y         028        000            02
                                                                   (02)                                                                                        OR<25
                                                                                                                02 NONE  0     TURN-L
                                                                                                                   PRVTE       SW-NW                                                   019            00
                                                                                                                   PSNGR CAR            01 DRVR  NONE  21 M   OR-Y         000        000            00
                                                                                                                                                               OR<25

00468  N N N     02/08/2011     17    MEYERS RD          ALLEY               N           N      CLR   O-1TURN   01 NONE  0     STRGHT                                                     013        02
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        S   D
        P   R S W                                                           INT-TYPE                                            SPCL USE
        E A U C O DATE         CLASS      CITY STREET           RD CHAR    (MEDIAN)   INT-REL      OFFRD  WTHR    CRASH         TRLR QTY      MOVE                        A   S
SER#    E L G H R DAY          DIST       FIRST STREET          DIRECT        LEGS    TRAF-        RNDBT  SURF    COLL          OWNER         FROM          PRTC   INJ    G   E  LICNS  PED
INVEST  D C S L K TIME         FROM       SECOND STREET         LOCTN       (#LANES)  CONTL        DRVWY  LIGHT   SVRTY      V# TYPE          TO         P# TYPE   SVRTY  E   X  RES    LOC    ERROR        ACT EVENT        CAUSE
CITY              TU           341        CASCADE HY SOUTH      SW         (NONE)     UNKNOWN      N      DRY     TURN          PRVTE         NE-SW                                                         000              00
                  5P                                            07                                 N      DAY     INJ           PSNGR CAR                01 DRVR   NONE  32  M   OR-Y          000          000              00
                                                                           (02)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         SW-NW                                                         019              00
                                                                                                                                PSNGR CAR                01 DRVR   INJB  57  M   OR-Y          028,004      000              02
                                                                                                                                                                                                 OR<25
                                                                                                                             03 NONE   0      STOP
                                                                                                                                PRVTE         NW-SE                                                         022              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE  44  M   OR-Y          000          000              00
                                                                                                                                                                                                 OR<25
02084   N N N     06/17/2010       17     MEYERS RD             ALLEY                 N            N      CLR     ANGL-OTH   01 NONE   0      TURN-L                                                                         02
NONE              TH           561        CASCADE HY SOUTH      SW         (NONE)     UNKNOWN      N      DRY     TURN          PRVTE         NW-NE                                                         018              00
                  5P                                            08                                 N      DAY     PDO           PSNGR CAR                01 DRVR   NONE  00  M   UNK           028          000              02
                                                                           (02)                                                                                                                  UNK
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         SW-NW                                                         019              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE  66  M   OR-Y          000          000              00
                                                                                                                                                                                                 OR<25
04972   Y N N N N 12/20/2012       17     MEYERS RD             ALLEY                 N            Y      CLD     FIX OBJ    01 NONE   0      TURN-L                                                            079,088      01
CITY              TH           2112       CASCADE HY SOUTH      SW         (NONE)     NONE         N      WET     FIX           PRVTE         NW-NE                                                         018 079,088      00
                  5P                                            08                                 N      DUSK    PDO           PSNGR CAR                01 DRVR   NONE  53  F   OR-Y          047,080,081 017              01
                                                                           (02)                                                                                                                  OR<25
01183   N N N     03/30/2012       17     MEYERS RD             ALLEY                 N            N      CLR     ANGL-OTH   01 NONE   0      TURN-L                                                                         02
NO RPT            FR           638        CASCADE HY SOUTH      W          (NONE)     UNKNOWN      N      DRY     TURN          PRVTE         N -E                                                          018              00
                  UNK                                           08                                 N      DAY     INJ           PSNGR CAR                01 DRVR   NONE  66  F   OR-Y          028          000              02
                                                                           (02)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      TURN-L
                                                                                                                                PRVTE         W -N                                                          019              00
                                                                                                                                PSNGR CAR                01 DRVR   INJB  87  F   OR-Y          000          000              00
                                                                                                                                                                                                 OR<25
04075   N N N     10/31/2011       17     MEYERS RD             STRGHT                Y            N      UNK     ANGL-STP   01 NONE   0      TURN-R                                                                         08
NONE              MO           20         CASCADE HY SOUTH      SW         (NONE)     L-TURN REF   N      UNK     TURN          PRVTE         NW-SW                                                         000              00
                  9A                                            06                                 N      DAY     PDO           PSNGR CAR                01 DRVR   NONE  19  F   OR-Y          001          000              08
                                                                           (03)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SW-NE                                                         012              00
                                                                                                                                PSNGR CAR                01 DRVR   NONE  47  F   OR-Y          000          000              00
                                                                                                                                                                                                 OR<25
02856   N N N     08/04/2012       17     MEYERS RD             STRGHT                N            N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                         07
NONE              SA           104        CASCADE HY SOUTH      SW         (NONE)     TRF SIGNAL   N      DRY     REAR          PRVTE         SW-NE                                                         000              00
                  2P                                            08                                 N      DAY     INJ           PSNGR CAR                01 DRVR   NONE  50  F   OR-Y          026          000              07
                                                                           (02)                                                                                                                  OR<25
                                                                                                                             02 NONE   0      STOP
                                                                                                                                PRVTE         SW-NE                                                         011              00
                                                                                                                                PSNGR CAR                01 DRVR   INJC  48  F   OR-Y          000          000              00
                                                                                                                                                                                                 OR<25
02314   N N N     06/25/2009       17     MEYERS RD             STRGHT                N            N      CLR     S-1STOP    01 NONE   0      STRGHT                                                                         07
NONE              TH           150        CASCADE HY SOUTH      SW         (NONE)     UNKNOWN      N      DRY     REAR          PRVTE         SW-NE                                                         000              00
                  11A                                           08                                 N      DAY     PDO           PSNGR CAR                01 DRVR   NONE  19  F   OR-Y          026          000              07
                                                                           (02)                                                                                                                  OR<25
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       S   D
       P   R S W                                                    INT-TYPE                                      SPCL USE
       E A U C O DATE      CLASS     CITY STREET         RD CHAR    (MEDIAN) INT-REL     OFFRD WTHR  CRASH       TRLR QTY     MOVE                     A   S
SER#   E L G H R DAY       DIST      FIRST STREET        DIRECT       LEGS   TRAF-       RNDBT SURF  COLL        OWNER        FROM         PRTC INJ    G   E  LICNS PED
INVEST D C S L K TIME      FROM      SECOND STREET       LOCTN      (#LANES) CONTL       DRVWY LIGHT SVRTY    V# TYPE        TO         P# TYPE  SVRTY  E   X  RES   LOC   ERROR      ACT EVENT      CAUSE
                                                                                                               02 NONE   0     STOP
                                                                                                                  PRVTE        SW-NE                                                  011            00
                                                                                                                  PSNGR CAR              01 DRVR  NONE  57  F  OR-Y        000        000            00
                                                                                                                                                               OR<25

01558  N N N     04/28/2012    17    MEYERS RD           STRGHT              N           N     CLR   S-STRGHT 01 NONE   0     STRGHT                                                                 13
NONE             SA        260       CASCADE HY SOUTH    SW        (NONE)    R-GRN-SIG   N     DRY   SS-O        PRVTE        SW-NE                                                  000            00
                 1P                                      08                              N     DAY   PDO         PSNGR CAR              01 DRVR  NONE  59  M  OR-Y        045        000            13
                                                                   (02)                                                                                        OR<25
                                                                                                               02 NONE   0     STRGHT
                                                                                                                  PRVTE        SW-NE                                                  000            00
                                                                                                                  PSNGR CAR              01 DRVR  NONE  00  M  OR-Y        000        000            00
                                                                                                                                                               OR<25

03983  N N N N N 10/24/2012    17    MEYERS RD           STRGHT              N           N     CLD   S-1STOP  01 NONE   0     STRGHT                                                     013        27,07
CITY             WE        1496      CASCADE HY SOUTH    SW        (NONE)    NONE        N     WET   REAR        PRVTE        SW-NE                                                  000            00
                 2P                                      08                              Y     DAY   INJ         PSNGR CAR              01 DRVR  NONE  18  M  OR-Y        016,026    038            27,07
                                                                   (02)                                                                                        OR<25
                                                                                                               02 NONE   0     STOP
                                                                                                                  PRVTE        SW-NE                                                  012 013        00
                                                                                                                  PSNGR CAR              01 DRVR  INJC  29  M  OR-Y        000        000            00
                                                                                                                                                               OR<25
                                                                                                               03 NONE   0     STRGHT
                                                                                                                  PRVTE        NE-SW                                                  022            00
                                                                                                                  PSNGR CAR              01 DRVR  INJC  41  M  OR-Y        000        000            00
                                                                                                                                                               OR<25

03077  N N N N N 08/18/2009    17    FRONTIER PKY        INTER     3-LEG     N           N     CLR   PED      01 NONE   0     STRGHT                                                                 02
CITY             TU        0         MEYERS RD           SE                  STOP SIGN   N     DRY   PED         PRVTE        NW-SE                                                  000            00
                 8P                                      05        0                     N     DAY   INJ         PSNGR CAR              01 DRVR  NONE  85  F  OR-Y        029        000            02
                                                                                                                                                               OR<25

                                                                                                                               -
                                                                                                                               STRGHT    01 PED  INJC  20  F        I XWLK 000       034            00
                                                                                                                               SW   NE

00246  N N N N N 01/22/2013    17    FRONTIER PKY        INTER     3-LEG     N           N     CLD   S-1STOP  01 NONE   0     STRGHT                                                     013        27,07
CITY             TU        0         MEYERS RD           SE                  NONE        N     DRY   REAR        PRVTE        SE-NW                                                  000            00
                 5P                                      06        0                     N     DUSK  INJ         PSNGR CAR              01 DRVR  NONE  18  F  OR-Y        016,043,026 000           27,07
                                                                                                                                                               OR<25
                                                                                                               02 NONE   0     STOP
                                                                                                                  PRVTE        SE-NW                                                  011 013        00
                                                                                                                  PSNGR CAR              01 DRVR  NONE  32  F  OR-Y        000        000            00
                                                                                                                                                               OR<25
                                                                                                               03 NONE   0     STOP
                                                                                                                  PRVTE        SE-NW                                                  022            00
                                                                                                                  PSNGR CAR              01 DRVR  INJC  45  F  OR-Y        000        000            00
                                                                                                                                                               OR<25

00832  N N N N N 03/05/2009    17    FRONTIER PKY        INTER     3-LEG     N           N     CLR   ANGL-OTH 01 NONE   0     STRGHT                                                                 02
CITY             TH        0         MEYERS RD           CN                  UNKNOWN     N     DRY   TURN        PRVTE        NW-SE                                                  000            00
                 6P                                      04        0                     N     DLIT  INJ         PSNGR CAR              01 DRVR  INJC  20  F  OR-Y        000        000            00
                                                                                                                                                               OR<25
                                                                                                               02 NONE   0     TURN-L
                                                                                                                  PRVTE        SW-NW                                                  000            00
                                                                                                                  PSNGR CAR              01 DRVR  NONE  20  M  OR-Y        028        000            02
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URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

MEYERS RD and Intersectional Crashes at MEYERS RD, City of Oregon City, Clackamas County, 01/01/2009 to 10/31/2013

Total crash records: 56

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        S   D
        P   R S W                                                 INT-TYPE                                      SPCL USE
        E A U C O DATE       CLASS      CITY STREET          RD CHAR    (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH        TRLR QTY      MOVE                          A   S
SER#    E L G H R DAY        DIST       FIRST STREET         DIRECT       LEGS    TRAF-        RNDBT  SURF   COLL         OWNER         FROM          PRTC   INJ      G   E  LICNS  PED
INVEST  D C S L K TIME       FROM       SECOND STREET        LOCTN      (#LANES)  CONTL        DRVWY  LIGHT  SVRTY     V# TYPE          TO         P# TYPE   SVRTY    E   X  RES    LOC    ERROR        ACT  EVENT       CAUSE
                                                                                                                                                                            OR<25
04341   N N N     11/18/2010      17    FRONTIER PKY         INTER      3-LEG     N            N      RAIN   O-1TURN   01 NONE   0      STRGHT                                                                              02
NO RPT            TH         0          MEYERS RD            CN                   UNKNOWN      N      WET    TURN         PRVTE         NW-SE                                                               000              00
                  5P                                         01         0                      N      DARK   INJ          PSNGR CAR                  01 DRVR   INJC    16   M  OR-Y          000          000              00
                                                                                                                                                                            OR<25
                                                                                                                   02 NONE   0      TURN-L
                                                                                                                      PRVTE         SE-SW                                                               000              00
                                                                                                                      PSNGR CAR                  01 DRVR   NONE    81   M  OR-Y          028,004      000              02
                                                                                                                                                                            OR<25
03036   N N N     08/16/2009      17    MEYERS RD            STRGHT               Y            N      CLR    S-1STOP   01 NONE   0      STRGHT                                                                              07
NONE              SU         15         FRONTIER PKY         SE         (NONE)    UNKNOWN      N      DRY    REAR         PRVTE         SE-NW                                                               000              00
                  6P                                         06                                N      DAY    PDO          PSNGR CAR                  01 DRVR   NONE    17   M  OR-Y          026          000              07
                                                                        (02)                                                                                                OR<25
                                                                                                                   02 NONE   0      STOP
                                                                                                                      PRVTE         SE-NW                                                               012              00
                                                                                                                      PSNGR CAR                  01 DRVR   NONE    44   F  OR-Y          000          000              00
                                                                                                                                                                            OR<25
00552   Y N N N N 02/09/2009      17    MEYERS RD            STRGHT               N            N      CLR    S-1STOP   01 NONE   0      STRGHT                                                                              01
CITY              MO         100        FRONTIER PKY         SE         (NONE)    UNKNOWN      N      DRY    REAR         PRVTE         SE-NW                                                               000              00
                  12P                                        08                                N      DAY    INJ          PSNGR CAR                  01 DRVR   NONE    28   M  OR-Y          026,047      000              01
                                                                        (02)                                                                                                OR<25
                                                                                                                   02 NONE   0      STOP
                                                                                                                      PRVTE         SE-NW                                                               012              00
                                                                                                                      PSNGR CAR                  01 DRVR   INJC    22   M  OR-Y          000          000              00
                                                                                                                                                                            OR<25
                                                                                                                   02 NONE   0      STOP
                                                                                                                      PRVTE         SE-NW                                                               012              00
                                                                                                                      PSNGR CAR                  02 PSNG   INJA    22   F                000          000              00

03805   N N N N N 10/12/2012      17    GAFFNEY LN           INTER      3-LEG     N            N      RAIN   S-1STOP   01 NONE   0      STRGHT                                                                              07
CITY              FR         0          MEYERS RD            SE                   STOP SIGN    N      WET    REAR         PRVTE         SE-NW                                                               000              00
                  10P                                        06         0                      N      DLIT   PDO          PSNGR CAR                  01 DRVR   NONE    18   F  OR-Y          026,043      000              07
                                                                                                                                                                            OR<25
                                                                                                                   02 NONE   0      STOP
                                                                                                                      PRVTE         SE-NW                                                               011              00
                                                                                                                      PSNGR CAR                  01 DRVR   NONE    42   M  OR-Y          000          000              00
                                                                                                                                                                            OR<25
04527   Y N N N N 11/21/2009      16    GAFFNEY LN           INTER      3-LEG     N            N      RAIN   ANGL-OTH  01 NONE   0      TURN-R                                                                              08,01
CITY              SA         0          MEYERS RD            NW                   STOP SIGN    N      WET    TURN         PRVTE         NE-NW                                                               000              00
                  12A                                        06         0                      N      DLIT   INJ          PSNGR CAR                  01 DRVR   NONE    20   M  OR-Y          001,047      000              08,01
                                                                                                                                                                            OR<25
                                                                                                                   02 NONE   0      STRGHT
                                                                                                                      PRVTE         NW-SE                                                               000              00
                                                                                                                      PSNGR CAR                  01 DRVR   INJC    19   F  OR-Y          000          000              00
                                                                                                                                                                            OR<25
00441   N N N     02/06/2011      17    GAFFNEY LN           INTER      3-LEG     N            N      RAIN   ANGL-OTH  01 NONE   0      STRGHT                                                                              02
NONE              SU         0          MEYERS RD            CN                   STOP SIGN    N      WET    TURN         PRVTE         SE-NW                                                               015              00
                  UNK                                        01         0                      N      DARK   PDO          PSNGR CAR                  01 DRVR   NONE    75   F  OR-Y          000          000              00
                                                                                                                                                                            OR<25
                                                                                                                   02 NONE   0      TURN-L
                                                                                                                      PRVTE         NE-SE                                                               015              00
```

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

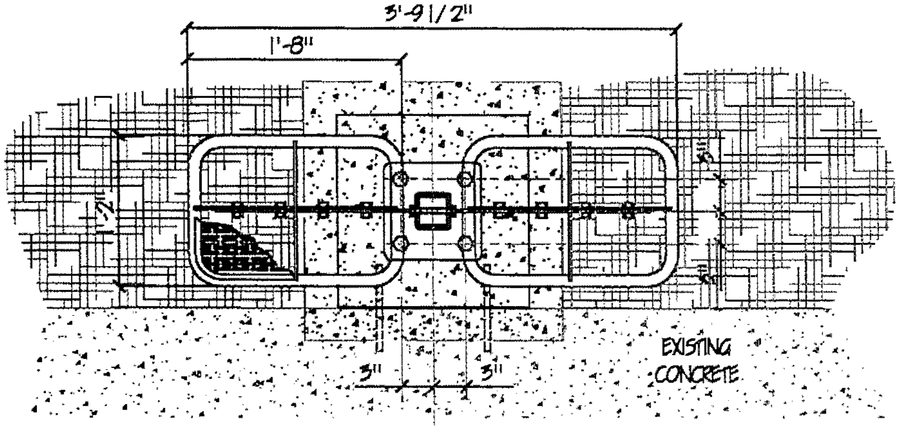
```
        S   D
        P   R S W                                                         INT-TYPE                                           SPCL USE
        E A U C O DATE        CLASS      CITY STREET          RD CHAR     (MEDIAN)  INT-REL      OFFRD  WTHR   CRASH         TRLR QTY      MOVE                        A  S
SER#    E L G H R DAY         DIST       FIRST STREET         DIRECT         LEGS   TRAF-        RNDBT  SURF   COLL          OWNER         FROM         PRTC   INJ     G  E  LICNS  PED
INVEST  D C S L K TIME        FROM       SECOND STREET        LOCTN       (#LANES)  CONTL        DRVWY  LIGHT  SVRTY      V# TYPE          TO        P# TYPE   SVRTY   E  X  RES    LOC    ERROR       ACT EVENT       CAUSE
                                                                                                                             PSNGR CAR               01 DRVR   NONE   00 Unk UNK           028         000             02
                                                                                                                                                                             UNK

00238   N N N     01/20/2011      16     LELAND RD            INTER      4-LEG     N            N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                       07
NO RPT            TH          0          S MEYERS RD          SW                   STOP SIGN    N      DRY    REAR          PRVTE         SW-NE                                                       000             00
                  7A                                          06         0                      N      DAY    INJ           PSNGR CAR               01 DRVR   NONE   16 F   OR-Y          026         000             07
                                                                                                                                                                             OR<25
                                                                                                                          02 NONE   0      STOP
                                                                                                                             PRVTE         SW-NE                                                       011             00
                                                                                                                             PSNGR CAR               01 DRVR   INJC   18 F   OR-Y          000         000             00
                                                                                                                                                                             OR<25

03638   N N N     10/01/2012      16     LELAND RD            INTER      4-LEG     N            N      CLR    ANGL-OTH   01 NONE   0      STRGHT                                                                       02
NONE              MO          0          S MEYERS RD          CN                   STOP SIGN    N      DRY    ANGL          PRVTE         SW-NE                                                       015             00
                  8P                                          01         0                      N      DLIT   PDO           PSNGR CAR               01 DRVR   NONE   00 Unk UNK           028         000             02
                                                                                                                                                                             UNK
                                                                                                                          02 NONE   0      STRGHT
                                                                                                                             PRVTE         N -S                                                        000             00
                                                                                                                             PSNGR CAR               01 DRVR   NONE   36 M   OR-Y          000         000             00
                                                                                                                                                                             OR<25

02569   N N N N N 07/17/2013      17     MEYERS RD            INTER      CROSS     N            N      CLR    ANGL-OTH   01 NONE   0      STRGHT                                                                       27,03
CITY              WE          0          SQUIRE DR            CN                   STOP SIGN    N      DRY    TURN          PRVTE         SE-NW                                                       000             00
                  2P                                          02         0                      N      DAY    PDO           PSNGR CAR               01 DRVR   NONE   63 M   OR-Y          000         000             00
                                                                                                                                                                             OR<25
                                                                                                                          02 NONE   0      TURN-R
                                                                                                                             PRVTE         NE-NW                                                       000             00
                                                                                                                             PSNGR CAR               01 DRVR   NONE   69 F   OR-Y          016,021     038             03
                                                                                                                                                                             OR<25

01278   N N N N N 04/15/2013      17     MEYERS RD            STRGHT               N            Y      CLD    FIX OBJ    01 NONE   0      STRGHT                                                          042,053      10
CITY              MO          130        SQUIRE DR            SE         (NONE)    UNKNOWN      N      WET    FIX           PRVTE         SE-NW                                                       000 042,053      00
                  2A                                          08                                N      DLIT   PDO           PSNGR CAR               01 DRVR   NONE   38 F   OTH-Y         080         000             10
                                                                         (02)                                                                                                OR<25

00856   Y N N N N 03/06/2009      17     MEYERS RD            STRGHT               N            N      CLR    S-1STOP    01 NONE   0      STRGHT                                                                       01
CITY              FR          1000       SQUIRE DR            SE         (NONE)    NONE         N      DRY    REAR          PRVTE         SE-NW                                                       000             00
                  5P                                          08                                N      DAY    INJ           PSNGR CAR               01 DRVR   NONE   28 M   OR-Y          026,047     000             01
                                                                         (02)                                                                                                OR<25
                                                                                                                          02 NONE   0      STOP
                                                                                                                             PRVTE         SE-NW                                                       012             00
                                                                                                                             PSNGR CAR               01 DRVR   INJC   29 M   OR-Y          000         000             00
                                                                                                                                                                             OR<25
```

Appendix C

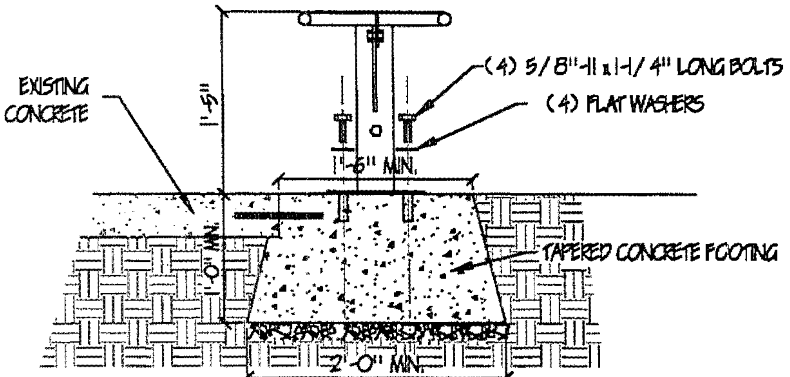
Trimet Ridership Data
Seating Cut-sheet

SIMME-SEAT

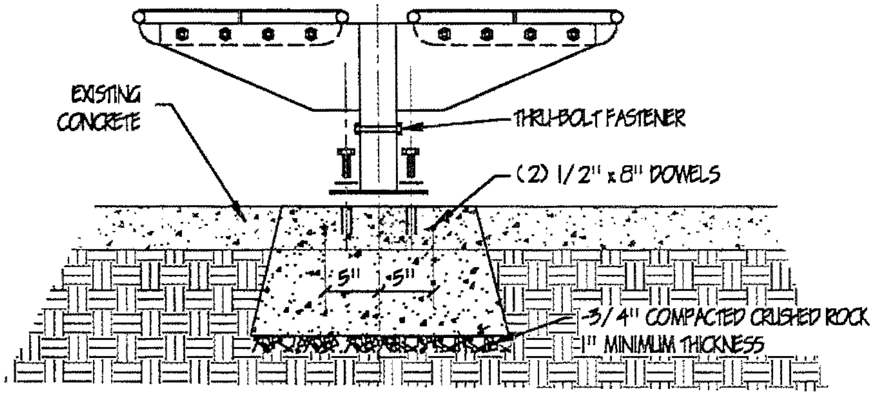
INSTALLATION INSTRUCTIONS



PLAN



SIDE ELEVATION



FRONT ELEVATION

INSTALLATION STEPS:

1. EXCAVATE 13" MIN. BELOW SURFACE ADJACENT TO EXISTING CONCRETE, PLACE AND COMPACT -3/4" CRUSHED ROCK, 1" MIN THICKNESS
2. DRILL TWO 5/8" HOLES INTO EXISTING CONCRETE AT LOCATIONS SHOWN AND EPOXY 2 #4 REBAR DOWELS INTO HOLES
3. FORM FOR AND POUR 4" MIN. THICK CONCRETE PAD FOR SEAT
4. AFTER CONCRETE CURES, STRIP FORMS AND BACKFILL AROUND CONCRETE PAD
5. DRILL FOUR 7/8" x 2-1/2" HOLES AT LOCATIONS SHOWN AND INSERT EXPANSION ANCHORS (RAMSET/REDHEAD MULTI-SET II DROP IN CAT. NO. SRM-58, OR EQUAL) ACCORDING TO MANUFACTURER'S INSTRUCTIONS
6. INSTALL SEAT SUPPORT, **SHIM AS REQUIRED TO LEVEL**, AND SECURE WITH FOUR 5/8" x 1-1/4" HEX HEAD MACHINE BOLTS AND WASHERS
7. ATTACH SEATS WITH 1/2" BOLTS & NUTS PROVIDED
8. AFTER INSTALLATION OF CUSTOMER'S SIGN POST INTO SEAT SUPPORT TUBE, SECURE WITH THRU-BOLT AND NUT PROVIDED

INSTALLATION ADJACENT TO EXISTING CONCRETE

Simme L.L.C.
555 Cherry Drive
Eugene, OR 97401
TEL. (541)338-7995
E-MAIL: SIMME-SEAT@HOME.COM

DATE: 3-20-2K
FILE NO: SS-2.DWG
DWN BY: JB
APP BY: CS
PLOT SCALE: NONE
DWG NO: **SS-2**

TriMet Passenger Census - Fall 2013
All Day Ons and Offs by Route and Stop
Weekdays

Route: 33-McLoughlin - To Portland City Center

*

Stop Location	Location ID	Direction	Position	Ons	Offs	Total	Monthly Lifts
Clackamas Community College	1068	S	AT	197	1	198	56
Molalla & Lazy Creek Ln	2828	N	OP	21	3	24	0
Molalla & Char Diaz Dr	9041	N	OP	7	2	9	0
Molalla & Oregon City Post Office	9042	N	AT	4	1	5	2
Molalla & Gaffney Ln	2841	N	NS	33	4	37	20
Molalla & Clairmont	2837	N	FS	67	3	70	7
Beavercreek & Danielson Dr	13592	W	NS	56	7	63	15
300 Block Beavercreek Rd	6115	W	AT	19	2	21	2
Beavercreek & Library Ct	9517	N	OP	42	9	51	11
200 Block Warner - Milne	6114	W	OP	4	1	5	0
Warner - Milne & Linn	6121	W	NS	7	6	13	4
Linn & Williams <Shelter>	3418	N	NS	36	3	39	1
Linn & Ethel <possible seating>	3410	N	NS	18	5	23	5
Linn & Holmes	3412	N	NS	11	3	14	0
Linn & Narain	3413	N	FS	4	1	5	0
Linn & Charman	3409	N	OP	3	3	6	0
Linn & Pearl	3416	N	FS	13	6	19	2
Linn & 4th	3423	N	OP	2	5	7	2
5th & Monroe	7621	W	NS	7	8	15	2
5th & Jefferson	7610	W	NS	1	5	6	4
5th & Washington (Oregon City)	8732	W	NS	5	7	12	18
5th & High	7604	W	NS	6	4	10	4
High & 3rd	2665	S	NS	8	6	14	2
S High & 1st	2663	S	FS	3	2	5	1
S 2nd & Tumwater	7101	W	FS	11	4	15	1
Railroad & 7th	4784	N	NS	2	8	10	0
9th & Main	8096	W	NS	2	4	6	0
Oregon City Transit Center	8758	N	AT	318	155	473	86
McLoughlin & Oregon City Shopping Center	3842	N	AT	39	21	60	11
McLoughlin & W Arlington	10328	N	FS	95	24	119	10
McLoughlin & W Gloucester	10327	N	FS	51	11	62	5
19300 Block McLoughlin	10421	N	AT	12	3	15	14
SE McLoughlin & Glen Echo	10326	N	FS	56	22	78	7
SE McLoughlin & Meldrum	8819	N	FS	9	5	14	1
SE McLoughlin & Hull Ave	3790	N	FS	29	10	39	2
SE McLoughlin & Jennings	3791	N	FS	68	25	93	31
SE McLoughlin & Boardman	3781	N	FS	54	20	74	3
SE McLoughlin & Roethe	3800	N	FS	104	42	146	31
SE McLoughlin & Naef	3794	N	FS	46	19	65	7
SE McLoughlin & Vineyard	3807	N	FS	38	27	65	15
SE McLoughlin & Holly Farm Mall	3789	N	AT	16	19	35	17
SE McLoughlin & Concord	3783	N	FS	69	43	112	14

TriMet Passenger Census - Fall 2013
All Day Ons and Offs by Route and Stop
Weekdays

Route: 33-McLoughlin - To Oregon City TC or Clackamas Community College

Stop Location	Location ID	Direction	Position	Ons	Offs	Total	Monthly Lifts
McLoughlin & River Rd	10325	S	NS	26	60	86	10
McLoughlin & Clackamette Dr	3831	S	NS	17	38	55	13
Oregon City Transit Center	8761	S	AT	199	150	349	50
Main & 8th St	3727	W	NS	9	11	20	2
Oregon City Transit Center	8758	N	AT	3	184	187	0
2nd & Tumwater	11331	E	NS	4	10	14	1
S High & S 1st	2661	N	NS	1	1	2	0
S High & 1st	2662	N	NS	2	3	5	1
High & 3rd	2664	N	NS	6	8	14	3
High & 5th	2666	N	NS	4	4	8	2
5th & Washington (Oregon City)	7643	E	NS	8	10	18	24
5th & Jefferson	7609	E	NS	3	3	6	2
5th & Monroe	7620	E	NS	10	11	21	1
Linn & 4th	3422	S	NS	3	5	8	0
Linn & Oak	3414	S	NS	5	14	19	1
Linn & Charman	3408	S	FS	2	3	5	0
Linn & Park	3415	S	FS	1	4	5	0
Linn & Holmes	3411	S	NS	2	19	21	0
Linn & A V Davis	3407	S	NS	4	21	25	8
Linn & Williams	9559	S	OP	3	33	36	3
Warner - Milne & Linn	6120	E	FS	2	8	10	0
100 Block Warner - Milne	6113	E	AT	1	10	11	0
Warner - Milne & Beavercreek	6118	E	NS	1	11	12	2
Beavercreek & Library Ct	6117	S	FS	7	32	39	5
Beavercreek & Red Soils Ct	6122	E	NS	1	18	19	2
400 Block Beavercreek Rd	10469	E	AT	3	38	41	4
Beavercreek & Molalla	9516	E	NS	1	17	18	5
Molalla & Clairmont	2838	S	FS	3	52	55	9
Molalla & Gaffney Ln	2842	S	FS	4	29	33	9
Molalla & Garden Meadow	11846	S	FS	1	6	7	3
Molalla & Char Diaz Dr	2827	S	FS	0	3	3	1
Molalla & Sebastian Way	2830	E	NS	1	12	13	0
Clackamas Community College	1068	S	AT	0	189	189	1

Appendix D

DKS Associates
Roundabout Analysis Memorandum

720 SW Washington St.
Suite 500
Portland, OR 97205
503.243.3500
www.dksassociates.com

MEMORANDUM

DATE: August 4, 2014

TO: Dave Brokaw, Wallis Engineering

FROM: Nate Schroeder, P.E., PTOE

SUBJECT: **Linn Ave Concept Plan – Roundabout Analysis Memorandum** P#13220-000

The purpose of this memorandum is to provide a summary of the traffic analysis refinement that was completed for the proposed roundabout alternatives at the Linn Avenue/Warner Milne Road/Warner Parrott Road/Leland Road intersection. Additionally, key design parameters will be discussed to assist in the development of conceptual designs for the roundabout. The following sections will discuss the project background, traffic analysis, field observations, roundabout characteristics, and recommendations.

Project Background

In 2008, DKS Associates was asked to provide sketches of potential roundabout concepts for the intersection of Linn Avenue/Warner Milne Road/Warner Parrott Road/Leland Road. These sketches were intended to show whether or not a roundabout could be a feasible option for this location, and no traffic analysis was completed as part of this work. The first option was a four-legged roundabout at the Linn Avenue/Warner Milne Road/Warner Parrott Road/Leland Road intersection, which would restrict access to Central Point Road to right-in/right-out/left-in only. The second option was a five-legged roundabout that included the Central Point Road approach, which makes the roundabout larger but doesn't restrict access. Option 1 is shown in Figure 1, and Option 2 is shown in Figure 2.

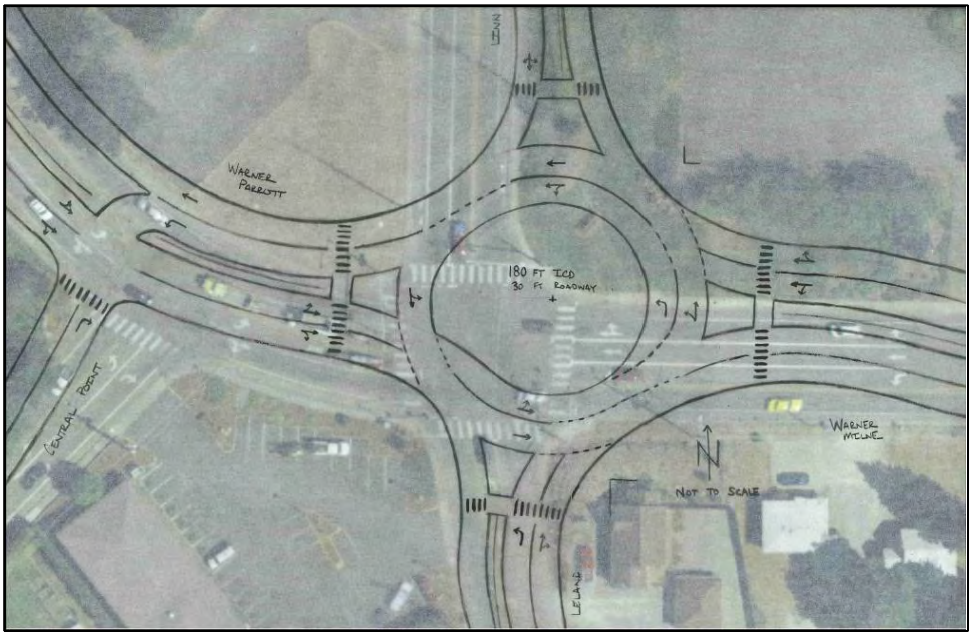


Figure 1 – Four-legged roundabout concept (Option 1 – 2008)

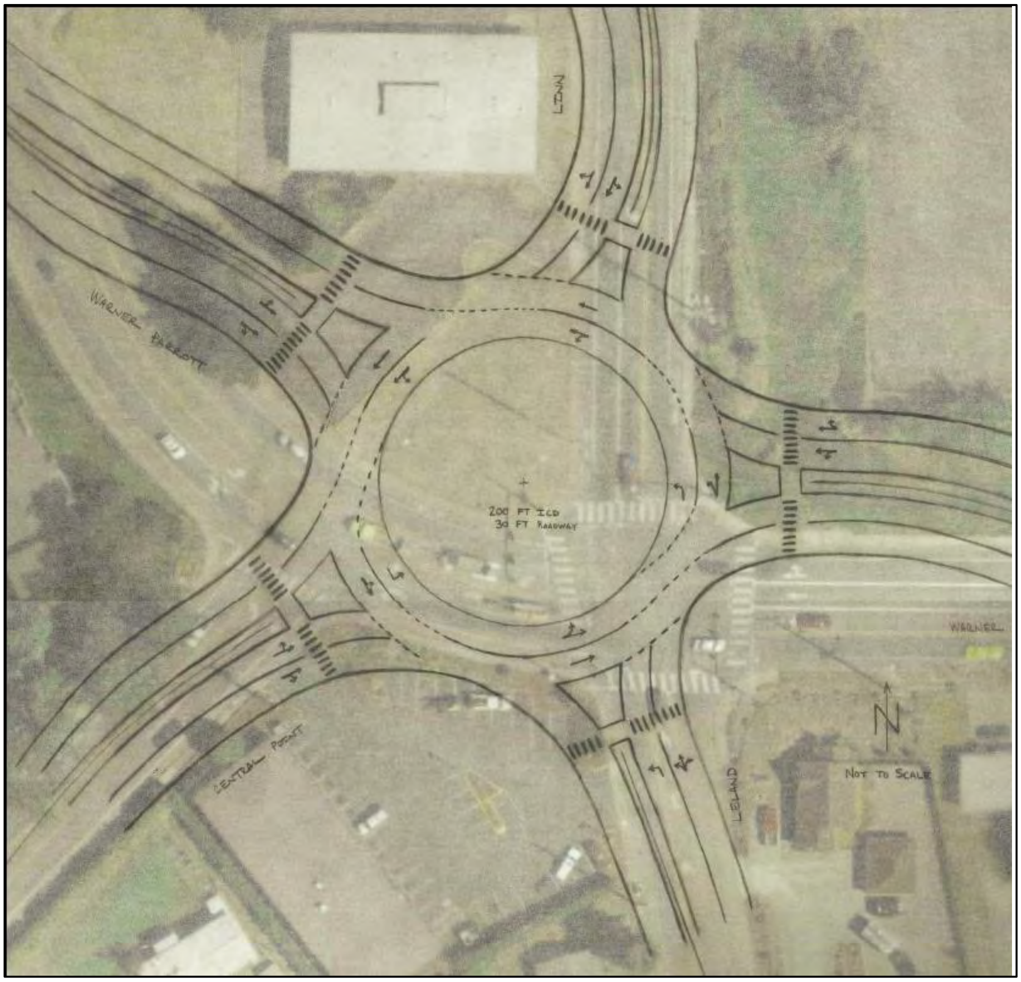


Figure 2 – Five legged roundabout concept (Option 2 – 2008)

As part of the recent Oregon City Transportation System Plan (TSP) update process, it was confirmed that a roundabout was the preferred treatment option for this intersection and would operate within acceptable standards. The traffic analysis for the TSP update focused on only one of the options for the roundabout configuration. This study prepares a more detailed analysis to determine the specific lane configuration that would be recommended for a roundabout at this location.

Traffic Analysis

Traffic operations for the two options were analyzed using Sidra Intersection 6, which is the same software that was used during the TSP update process. The future traffic volumes developed as part of the TSP update were used for this analysis. Based on the initial analysis results, the following changes were made to the initial lane configurations assumed previously:

- Option 1
    - Dedicated right-turn only lane added to the southbound approach
    - Northbound approach changed from a left-turn lane and shared through-right lane to a shared left-through lane and right-turn only lane

- Option 2
    - Southbound approach changed from a shared through-right lane and shared through-left lane to a shared left-through lane and right-turn only lane
    - Northbound approach changed from a left-turn lane and shared through-right lane to a shared through-left lane and right-turn only lane
    - Exit to Central Point Road reduced to a single lane

The actual lane configurations used for the analysis are shown in Figure 3.

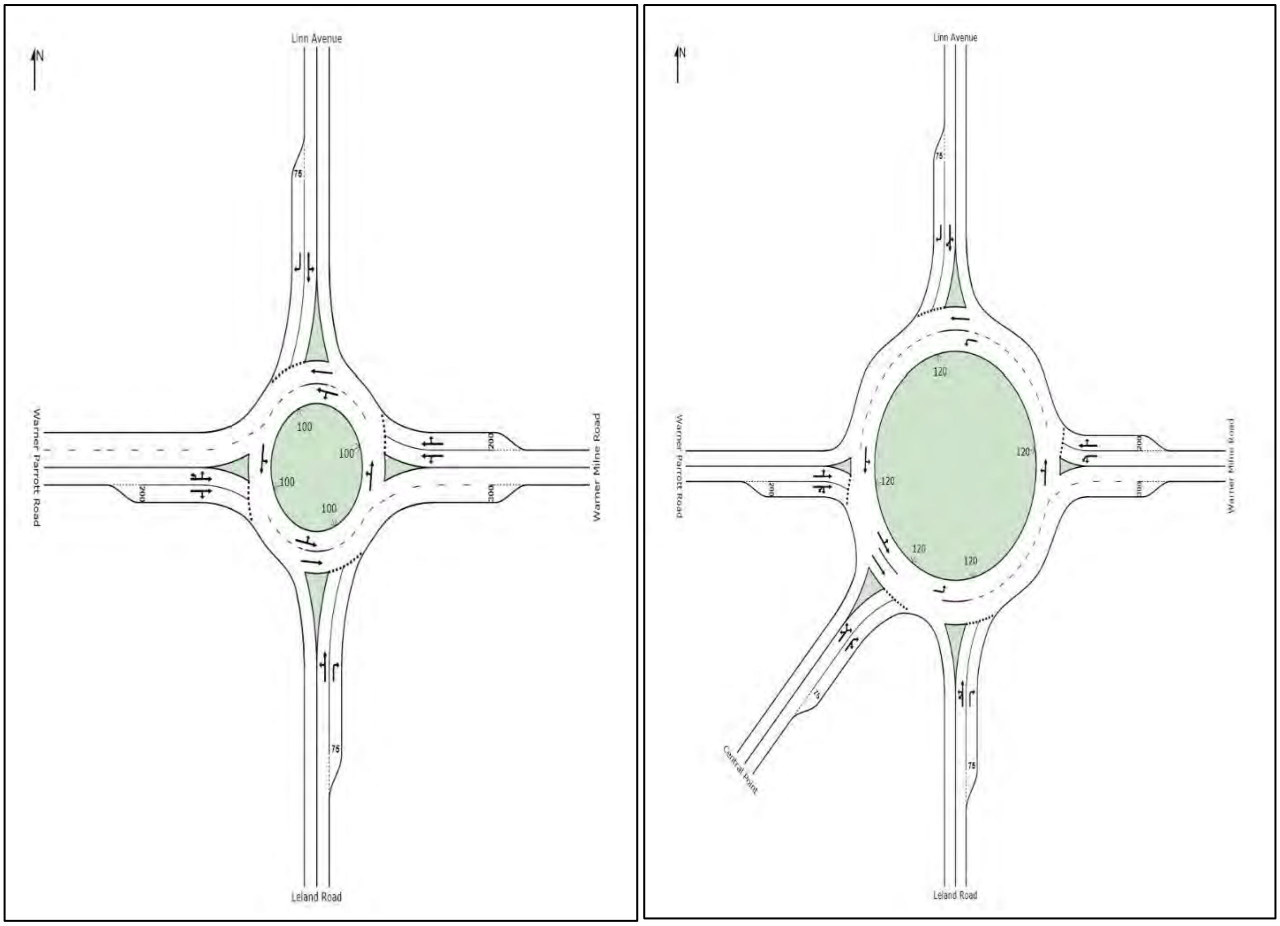


Figure 3 – Sidra Layout of Four-legged and Five legged roundabout concepts

The traffic analysis results using the refined lane geometry above and forecasted traffic volumes from the TSP update are shown in Table 1.

Table 1 – 2035 PM Peak Traffic Analysis Results

Intersection	Option 1 (Four-legged Roundabout)			Option 2 (Five-legged Roundabout)		
	LOS	Delay	V/C	LOS	Delay	V/C
Linn Avenue/Warner Milne Road/Warner Parrott Road/Leland Road	C	25.2	0.77	C	29.5	0.83

Notes:
Unsignalized Intersection Operations (Roundabout controlled)
LOS = level of service for the critical approach to the roundabout
Delay = average vehicle delay for the critical approach to the roundabout
V/C Ratio = volume to capacity ratio for the critical approach to the roundabout

Both options operate within acceptable standards during the 2035 PM peak, with the lane geometry assumed as part of this analysis. Detailed Sidra results are attached to this memorandum.

Field Observations

In an effort to validate traffic operations, and observe existing constraints, a site visit was conducted on January 15, 2014 during the PM peak. Extensive queues were observed along Warner Parrott Road in the eastbound direction, which at times prevented northbound vehicles on Central Point from turning right onto Warner Parrott Road. Queues in excess of 500 feet were also observed along Warner Milne Road in the westbound direction.

Existing constraints observed in the field included numerous driveways and buildings within the area that may be impacted by the installation of a roundabout. In particular, the driveways accessing the properties on the south side of the intersection will require additional consideration during the refined design process. The proximity of these accesses to the roundabout could create challenges related to access spacing and vehicular conflict points. However, with the ability of the roundabout to facilitate U-turns, it’s possible that the accesses could be restricted to right-in/right-out. Doing this could eliminate or reduce these challenges, while still providing access to the businesses.

Based on field observations and aerial photos, right-of-way appears to be constrained in a few locations near the intersection. However, no actual survey work was completed as part of this analysis, and right-of-way would need to be evaluated further as part of the design process.

Roundabout Characteristics

Generally speaking, roundabouts present a safer form of intersection control than a traffic signal. The main reasons for this are the relatively low vehicular speeds and reduced number of vehicular conflict points, which results in less severe collisions in roundabouts compared to those at signalized intersections. Other benefits of roundabouts are lower annual maintenance costs than traffic signals, and the potential for a more aesthetic intersection control treatment.

While there are many benefits to roundabouts, there are also potential drawbacks. Typically roundabouts require substantially more right-of-way than a traffic signal, which can be problematic in constrained locations. Additionally, the upfront construction costs are usually significantly higher than those of a signalized intersection. Multi-lane roundabouts also pose a potential safety risk for visually impaired pedestrians, due to pedestrians having to cross multiple lanes without a signalized crossing. Current guidelines recommend the installation of a pedestrian hybrid beacon for all multi-lane approaches, to address this safety concern.

Recommendations

Both options appear to be feasible from a traffic operations standpoint, operating well within acceptable standards. Development of more detailed concepts that can be used to evaluate potential impacts to access and right-of-way may help in determining the preferred option. NCHRP Report 672 – 2nd Edition of the FHWA Roundabouts an Informational Guide presents a thorough discussion of design parameters that should be considered as part of the revised design process. The following sections provide key design parameters that are recommended for the concept development being completed as part of the Linn Avenue Concept Plan:

General Parameters

- Circulatory roadway width should be approximately 20 feet for single lanes and 30 feet for two lanes
- Approach lane widths should be between 13 feet and 15 feet, and may even require some flaring at the yield line
- Splitter islands should be a minimum of 50 feet in length (100 feet is desirable), and provide adequate space for a pedestrian refuge area

Option 1 – Four-legged Roundabout

- The inscribed circle diameter should be in the range of 150-180 feet, which is consistent with NCHRP Report 672 - 2nd Edition of the FHWA Roundabouts an Informational Guide
- The storage length for the northbound and southbound right-turn lanes should be 75 feet, which could be reduced to 50 feet if space is limited
- The second westbound travel lane should be developed at least 150 feet from the roundabout to provide adequate storage
- The second eastbound travel lane should be developed prior to the intersection with Central Point Road, which is the same as the existing condition
- Storage for the left-turn on Warner Parrott Road to Central Point Road should be at least 75 feet, and could possibly be designed as a drop lane as shown in the original concept

Option 2 – Five-legged Roundabout

- The inscribed circle diameter should be in the range of 180-200 feet, which is consistent with NCHRP Report 672 - 2nd Edition of the FHWA Roundabouts an Informational Guide
- The storage length for the northbound and southbound right-turn lanes should be 75 feet, which could be reduced to 50 feet if space is limited
- The second westbound travel lane should be developed at least 150 feet from the roundabout to provide adequate storage
- The second eastbound travel lane should be developed at least 150 feet from the roundabout to provide adequate storage
- The storage length for the second lane on Central Point Road should be at least 75 feet

Prior to development of designs beyond the conceptual level, it is recommended that further analysis be completed for the AM and midday time periods. Additionally, interim years should be evaluated to determine if a staged approach to construction is appropriate or beneficial.

APPENDIX

Sidra Analysis Results

Definitions of Key Terms (from Sidra User's Manual):

Average Speed

The average vehicle speed including the effect of all delays (control delay, geometric delay, etc.).

Back of Queue

Maximum extent of the queue relative to the yield line during a gap-acceptance cycle, expressed in terms of vehicles and distance (feet).

Degree of Saturation

The ratio of arrival (demand) flow rate to capacity during a given flow period. Also known as the volume to capacity ratio.

Delay

The additional travel time experienced by a vehicle or pedestrian with reference to a base travel time (e.g. the free-flow travel time).

Demand Flow (Demand Volume)

The number of vehicles or pedestrians arriving during a given period as measured at the back of queue (as distinct from departure flows measured in front of the queue).

Level of Service

An index of the operational performance of traffic on a given traffic lane, roadway or intersection, based on service measures such as delay, degree of saturation, density and speed during a given flow period.

Proportion Queued

Proportion of traffic that is queued due to the effects of traffic control and the existence of other vehicles.

Stop Rate

Average number of all acceleration-deceleration maneuvers including queue move-ups, partial stops and geometric stops.

MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3	L2	158	2.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
8	T1	189	1.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
18	R2	121	0.0	0.281	13.0	LOS B	1.3	32.5	0.73	1.46	25.5
Approach		468	1.1	0.537	14.1	LOS B	3.7	93.7	0.80	0.85	24.6
East: Warner Milne Road											
1	L2	168	0.0	0.582	13.3	LOS B	5.4	136.4	0.84	1.66	25.1
6	T1	647	2.0	0.582	12.7	LOS B	5.5	139.9	0.84	1.63	25.7
16	R2	189	0.0	0.582	12.2	LOS B	5.5	139.9	0.84	1.60	26.3
Approach		1005	1.3	0.582	12.7	LOS B	5.5	139.9	0.84	0.81	25.7
North: Linn Avenue											
7	L2	179	0.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
4	T1	284	1.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
14	R2	126	2.0	0.388	19.9	LOS B	1.8	45.2	0.77	1.62	22.6
Approach		589	0.9	0.766	25.2	LOS C	6.7	168.2	0.89	1.03	20.7
West: Warner Parrott Road											
5u	U	58	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
5	L2	95	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
2	T1	511	2.0	0.672	15.7	LOS B	7.7	195.1	0.93	1.96	24.2
12	R2	120	2.0	0.433	12.7	LOS B	3.1	78.2	0.83	1.67	26.0
Approach		783	2.0	0.672	15.5	LOS B	7.7	195.1	0.92	0.97	24.4
All Vehicles		2846	1.4	0.766	16.3	LOS B	7.7	195.1	0.86	0.91	23.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalized Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3b	L3	88	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
3	L2	75	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
8	T1	196	1.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
18	R2	125	0.0	0.258	11.3	LOS B	1.2	29.4	0.70	1.40	26.6
Approach		484	1.1	0.499	12.1	LOS B	3.4	84.8	0.76	0.81	25.7
East: Warner Milne Road											
1	L2	174	0.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
1a	L1	359	2.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
6	T1	300	2.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
16	R2	189	0.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
Approach		1022	1.3	0.587	12.2	LOS B	5.5	139.7	0.84	0.80	25.3
North: Linn Avenue											
7	L2	179	0.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
4	T1	293	1.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14a	R1	70	2.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14	R2	59	2.0	0.176	13.9	LOS B	0.7	17.0	0.71	1.43	25.3
Approach		601	0.9	0.833	29.5	LOS C	7.8	195.6	0.90	1.09	19.7
West: Warner Parrott Road											
5	L2	46	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
2	T1	251	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
12	R2	63	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
12b	R3	136	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
Approach		496	2.0	0.634	23.9	LOS C	7.3	185.6	1.00	1.20	21.4
SouthWest: Central Point Road											
5bx	L3	60	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
5ax	L1	50	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
12ax	R1	266	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	1.59	25.8
12bx	R3	64	2.0	0.290	12.0	LOS B	1.3	33.0	0.72	1.44	26.4
Approach		440	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	0.79	25.8
All Vehicles		3043	1.4	0.833	17.6	LOS B	7.8	195.6	0.85	0.92	23.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalized Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Tuesday, February 18, 2014 7:37:30 AM
SIDRA INTERSECTION 6.0.15.4263

Appendix E

Revised City of Oregon City Municipal Code
Chapter 12.04.180 Street Design

~~Type of Street~~	~~Maximum Right-of-Way Width~~	~~Pavement Width~~
~~Minor arterial~~	~~114 feet~~	~~88 feet~~
~~Collector street~~	~~86 feet~~	~~62 feet~~
~~Neighborhood Collector street~~	~~81 feet~~	~~59 feet~~
~~Local street~~*	~~54 feet~~	~~32 feet~~
~~Alley~~	~~20 feet~~	~~16 feet~~

~~B. The applicant may submit an alternative street design plan that varies from the street design standards identified above. An alternative street design plan may be approved by the city engineer if it is found the alternative allows for adequate and safe traffic, pedestrian and bicycle flows and transportation alternatives and protects and provides adequate multi-modal transportation services for the development as well as the~~

All development regulated by this Chapter shall provide street improvements in compliance with the standards in ~~the~~ Figure ~~in~~ 12.04.180 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The standards provided below are maximum design standards and may be reduced with an alternative street design which may be approved based on the modification criteria in 12.04.007.

Figure 12.04.180 Example Residential Local Street

Table 12.04.180 Street Design

To read the table below, select the road classification as identified in the Transportation System Plan and the Comprehensive Plan designation of the adjacent properties to find the maximum design standards for the road cross section. If the Comprehensive Plan designation on either side of the street differs, the wider right-of-way standard shall apply. The steps for determining the appropriate cross-section of a street are found in the Transportation System Plan.

Road Classification	**Comprehensive Plan Designation**	**Right-of-Way Width**	**Pavement Width**	**Public Access**	**Sidewalk**	**Landscape Strip**	**Bike Lane**	**Street Parking**	**Travel Lanes**	**Median**
Major Arterial	Mixed Use, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft.x5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	120 ft.	88 ft.	0.5 ft.	5 ft.	10.5~~'~~ ft.	6 ft.	N/A	(5) 14 ft. Lanes	6 ft.
	Residential	126 ft.	94 ft.	0.5 ft.	5 ft.	10.5~~'~~ ft.	6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.

Road Classification	**Comprehensive Plan Designation**	**Right-of-Way Width**	**Pavement Width**	**Public Access**	**Sidewalk**	**Landscape Strip**	**Bike Lane**	**Street Parking**	**Travel Lanes**	**Median**
Minor Arterial	Mixed Use, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft.x5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	118 ft.	86 ft.	0.5 ft.	5 ft.	10.5~~'~~ ft.	6 ft.	7 ft.	(5) 12 ft. Lanes	N/A

	Residential	100 ft.	68 ft.	0.5 ft.	5 ft.	10.5~~'~~ ft.	6 ft.	7 ft.	(3) 12 ft. Lanes	6 ft.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Collector	Mixed Use, Commercial or Public/Quasi Public	86 ft.	64 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft.x5 ft. tree wells		6 ft.	8 ft.	(3) 12 ft. Lanes	N/A
	Industrial	88 ft.	62 ft.	0.5 ft.	5 ft.	7.5 ft.	6 ft.	7 ft.	(3) 12 ft. Lanes	N/A
	Residential	85 ft.	59 ft.	0.5 ft.	5 ft.	7.5 ft.	6 ft.	7 ft.	(3) 11 ft. Lanes	N/A

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Local	Mixed Use, Commercial or Public/Quasi Public	62 ft.	40 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft.x5 ft. tree wells		N/A	8 ft.	(2) 12 ft. Lanes	N/A
	Industrial	60 ft.	38 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 19 ft. Shared Space			N/A
	Residential	54 ft.	32 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 16 ft. Shared Space			N/A

1. Pavement width includes, bike lane, street parking, travel lanes and median.
2. Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.
3. A 0.5~~'~~ foot curb is included in landscape strip or sidewalk width.
4. Travel lanes may be through lanes or turn lanes.
5. The 0.5~~'~~ foot public access provides access to adjacent public improvements.
6. Alleys shall have a minimum right-of-way width of 20 feet and a minimum pavement width of 16 feet. If alleys are provided, garage access shall be provided from the alley.

12.04.190 Street Design--Alignment.

The centerline of streets shall be:

A. Aligned with existing streets by continuation of the centerlines; or

B. Offset from the centerline by no more than five ~~10~~(5) feet, provided appropriate mitigation, in the judgment of the City Engineer, is provided to ensure that the offset intersection will not pose a safety hazard.

12.04.194 Traffic Sight Obstructions

All new streets and driveways shall comply with the Traffic Sight Obstructions in ~~c~~Chapter 10.32.

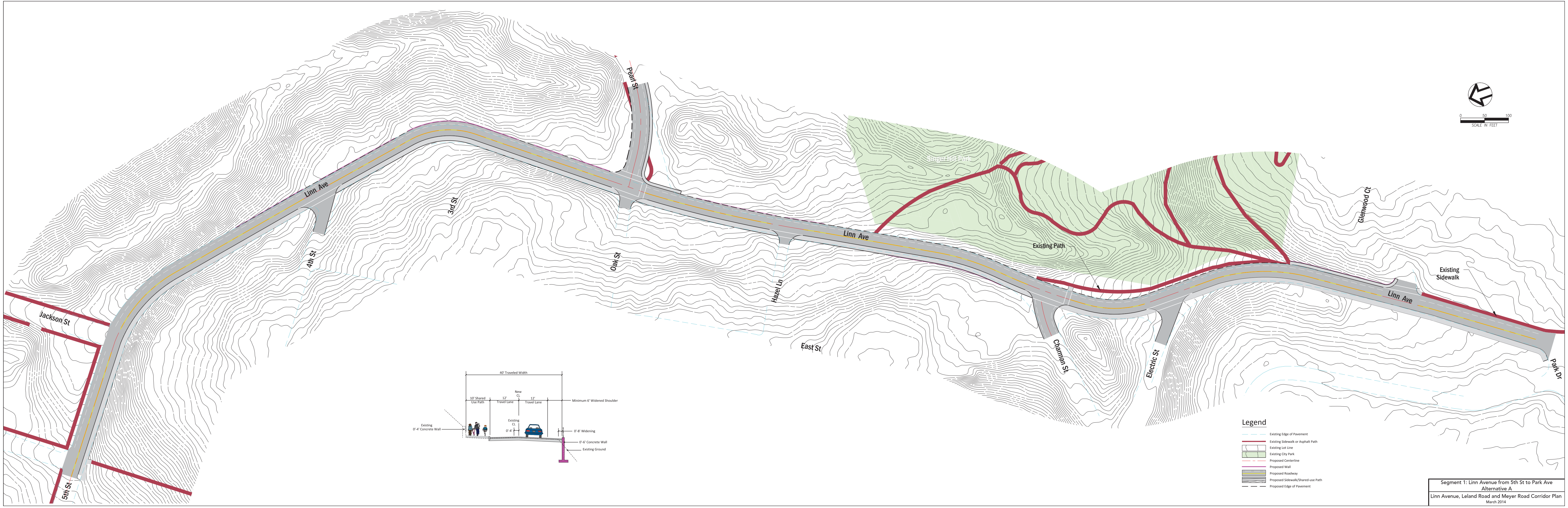
~~**12.04.195 – Minimum Street Intersection Spacing Standards**~~

~~A. All new development and redevelopment shall meet the following Public intersection spacing standards~~

~~ADD DIAGRAM EXAMPLE~~

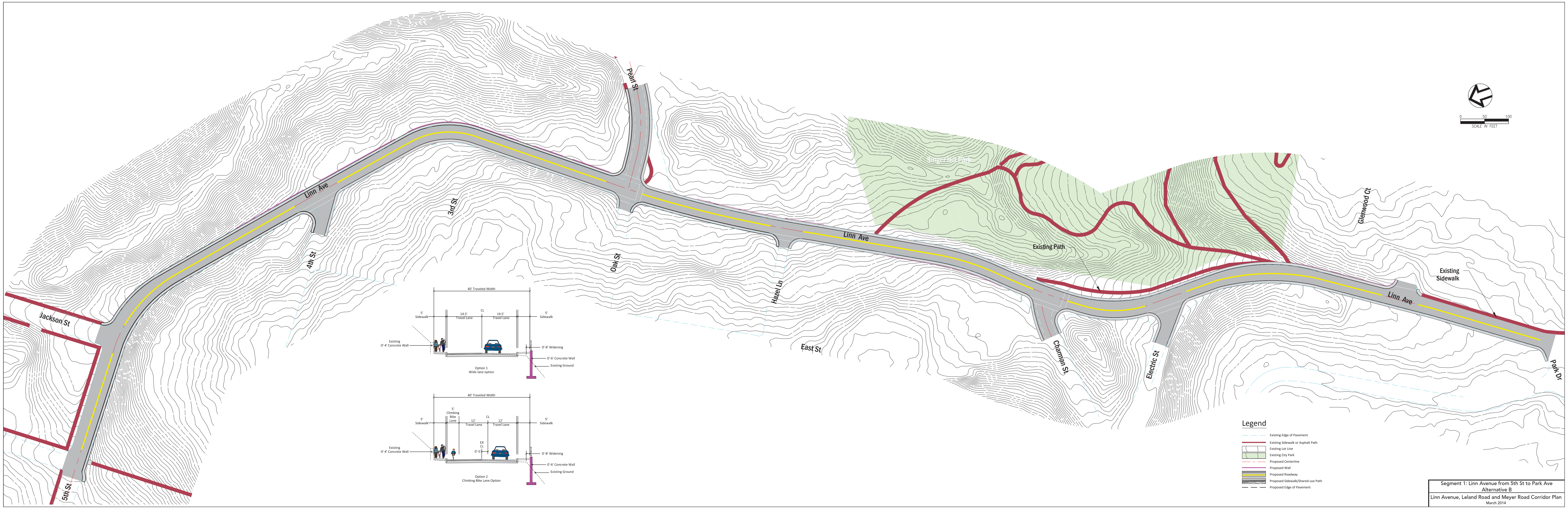
Appendix F

Full Plan of Segment 1 Alternative A and Alternative B



Segment 1: Linn Avenue from 5th St to Park Ave
Alternative A

Linn Avenue, Leland Road and Meyer Road Corridor Plan
March 2014



Option 1
Wide lane option

Option 2
Climbing Bike Lane Option

Legend

- Existing Edge of Pavement
- Existing Sidewalk or Asphalt Path
- Existing Lot Line
- Existing City Park
- Proposed Centerline
- Proposed Wall
- Proposed Roadway
- Proposed Sidewalk/Shared-use Path
- Proposed Edge of Pavement

Segment 1: Linn Avenue from 5th St to Park Ave
Alternative B

Linn Avenue, Leland Road and Meyer Road Corridor Plan
March 2014

Appendix G

Public Involvement Process Documentation

PUBLIC INVOLVEMENT PROCESS DOCUMENTATION

Neighborhood Association Meetings

The City attended meetings for Neighborhood Associations within the corridor limits in order to introduce the project to the Associations and attending residents. These included the following:

- McLoughlin Neighborhood Association
- Rivercrest Neighborhood Association
- Hillendale Neighborhood Association
- Barclay Hills Neighborhood Association
- Gaffney Lane Neighborhood Association
- Tower Vista Neighborhood Association

Graphics used to show the project area and existing conditions throughout the corridor for these meetings are included in this Appendix. There was very little public comment on the project from the Neighborhood Association meetings. Notes from the Hillendale Neighborhood Association Meeting are included in this Appendix.

Presentation Graphics

The corridor plan was presented on three occasions in order to introduce the project and obtain comments on proposed improvements. Presentations were given to the TAC (Transportation Advisory Committee), to the general public for an Open House, and to the Planning Commission (at a workshop). Graphics used for these presentations are included in this Appendix.

Transportation Advisory Committee Meeting

The corridor plan was presented to the TAC on November 9th, 2014 and February 9th, 2015. Video (with meeting minutes) of the proceedings are available at:

http://oregon-city.granicus.com/MediaPlayer.php?view_id=2&clip_id=1278
http://oregon-city.granicus.com/MediaPlayer.php?view_id=6&clip_id=1423

City Commission Meeting

The corridor plan was discussed during multiple City Commission meetings. Video (with meeting minutes) of the proceedings are available at:

http://oregon-city.granicus.com/MediaPlayer.php?view_id=2&clip_id=1350
http://oregon-city.granicus.com/MediaPlayer.php?view_id=2&clip_id=1362
http://oregon-city.granicus.com/MediaPlayer.php?view_id=2&clip_id=1393
http://oregon-city.granicus.com/MediaPlayer.php?view_id=2&clip_id=1394

Online Survey Results

An online survey was created and posted on the City’s website. A total of 172 respondents completed the survey.

Open House Meeting

The corridor plan was presented to the general public at an Open House meeting. Interested members of the public signed in and/or completed comment cards.

Additional Stakeholder Comments

The City solicited comments from TriMet, the Oregon City School District, and other project stakeholders regarding the proposed improvements.

Neighborhood Association Meetings

Presentation Graphics

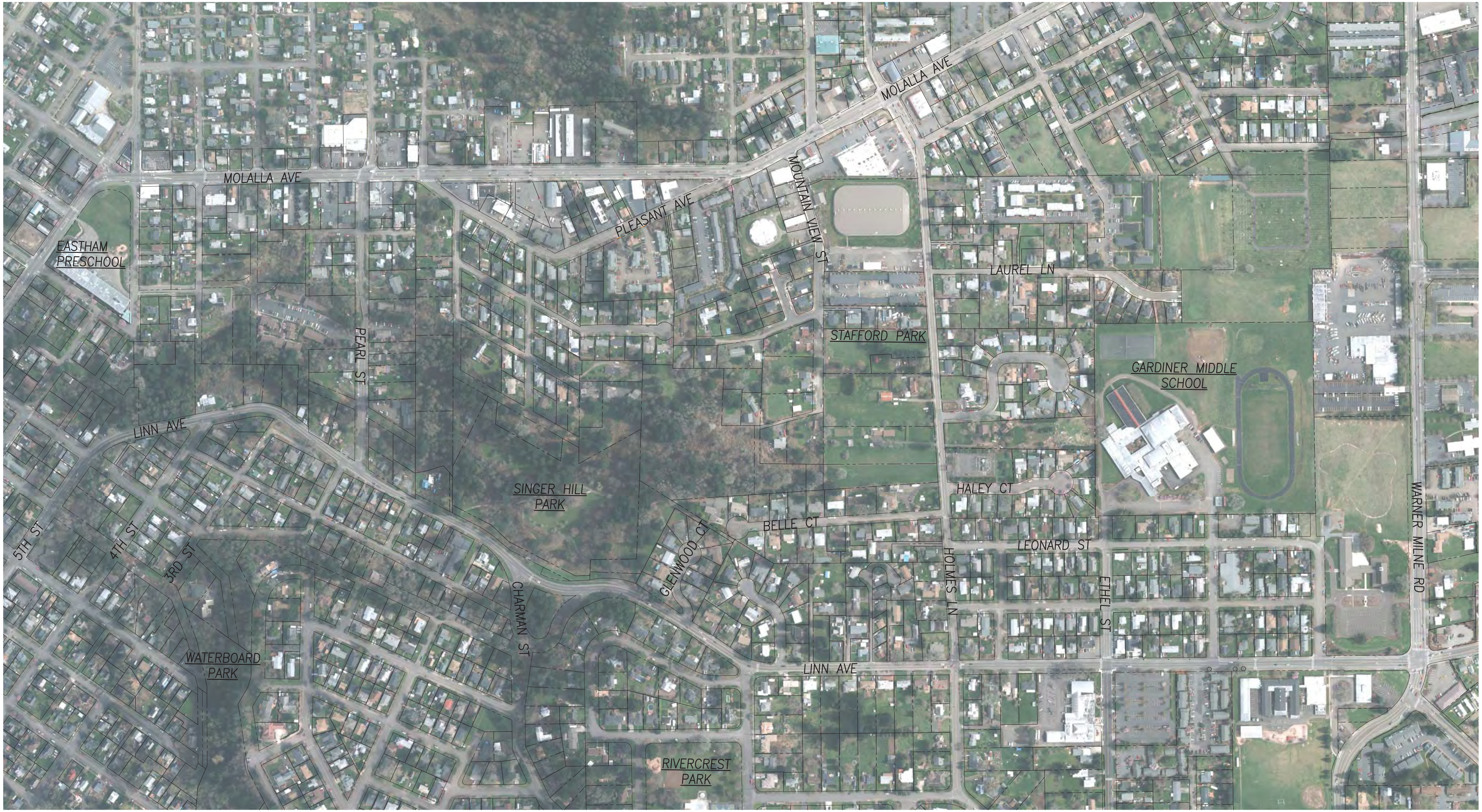
Transportation Advisory Committee Meeting

Online Survey Results

Open House Meeting

Trimet Comments

Neighborhood Association Meetings



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Corridor through Barclay Hills Neighborhood

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

0 75 150
SCALE IN FEET

Corridor through Gaffney Lane Neighborhood
Linn Avenue, Leland Road & Meyers Road Corridor Plan
April 2014

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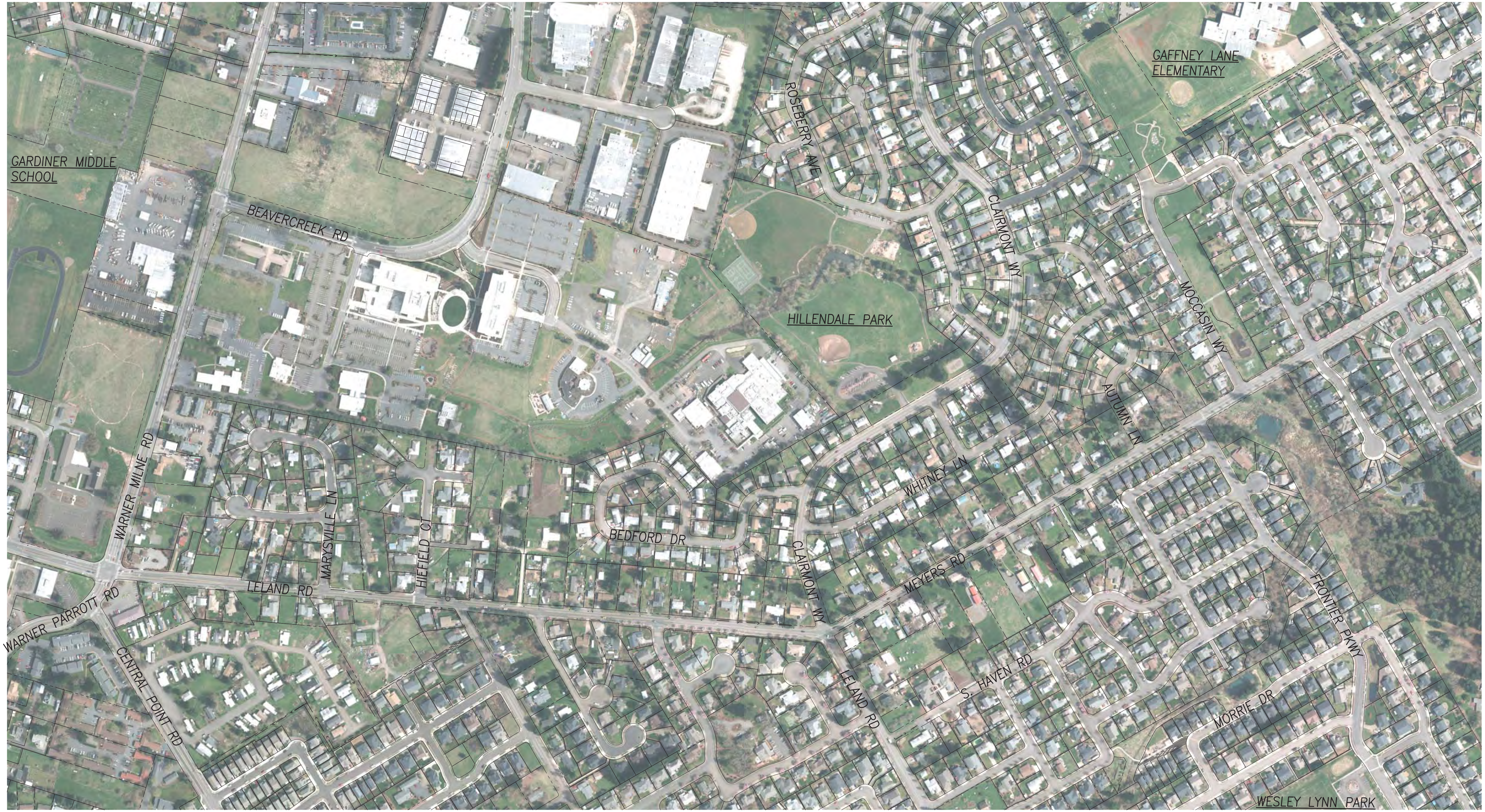

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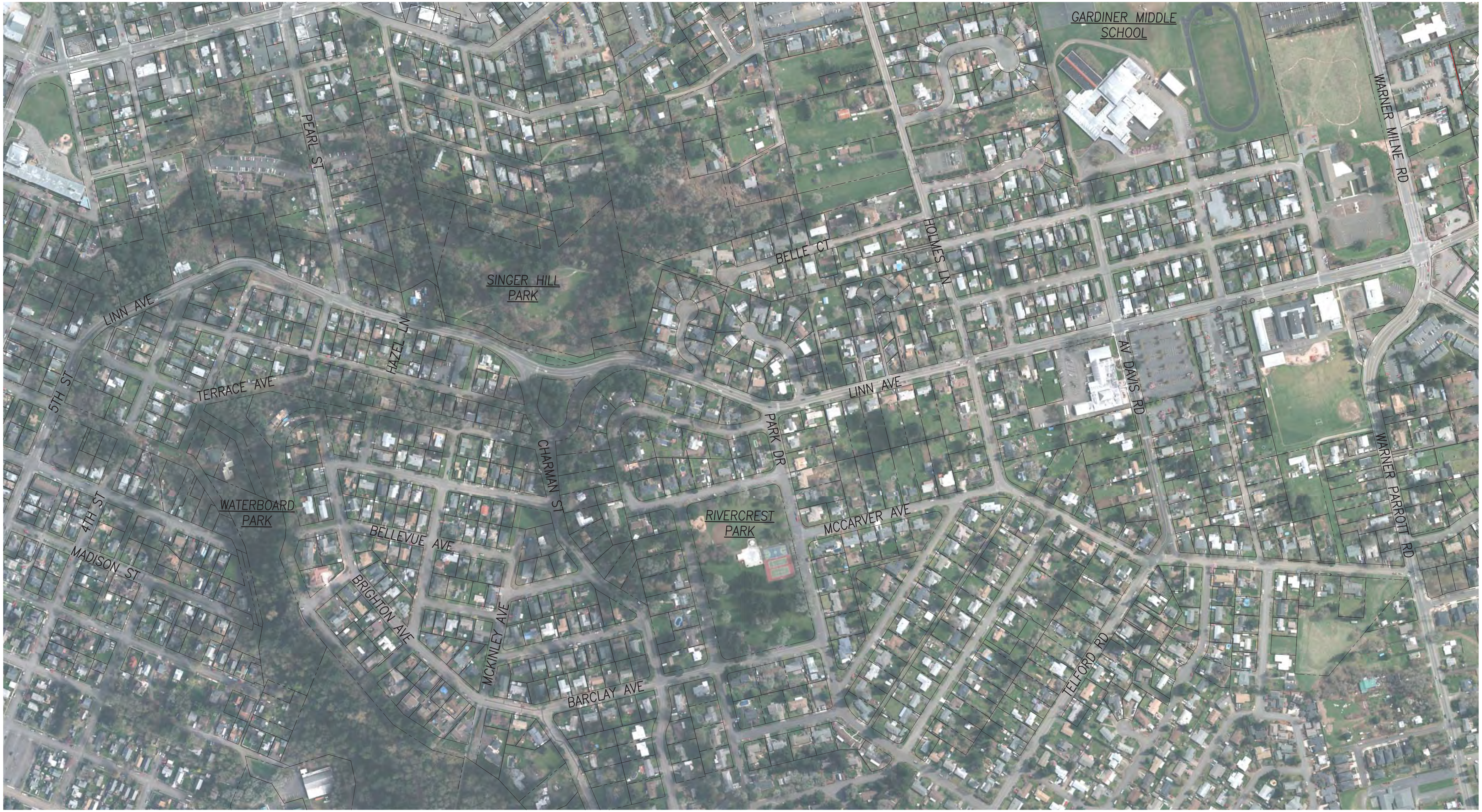
0 100 200
SCALE IN FEET

Corridor through Hillendale Neighborhood

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014


0
100
200
SCALE IN FEET
7TH ST
JOHN QUINCY ADAMS ST
JACKSON ST
LINN AVE.
6TH ST
MONROE ST
MADISON ST
4TH ST
3RD ST
PEARL ST
JEFFERSON ST
5TH ST
OAK ST
HAZEL ST
3RD ST



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Corridor through Rivercrest Neighborhood

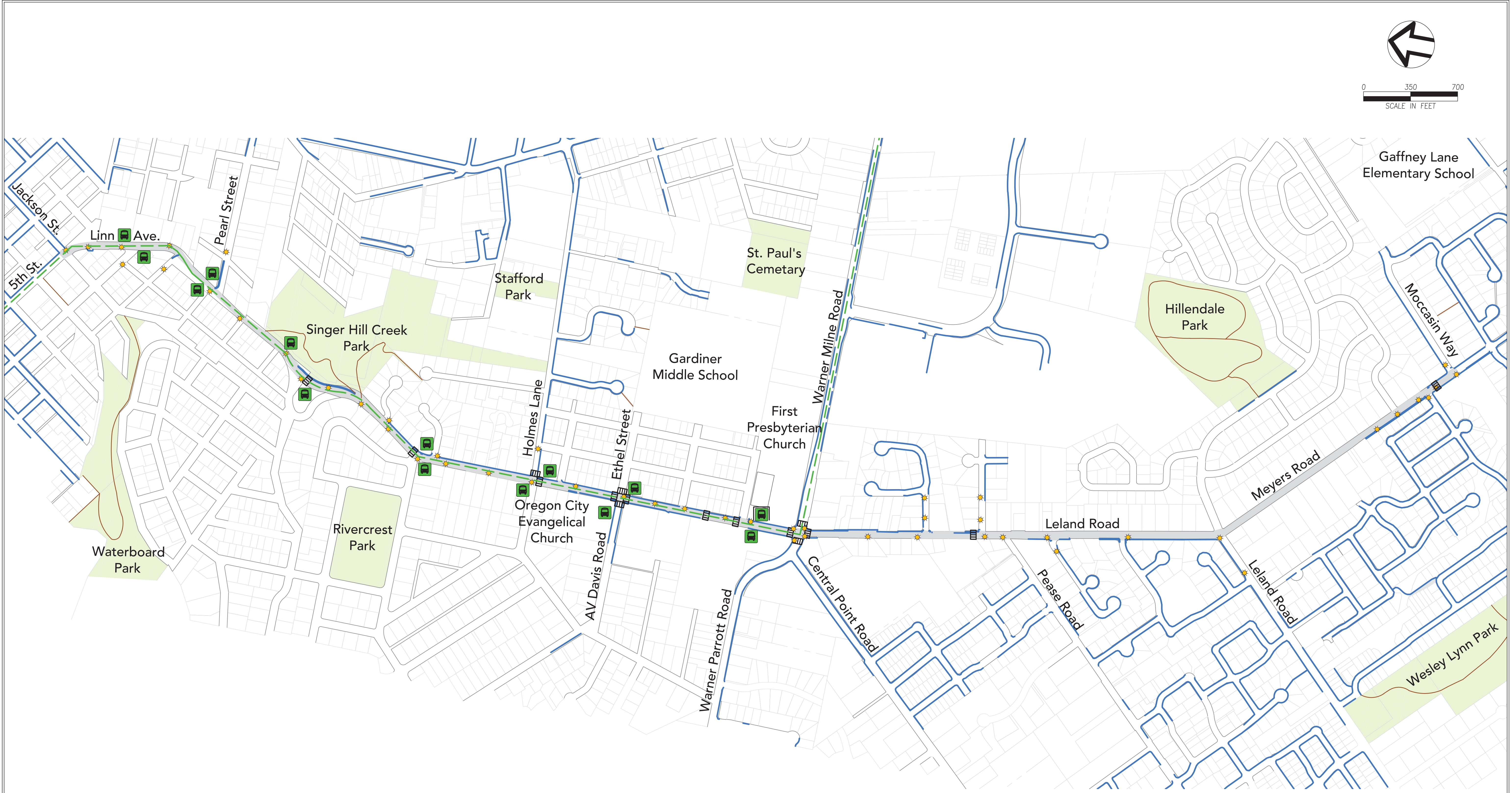
Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

Corridor through Tower Vista Neighborhood

Linn Avenue, Leland Road & Meyers Road Corridor Plan

March, 2014



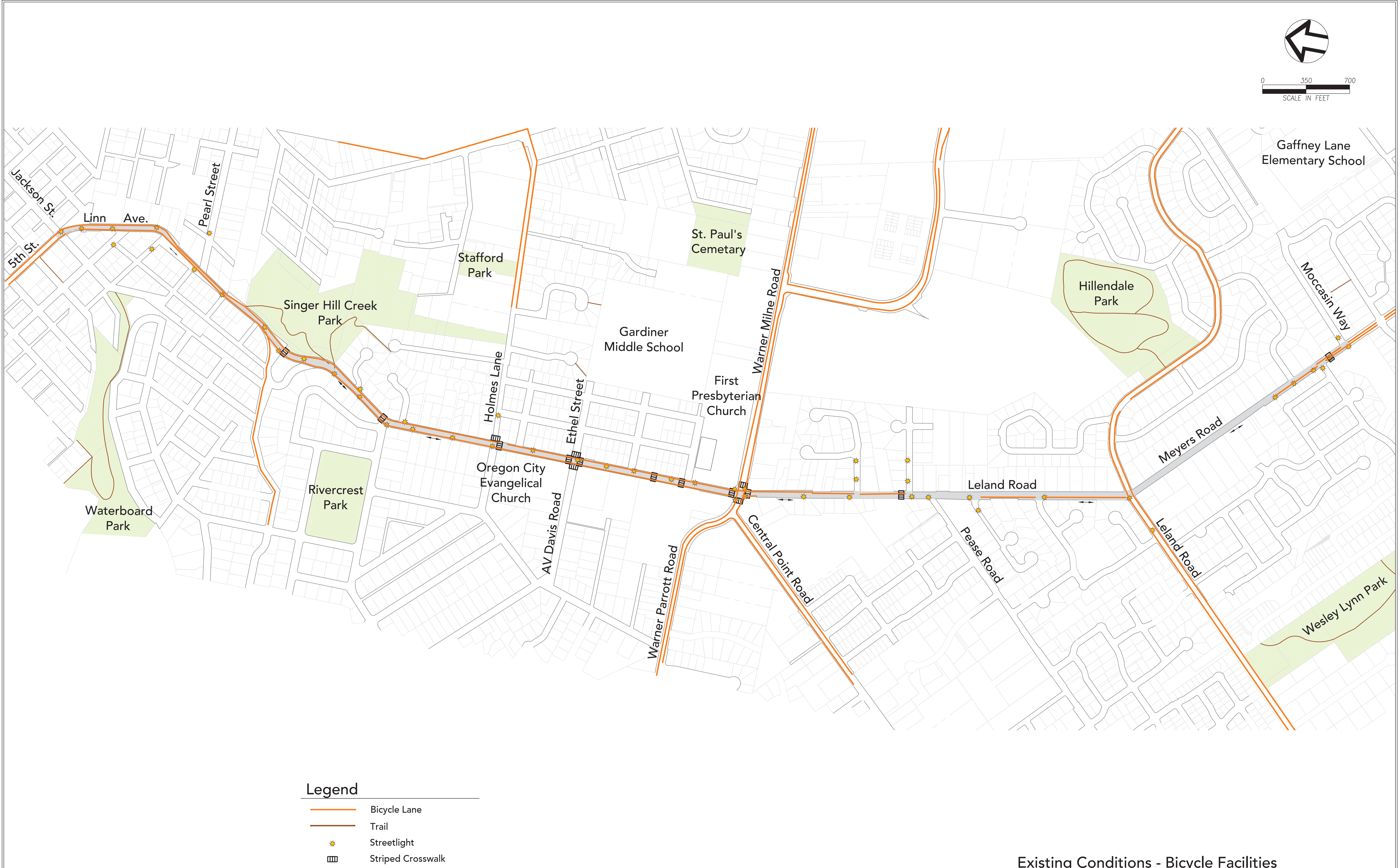
Legend

- Sidewalk
- Trail
- ✱ Streetlight
- ▥ Striped Crosswalk
- Trimet Bus No. 33 Route
- Bus stop with shelter
- Bus stop

Existing Conditions - Pedestrian Facilities

Linn Avenue, Leland Road & Meyers Road Corridor Plan

March, 2014



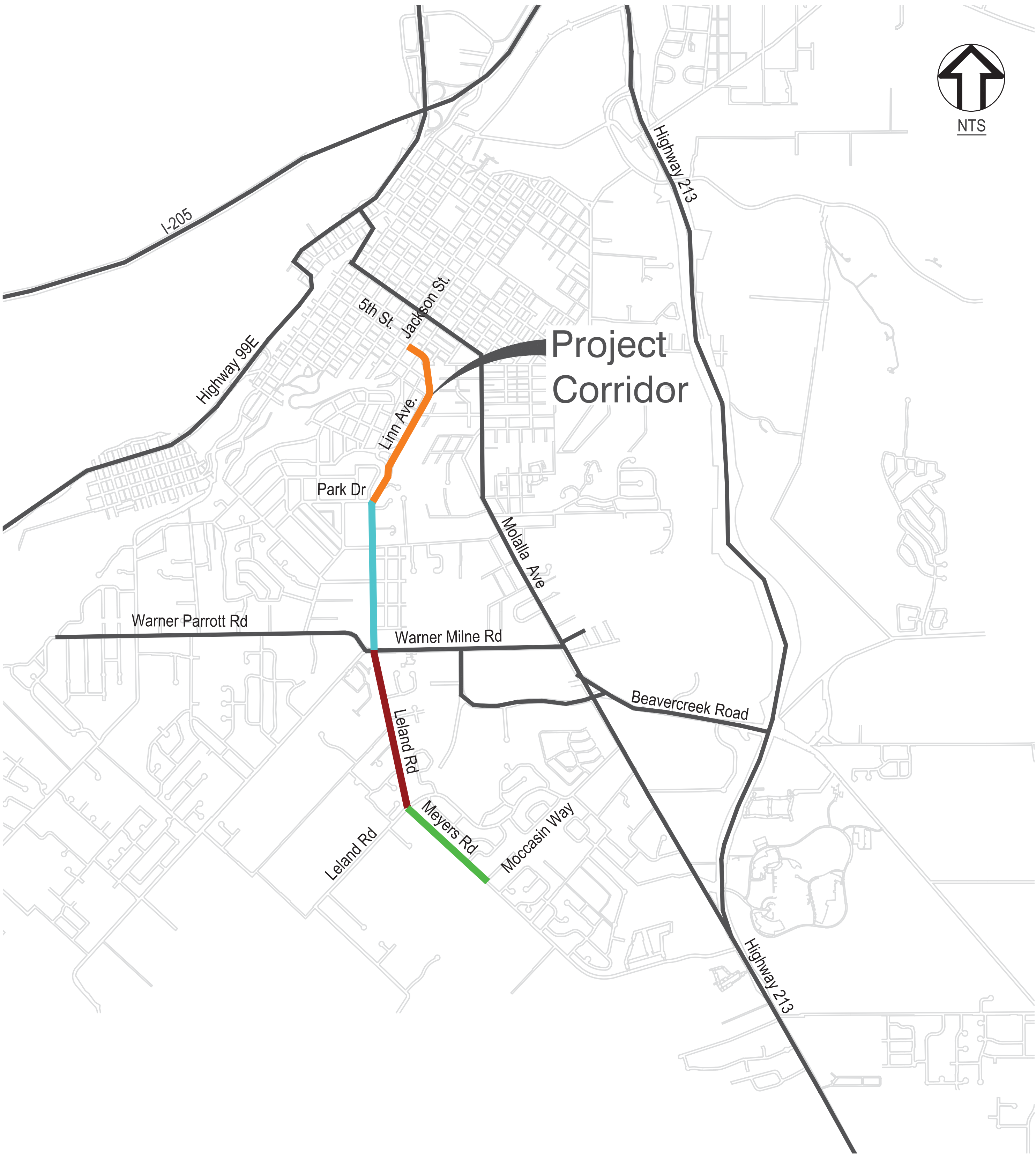
Existing Conditions - Bicycle Facilities

Linn Avenue, Leland Road & Meyers Road Corridor Plan

March, 2014

Presentation Graphics

Vicinity Map



Legend

Segment 1: Linn Ave, 5th St to Park Dr

Segment 2: Linn Ave, Park Dr to Warner Parrott Rd/Warner Milne Rd

Segment 3: Leland Rd, Warner Parrott Rd/Warner Milne Rd to Meyers Rd

Segment 4: Meyers Rd, Leland Rd to Moccasin Way

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Vicinity Map
Linn Avenue, Leland Road & Meyers Road Corridor Plan
April 2014

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Existing Connectivity and Access

Legend

▬ Corridor Roadway

▭ City Park or Green Space

— Sidewalk, Path or Trail

— Bicycle Lane

▥ Striped Crosswalk

🚌 Bus Stop

⛪ School

⛪ Church

⛪ Museum

⛪ Municipal Building

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Existing Connectivity and Access

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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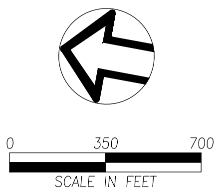
Existing Connectivity and Access - Activity Generators



Legend

▬ Corridor Roadway

🟩 City Park or Green Space

▲ School

▲ Church

▲ Museum

▲▲ Municipal Building

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Existing Connectivity and Access - Activity Generators

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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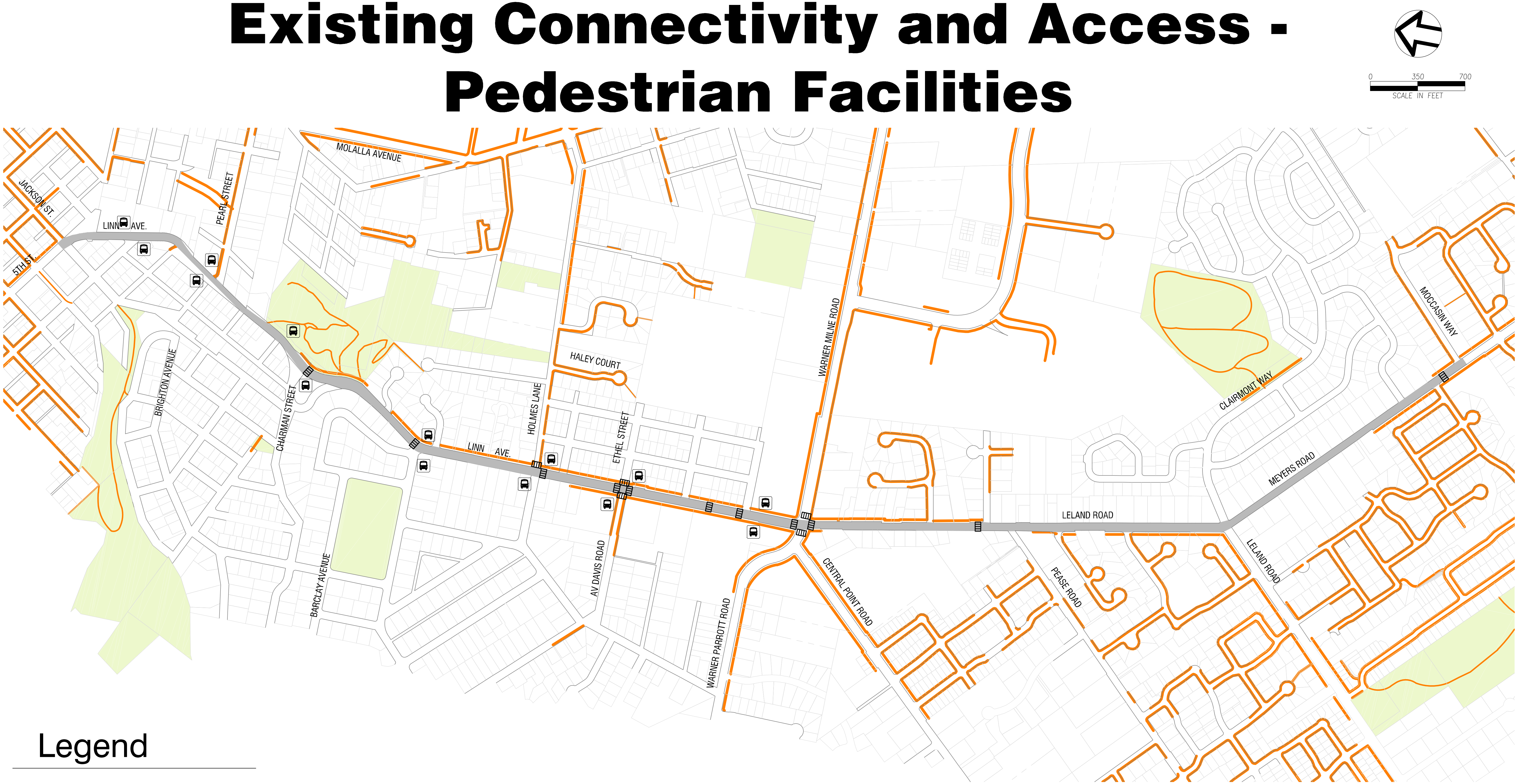
Existing Connectivity and Access - Pedestrian Facilities



Legend

- ▬ Corridor Roadway
- 🟩 City Park or Green Space
- — Sidewalk, Path or Trail
- ▥ Striped Crosswalk
- 🚌 Bus Stop

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Existing Connectivity and Access - Pedestrian Facilities

Linn Avenue, Leland Road & Meyers Road Corridor Plan

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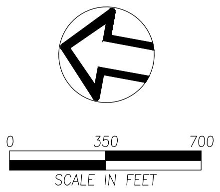
Existing Connectivity and Access - Bicyclist Facilities



Legend

▬ Corridor Roadway

▭ City Park or Green Space

— Bicycle Lane

▥ Striped Crosswalk

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Existing Connectivity and Access - Bicyclist Facilities

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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Major Concerns

Limited Multi-modal Connectivity

- Discontinuous sidewalks
- Discontinuous bike lanes
- Non-ADA sidewalks and ramps
- Excessive block lengths without pedestrian crossings

Safety

- Specific areas of concern for vehicle crashes include: Linn Avenue & 3rd to 4th St, Linn Avenue & Electric St, and Linn Avenue & AV Davis Rd
- Pedestrian and bicyclist safety concerns in narrow roadway
- Speeding concerns

Stormwater

- Limited stormwater quality, conveyance and runoff control
- Erosion and flooding issues

Constrained Right-of-Way/ Roadway

- ROW typically ~60ft and largely built-out with residences on either side of roadway
- Steep slopes and retaining walls within ROW

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Major Concerns
Linn Avenue, Leland Road & Meyers Road Corridor Plan
April 2014

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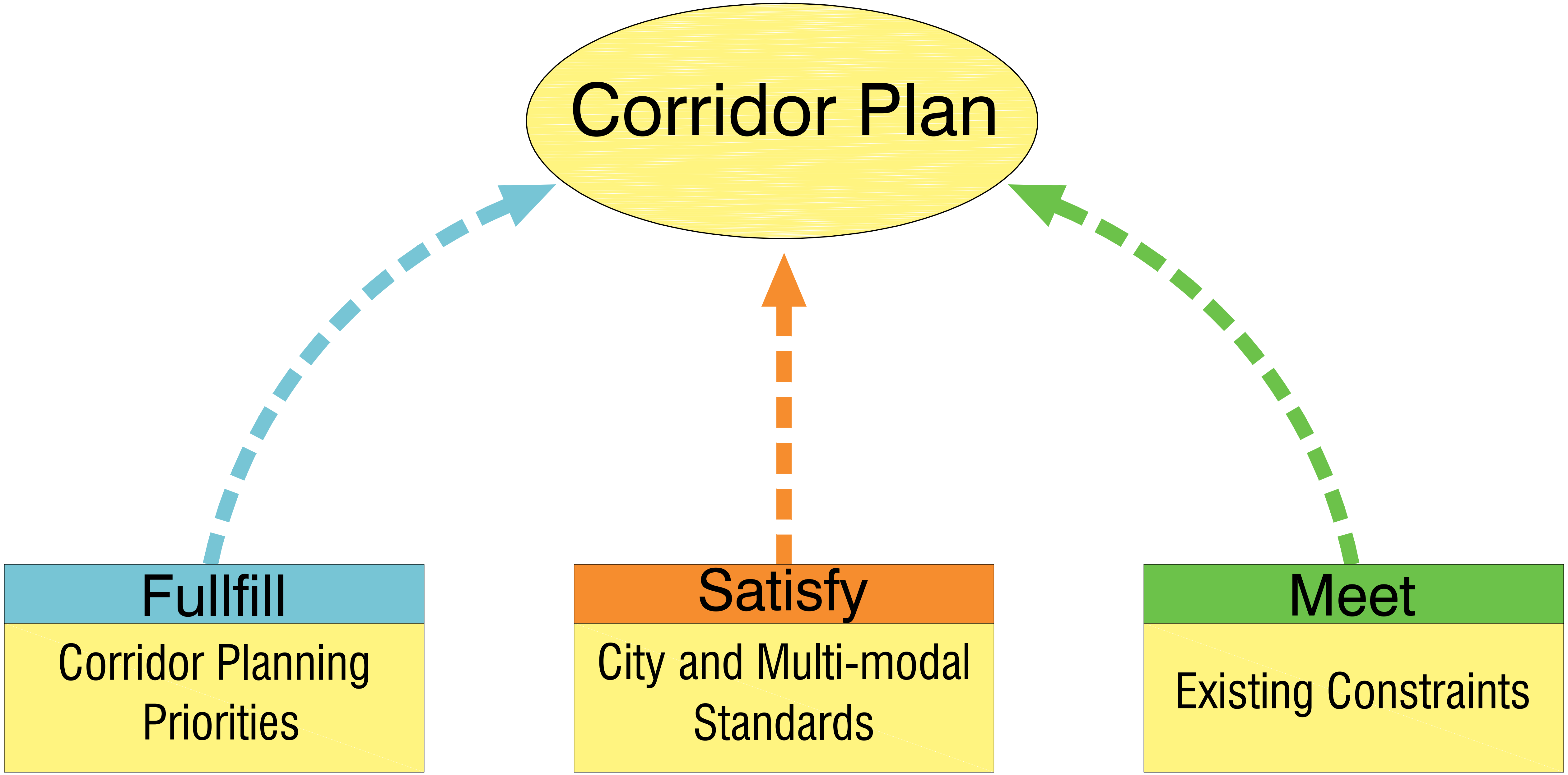
Concept Plan Development



Corridor Plan

Fullfill

Corridor Planning Priorities

Satisfy

City and Multi-modal Standards

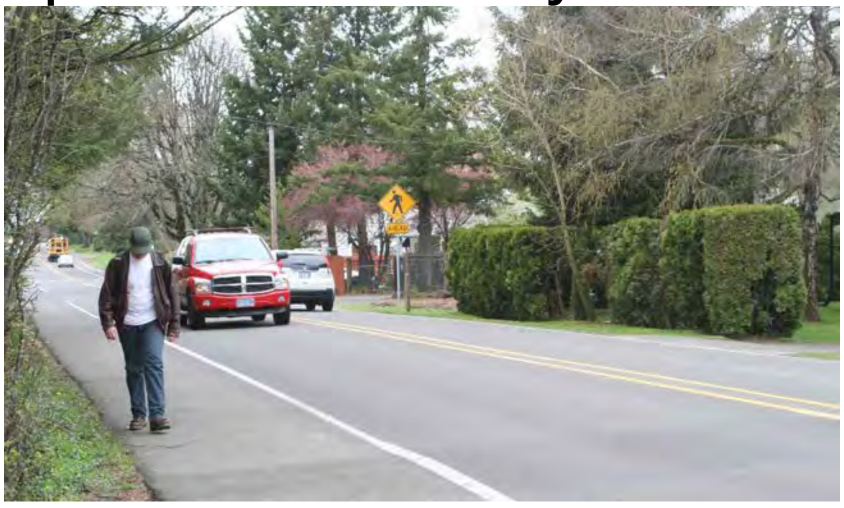
Meet

Existing Constraints

Corridor Planning Priorities

Provide a Complete and Continuous Multi-modal Route through the Corridor

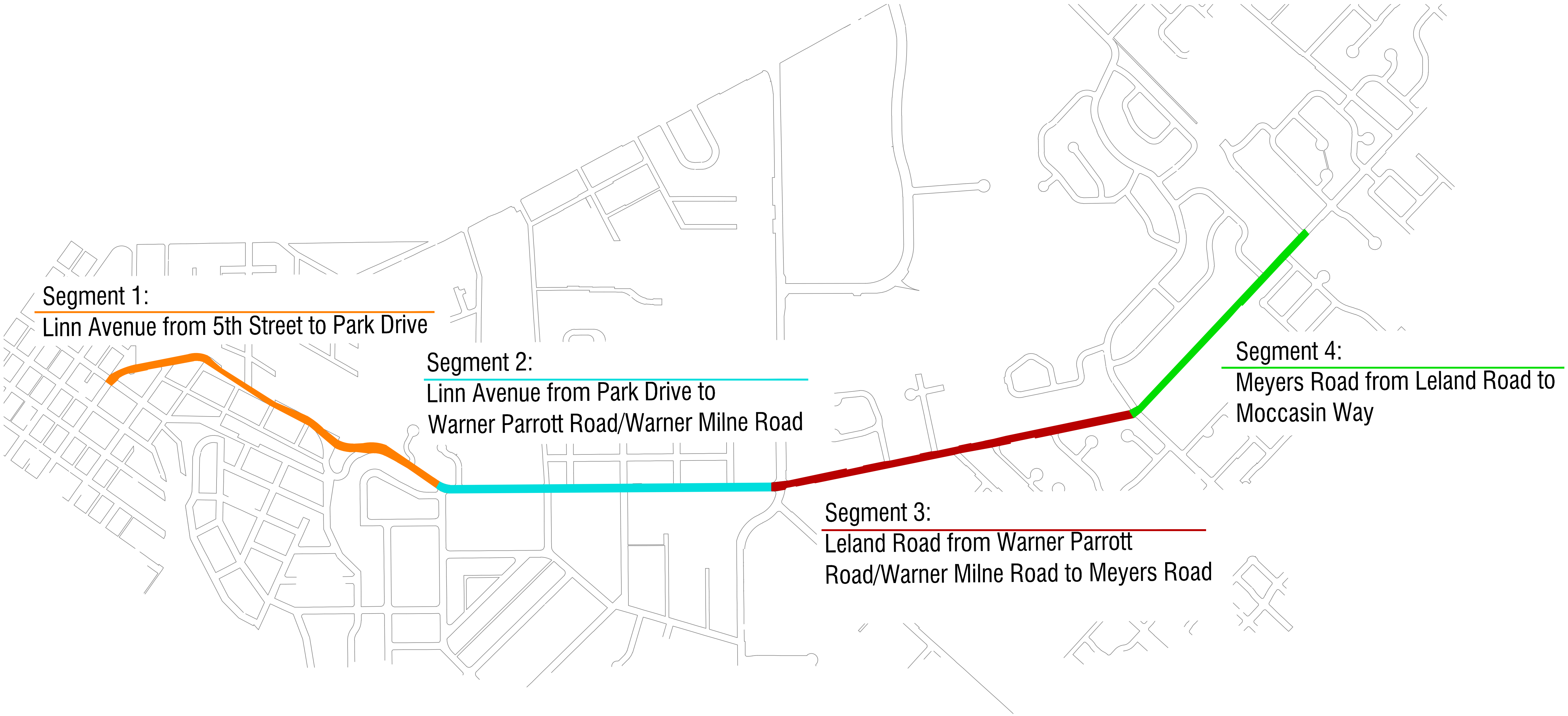
Improve Connectivity and Access



Improve Safety for all Users

Address Stormwater Issues

Draft Concept Plan



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Draft Concept Plan

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

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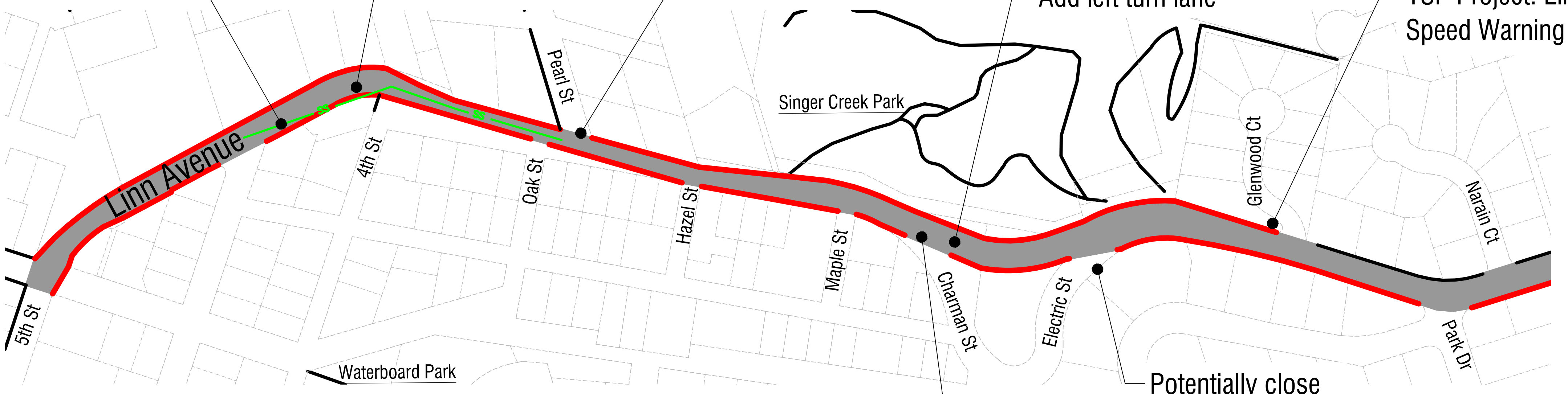
Concept Plan for Segment 1

Linn Avenue from
5th Street to Park Drive



Sewer Master Plan project:
Linn Avenue Sewer
Replacement

Increase curve radius

Realign Pearl Street

Add left turn lane

TSP Project: Linn Avenue
Speed Warning System

Potentially close
Electric Street

TSP Project: Add
pedestrian-activated
signal to crossing

Plan

Legend

━ Existing Sidewalk and Bike Lanes

🟥 Proposed Sidewalk and Bike Lanes (see cross-sections)

Add ● Proposed Improvement

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Segment 1 Concept Plan

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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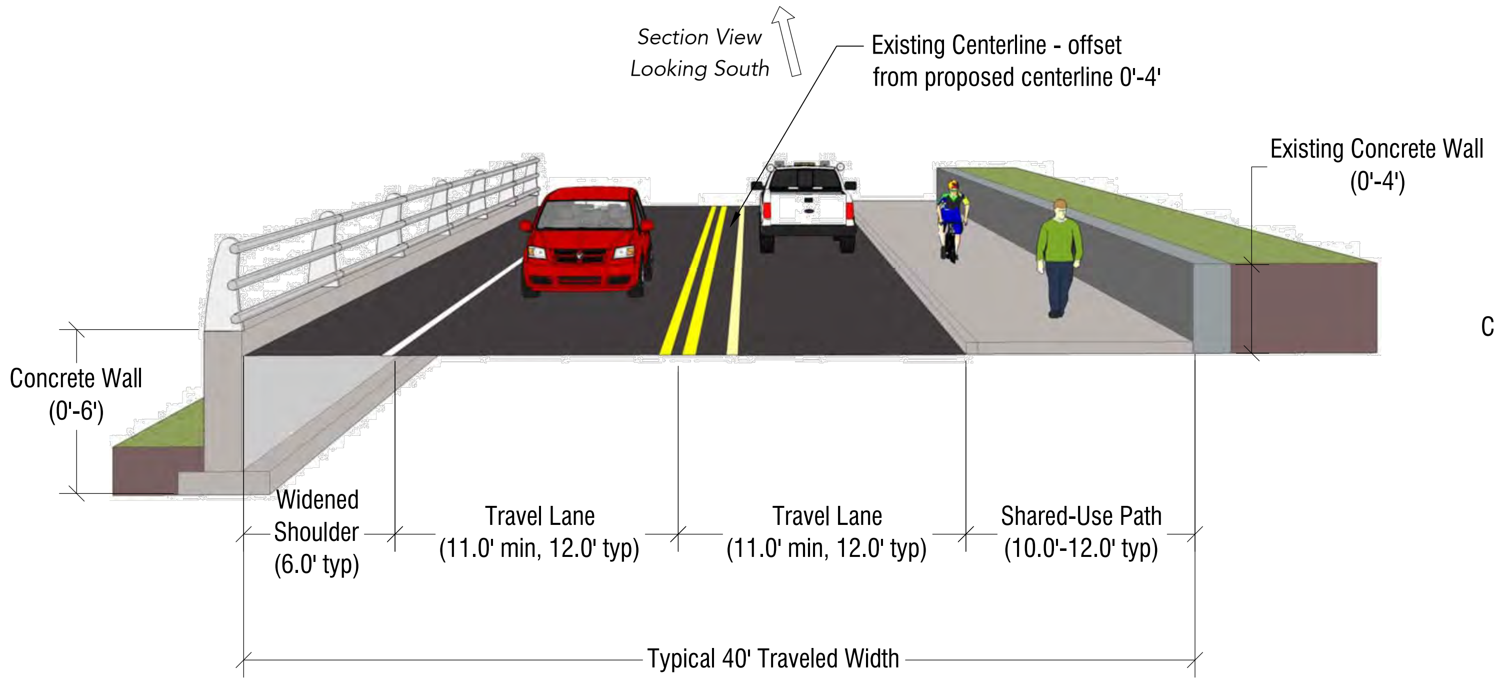
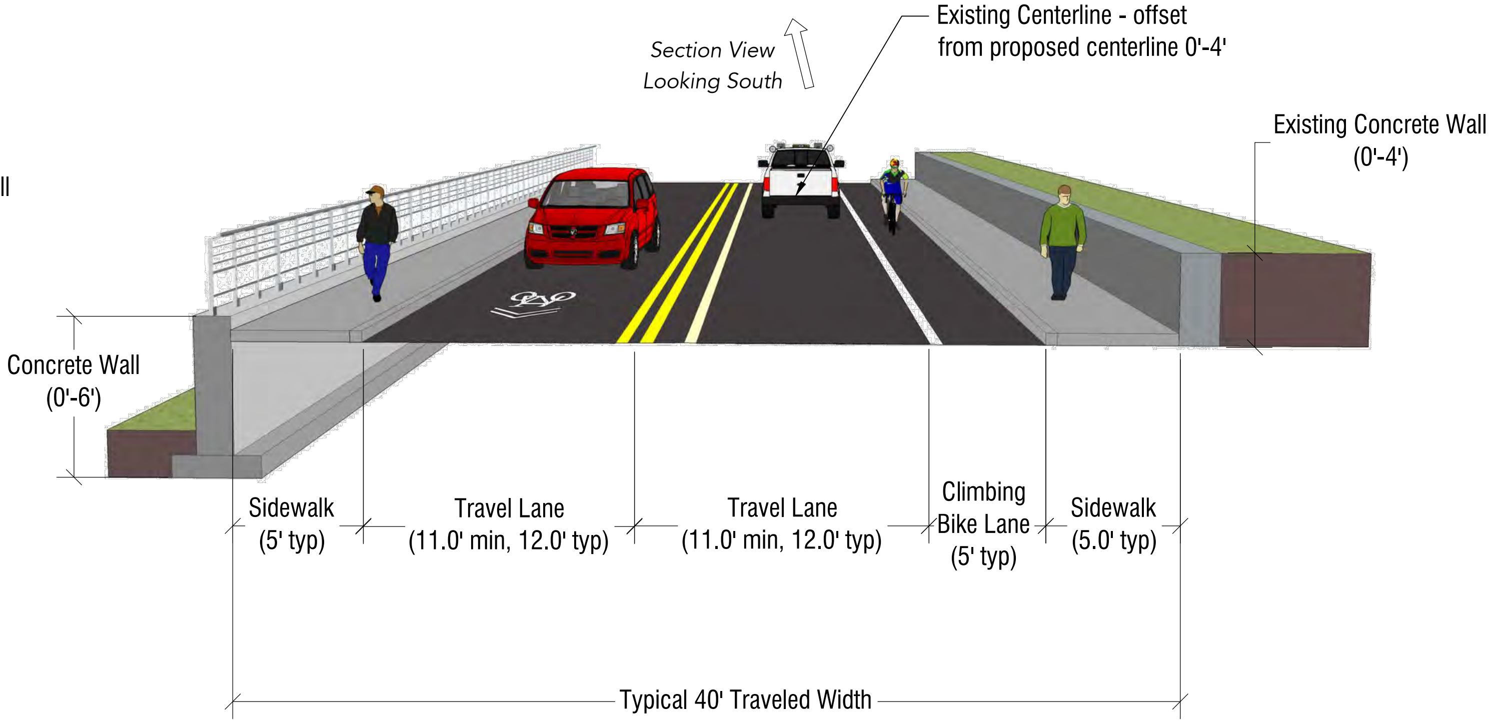
Concept Plan for Segment 1: Alternative Cross-sections

Linn Avenue from
5th Street to Park Drive



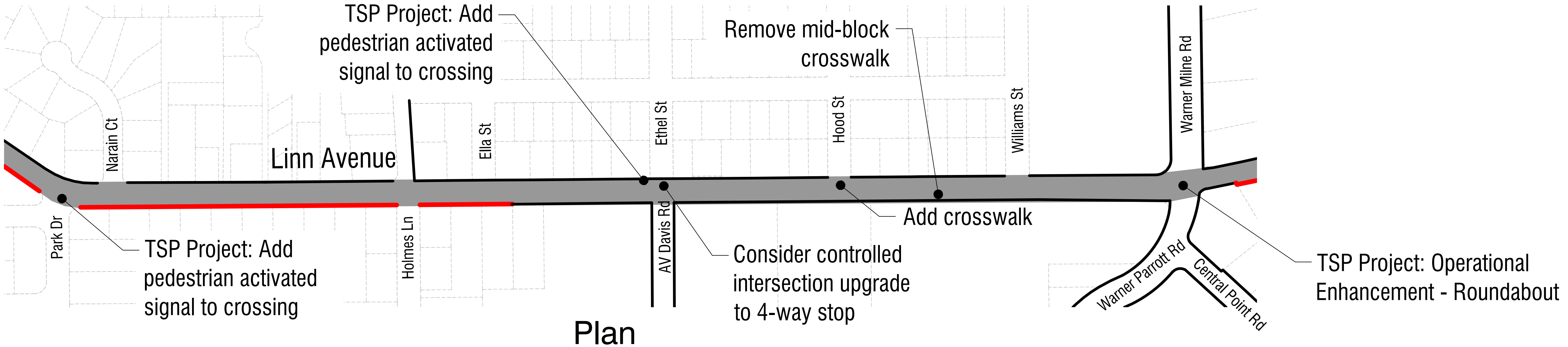
Alternative A Cross-section



Alternative B Cross-section

Concept Plan for Segment 2

Linn Avenue from
Park Drive to Warner Parrott Road



TSP Project: Add
pedestrian activated
signal to crossing

Remove mid-block
crosswalk

TSP Project: Add
pedestrian activated
signal to crossing

Add crosswalk

Consider controlled
intersection upgrade
to 4-way stop

TSP Project: Operational
Enhancement - Roundabout

Plan

Legend

— Existing Sidewalk and Bike Lanes

🟥 Proposed Sidewalk and Bike Lanes (see Cross-Section)

Add ● Proposed Improvement

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Segment 2 Concept Plan

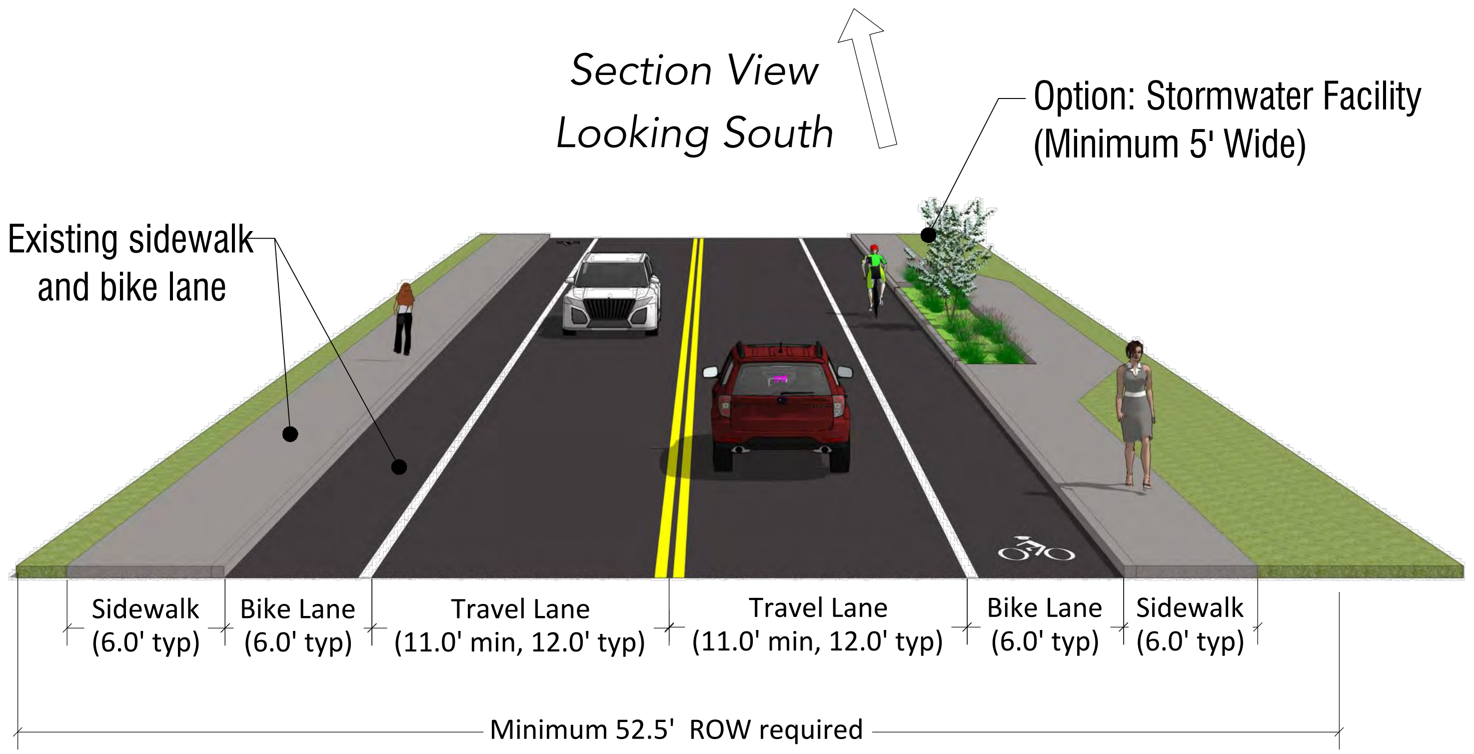
Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

OREGON CITY

Concept Plan for Segment 2: Cross-section

Linn Avenue from
Park Drive to Warner Parrott Road

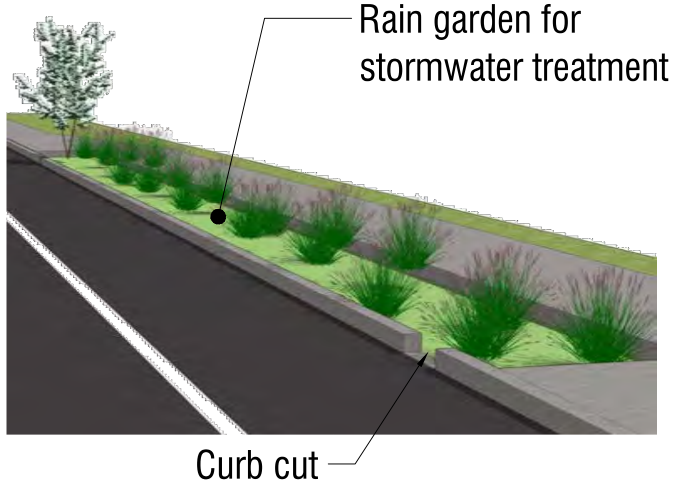


Section View Looking South

Option: Stormwater Facility (Minimum 5' Wide)

Existing sidewalk and bike lane

Cross-section



Rain garden for stormwater treatment

Curb cut

Option: Stormwater Facility

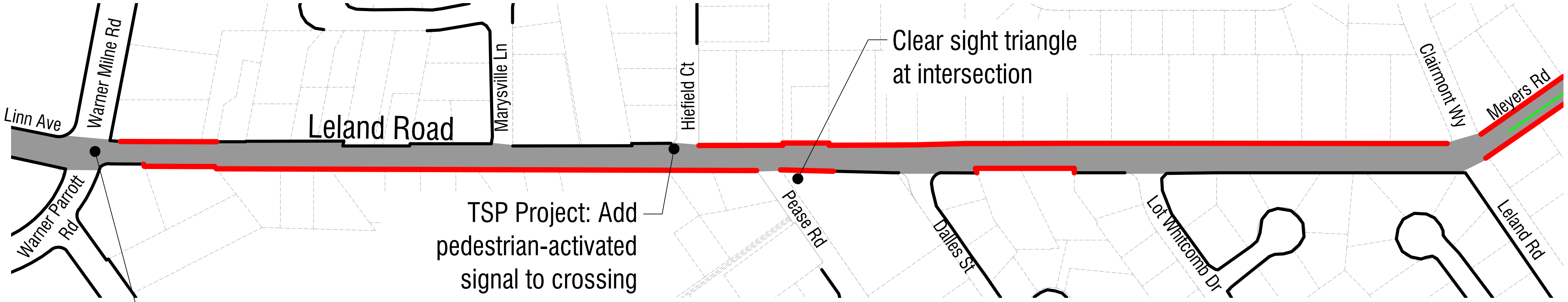
Segment 2 Concept Plan Cross-section

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

Concept Plan for Segment 3

Leland Road from
Warner Parrott Road to Meyers Road



Clear sight triangle
at intersection

TSP Project: Add
pedestrian-activated
signal to crossing

TSP Project: Operational
Enhancement - Roundabout

Plan

Legend

— Existing Sidewalk and Bike Lanes

— Proposed Sidewalk and Bike Lanes (see Cross-section)

Add ● Proposed Improvement

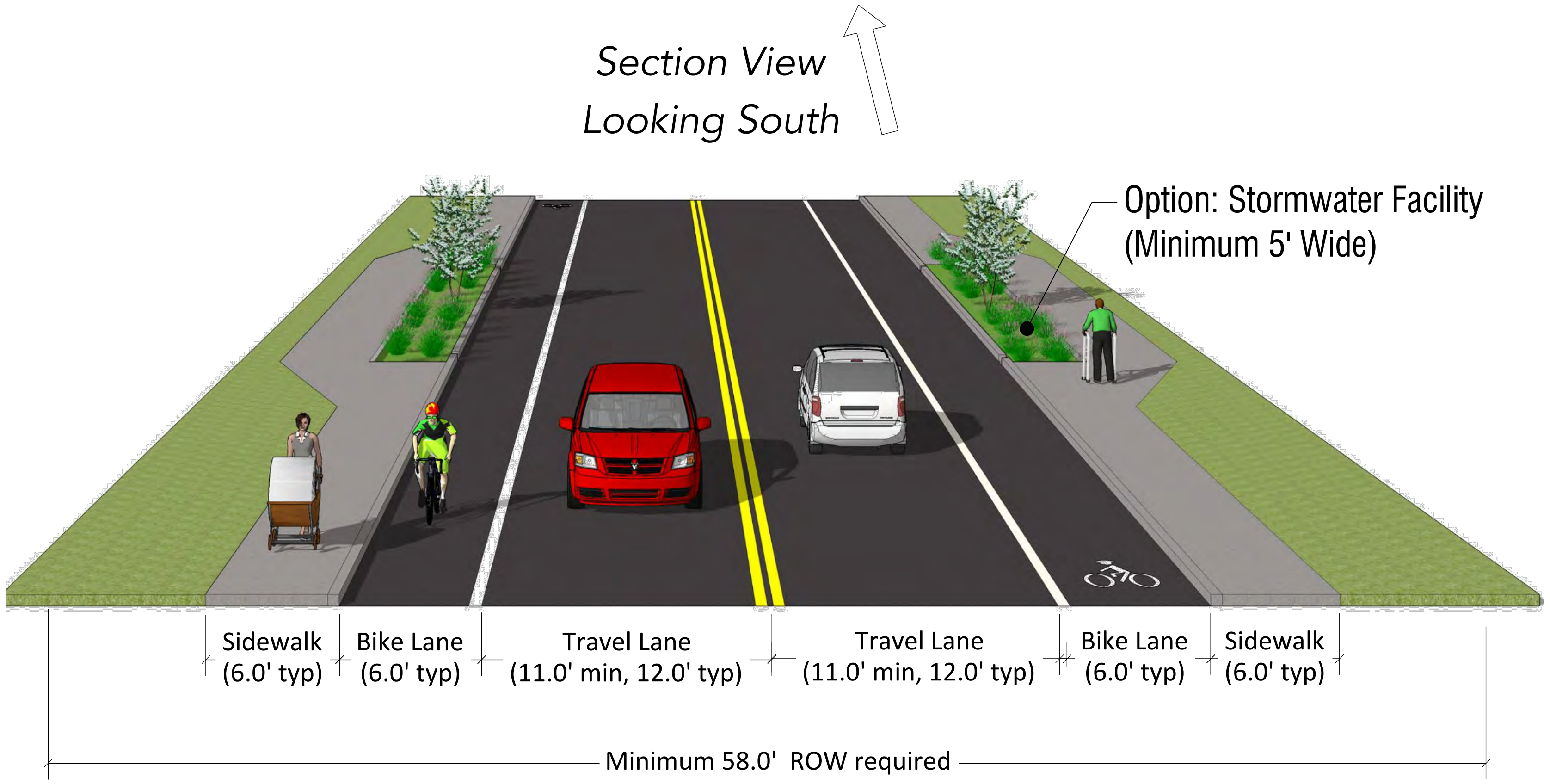
Segment 3 Concept Plan

Linn Avenue, Leland Road & Meyers Road Corridor Plan

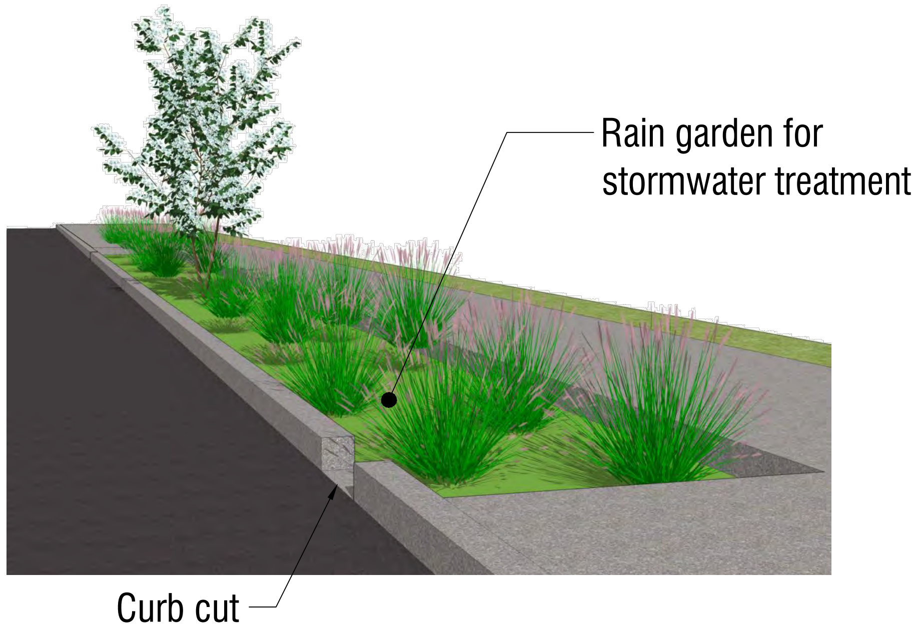
May 2014

Concept Plan for Segment 3: Cross-section

Leland Road from
Warner Parrott Road to Meyers Road



Cross-section



Option: Stormwater Facility

Segment 3 Concept Plan Cross-section

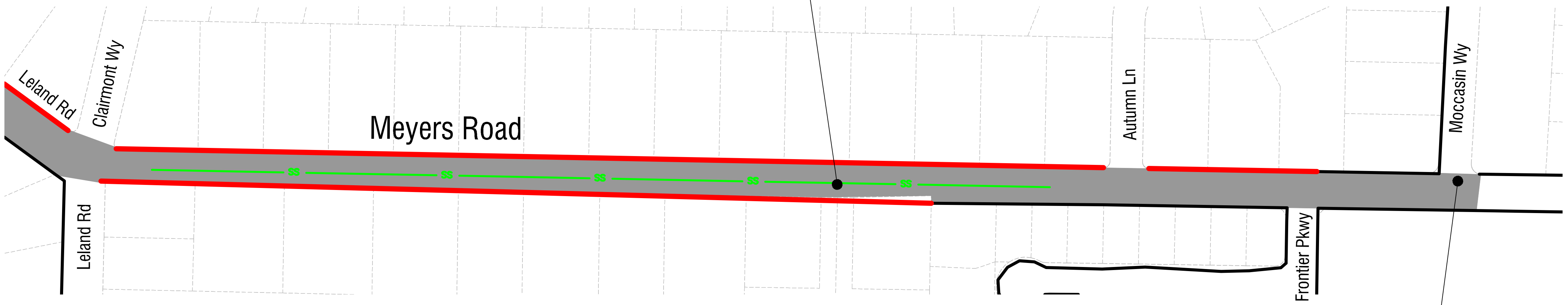
Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

Concept Plan for Segment 4

Meyers Road from
Leland Road to Moccasin Way

Sewer Master Plan project:
Leland Meyers Sewer
Extension



TSP Project:
Shared-use path crossing

Plan

Legend

— Existing Sidewalk and Bike Lanes

🟥 Proposed Sidewalk and Bike Lanes (see Cross-Section)

Add ● Proposed Improvement

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Segment 4 Concept Plan

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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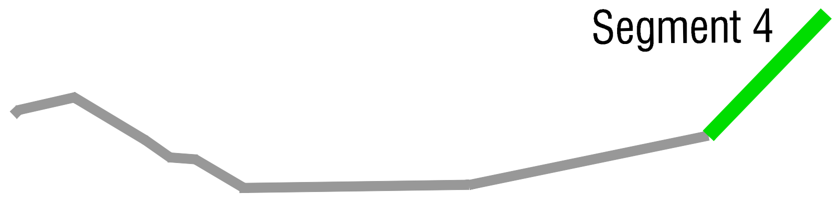
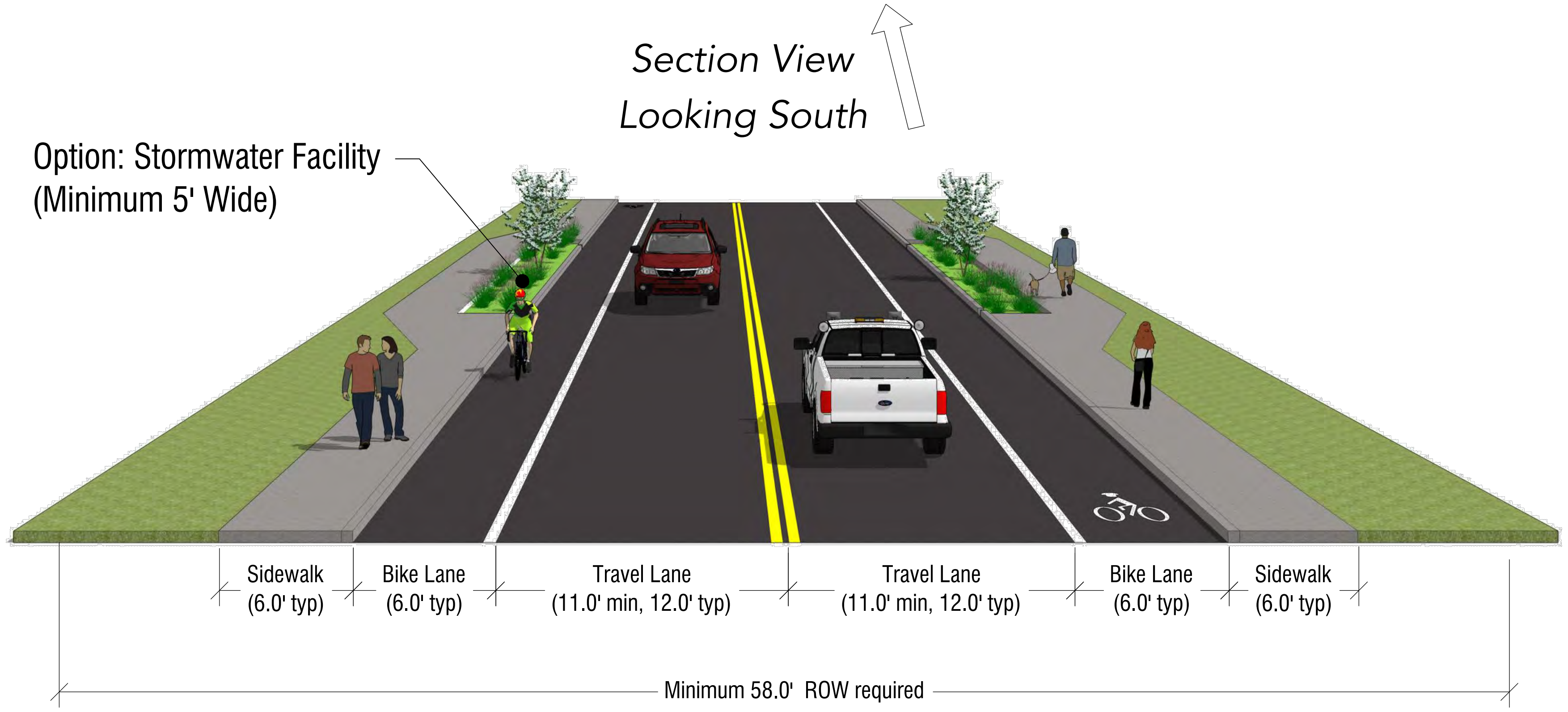
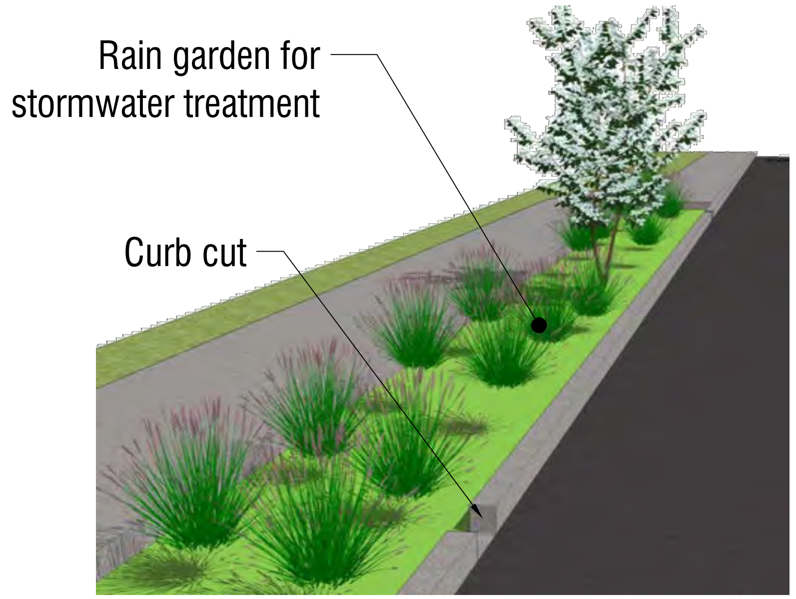
Concept Plan for Segment 4: Cross-section



Meyers Road from
Leland Road to Moccasin Way



Cross-section



Option: Stormwater Facility

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Segment 4 Concept Plan Cross-section

Linn Avenue, Leland Road & Meyers Road Corridor Plan

May 2014

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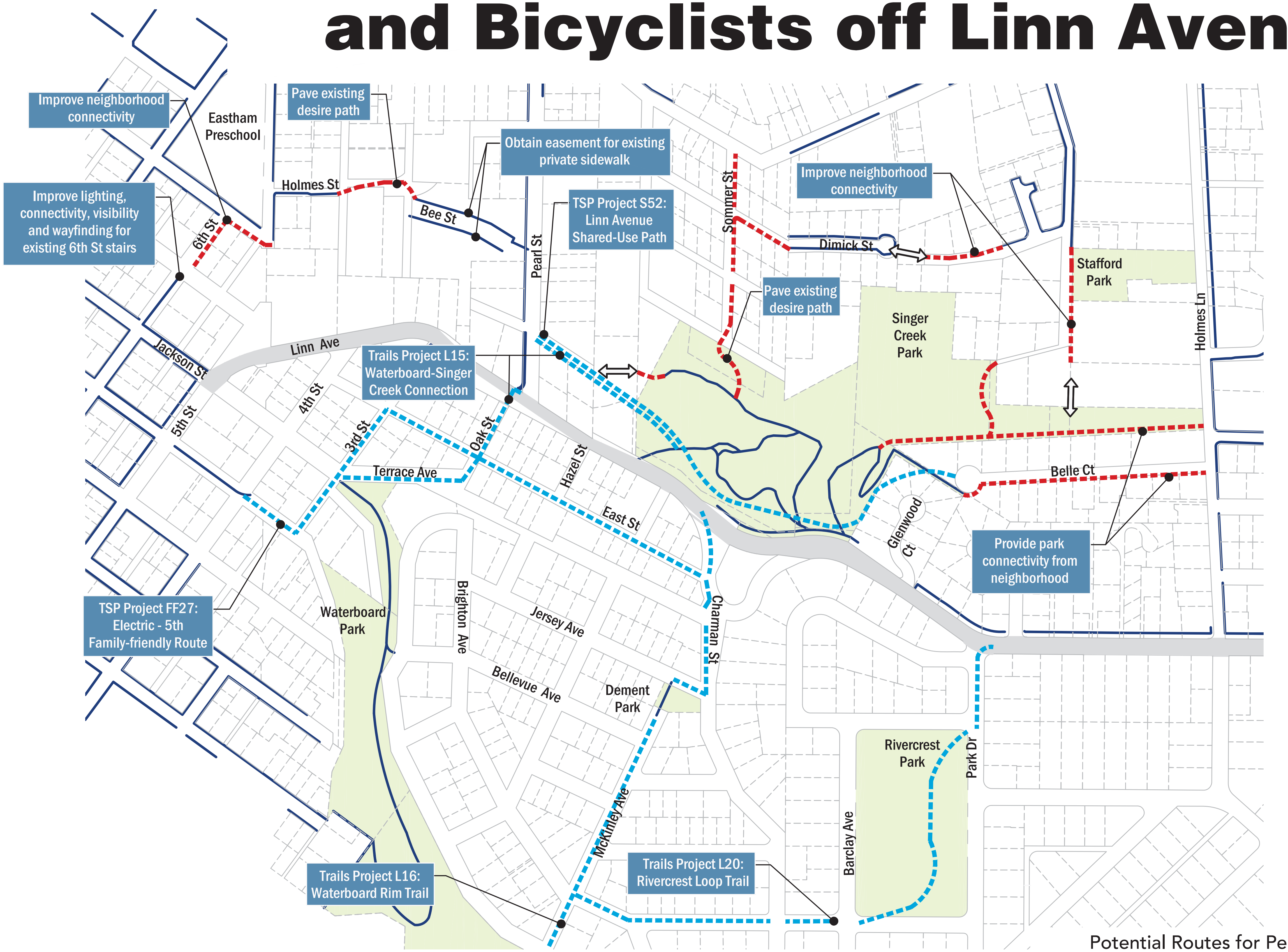
Potential Routes for Pedestrians and Bicyclists off Linn Avenue



Legend

▭	Corridor Roadway
- - -	Lot Lines
🟩	City Park or Green Space
—	Existing Sidewalk, Path or Trail
- - -	Potential Pedestrian/Bicyclist Route (within City ROW)
⟺	Potential Pedestrian/Bicyclist Route (outside City ROW - requires easement)
- - -	Proposed Project identified in Oregon City Planning Documents*
Pave existing desire path	Potential improvement

*These specific improvement projects have been identified within the Oregon City 2004 Trails Master and in the 2013 Oregon City Transportation System Plan

Potential Routes for Pedestrians and Bicyclists off Linn Avenue

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

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Potential Routes to Gardiner Middle School

Potential sidewalk infill connection

Widen fence opening and provide paved connection

Provide a paved connection

Remove fence blocking access

Add curb ramp at crosswalk

Provide an accessible multimodal route from Linn

Complete crosswalk striping at intersection

Add crosswalk and pedestrian-activated signal to facilitate safe street crossing

Remove unecessary and unsafe midblock crossing

Legend

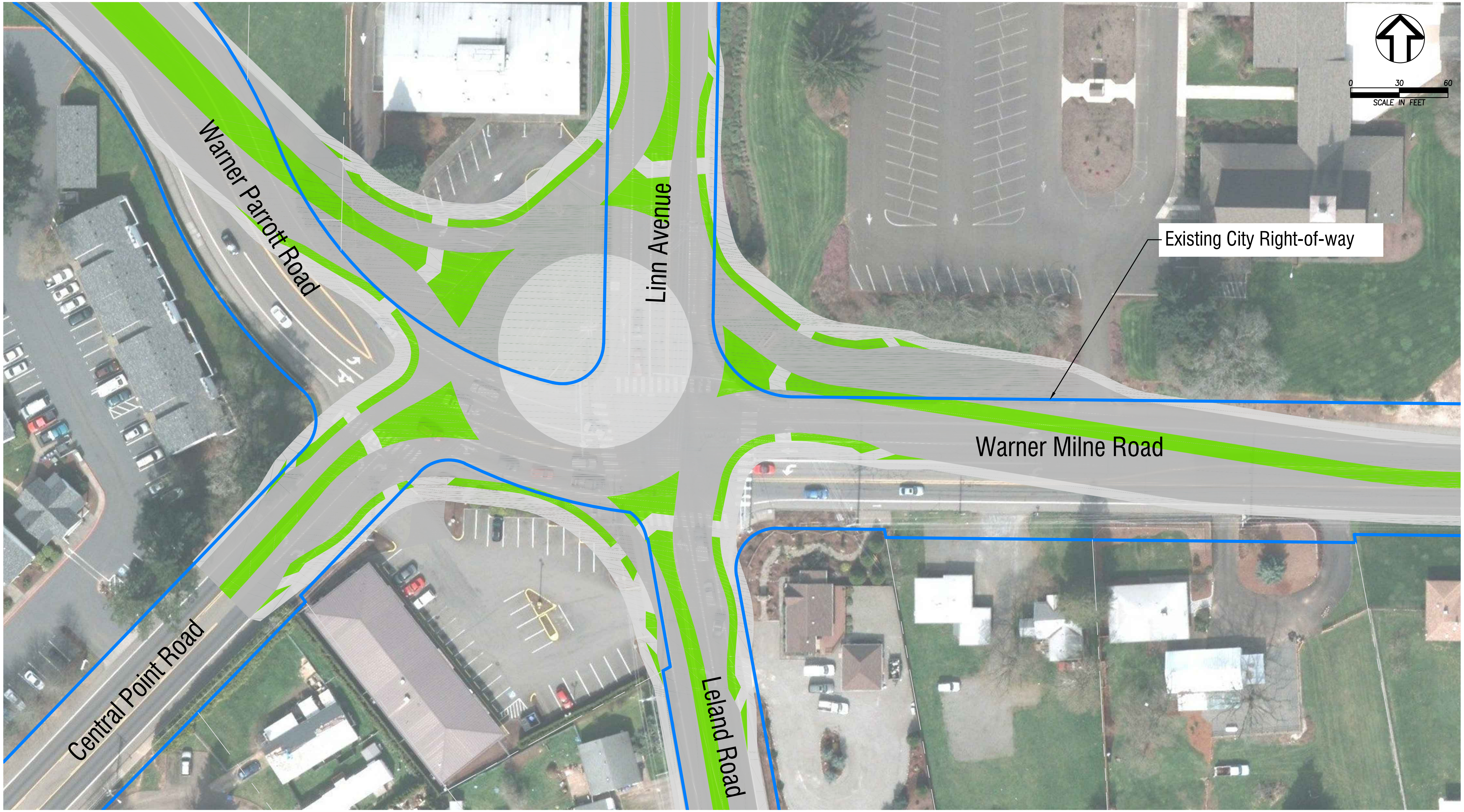
▨	Lot Lines
🟩	City Park or Green Space
—	Existing Sidewalk, Path or Trail
- - -	Potential Pedestrian/Bicyclist Route (within City ROW)
⇔	Potential Pedestrian/Bicyclist Route (outside City ROW - requires easement)
Add curb ramp at crosswalk	Potential improvement to pedestrian/bicyclist connectivity and access

Potential Routes to Gardiner Middle School

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

Concept Plan for 5-Leg Roundabout



Concept Plan for 5-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

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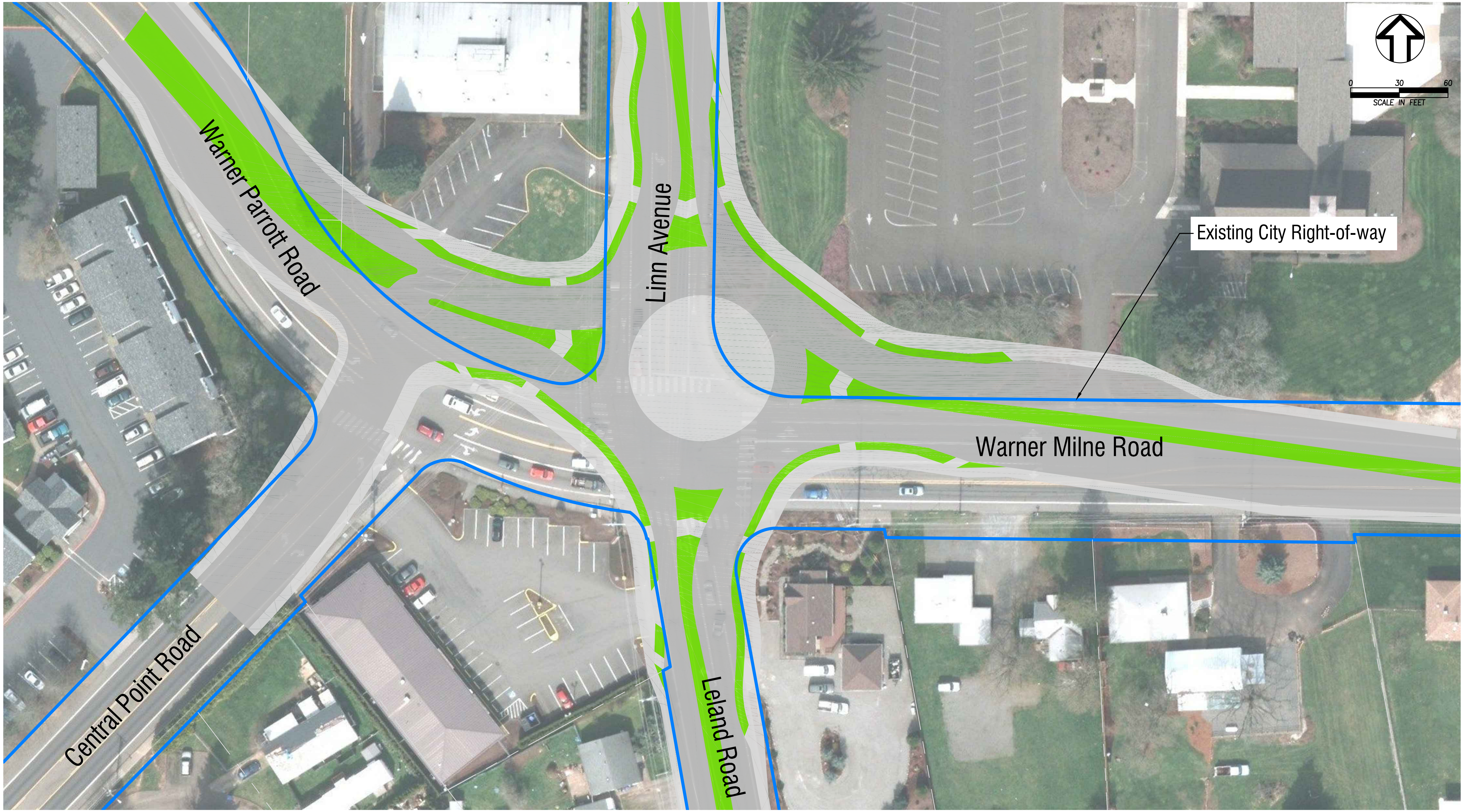
Concept Plan for 4-Leg Roundabout



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Concept Plan for 4-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan

April 2014

OREGON CITY

Transportation Advisory Committee Meeting

OREGON CITY

Transportation Advisory Committee
Minutes

April 15, 2014

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1. CALL TO ORDER AND ROLL CALL

The Transportation Advisory Committee meeting of **Tuesday, April 15, 2014**, was called to order by Chair Johnson at 6:00 PM in the Commission Chambers at Oregon City Hall, 625 Center Street, Oregon City, Oregon.

Committee members present included Chair Steve Johnson, Vice-Chair Bob La Salle, John Anderson, William Gifford, Henry Mackenroth and Robert Mahoney. Cedomir Jesic arrived at 6:15 PM. Scott Failmezger and Blane Meier were excused.

Staff members present included John Lewis, Public Works Director; Martin Montalvo, Operations Manager; John Burrell, Project Manager; Lisa Oreskovich, Administrative Assistant and Kathy Griffin, Sr. Administrative Assistant.

2. APPROVAL OF THE MINUTES

Mr. La Salle asked about item 5c, Public Works Report which indicated that staff sent out an email update on the topic. He indicated that he didn't remember receiving the email and the TAC requested that it be resent.

Mr. La Salle moved to approve the minutes of March 18, 2014. Mr. Mackenroth seconded the motion and it **passed** with Mr. Anderson Mr. La Salle, Mr. Johnson, Mr. Mackenroth and Mr. Mahoney voting yes. Mr. Gifford abstained.

3. AGENDA ANALYSIS

No changes were made.

4. CITIZEN COMMENTS

No comments were received.

5. NEW BUSINESS/DISCUSSION ITEMS

a. Linn Ave/Leland Rd/Meyers Rd Corridor Plan

David Brokaw and Jane Wallis with Wallis Engineering PLLC discussed the idea behind the corridor plan and showed slides.

The plan was divided into four segments:

Segment 1 - Linn Avenue from 5th to Park
Segment 2 – Linn Avenue from Park to Warner Parrott Road/Warner Milne Road
Segment 3 – Leland Road from Warner Parrott Road to Clairmont Way
Segment 4 – Meyers Road from Clairmont Way to Moccasin Way

Points discussed included:

- Intersection of AV Davis and Linn Avenue had some sight hindrances including heritage trees.
- AV Davis was a cut-through route to Warner Parrott and South End Roads.
- Priorities of the corridor plan was to provide a multi-modal route, improve connectivity and access as well as improving safety and addressing stormwater issues.
- Squaring up the intersection of Oak Street and Pearl Street.
- Closing Electric Avenue.
- Installation of a pedestrian activated signal at Charman Street.
- Roundabout at Linn Avenue/Warner Parrott Road/Central Point Road/Leland Road/Warner Milne Road

Mr. Anderson was concerned about the cost of maintaining rain gardens and Mr. Jesic questioned whether any of the facilities would affect wetlands.

Mr. Gifford indicated that he preferred sidewalks separated by landscape islands over curb-tight sidewalks. Mr. Johnson requested that manholes be in the centerlines so as to avoid motorcycle travel lanes.

Regarding the proposed roundabout along the corridor, William Gifford noted that the state of Indiana was aggressively trying to replace traffic signals with roundabouts.

Mr. Mackenroth asked whether the presentation had been made to the local PTA and City staff replied that it hadn't but they had made presentations to several neighborhood associations and then it would have to be presented to the CIC, Planning Commission and City Commission.

b. Public Works Report

i) Meyers Road Extension

John Lewis indicated that the City hired David Evans and Associates, Inc. to prepare the design.

ii) Annual TAC Report

Mr. La Salle noted that light rail was on the Committee's annual report so he wanted to see light rail discussion on the TAC agenda for 2014.

iii) Winter Action Plan

For the TAC's information, Mr. Montalvo distributed a copy of the Winter Action Plan that he prepared for the Operations Center.

iv) Molalla Avenue Turn Lanes at Walgreens and Joanne's Fabric

Mr. Montalvo indicated that he had met with Police Department staff who had pulled all the accident data for the turn pockets. He added that because of the lack of accidents occurring in the turn pockets, the City would not be investing money on a complete traffic analysis.

v) Molalla Avenue Crossing at Garden Meadows

Mr. Montalvo reported that PGE installed two new cobra head lights which improved the lighting at the crosswalk tremendously. The pedestrian crosswalk signs were also installed and new continental crosswalk markings would be installed during June or July when the weather was more favorable.

vi) Radar Speed Signs

City staff was considering developing a policy for neighborhoods to invest in traffic control devices such as radar speed signs. The City just received a new one in January that was purchased in a cooperative agreement with Oregon City Public Works and the McLoughlin NA. The plan for the sign was to move it around within the neighborhood boundaries.

Regarding the City's portable speed radar signs, the City currently has six locations on a rotating schedule.

The signs cost $9,700 for a fully solar powered unit with a battery backup. One positive was that a local Tualatin company now makes the signs so the City can purchase them and get them repaired locally.

vii) Sidewalk Infill Funding Opportunities

Mr. Lewis noted that the City does not have a specific program for sidewalk infill funding opportunities; however, the City was always looking for new grant opportunities.

viii) 7th and John Adams Pedestrian Crossing

The City purchased the pedestrian crossing device and has asked Wallis Engineering to provide a cost proposal to design its installation.

ix) City Commission Transportation-Related Announcements

Information only.

c. 2014 Summer Construction in Oregon City

William Gifford was aware of discussion ongoing at the County about roadway maintenance funding. He asked if there was any interest in having the County give a presentation to TAC about roadway funding. Mr. Gifford agreed to provide City staff with a contact name.

5. COMMUNICATIONS

It was noted that the property owner off of Oak Tree Terrace and Wittke Way installed a cable to discourage mischief down the secluded dead end street.

Mr. Lewis announced that April 26 was SOLV day and Oregon City Public Works would be sponsoring two sites.

Mr. Gifford reported that he had been appointed to Metro's PERC (Public Engagement Resource Committee) to see how effective they are with getting their communications out to the citizenry. He indicated that if there was a better way to improve Metro communications to the City he was open to suggestions.

6. AGENDA ANALYSIS

The Dutch Bros ingress/egress issue was temporarily on hold as the City does not have any capital to make improvements at the site. Additionally, the property owner needed to be contacted to discuss any proposed improvements.

The realignment of signal heads on Holcomb Boulevard and Redland Road will be improved as part of the summer's pavement rehabilitation project.

7. ADJOURNMENT

There being no further business, the meeting adjourned at 7:59 p.m.

Respectfully Submitted,

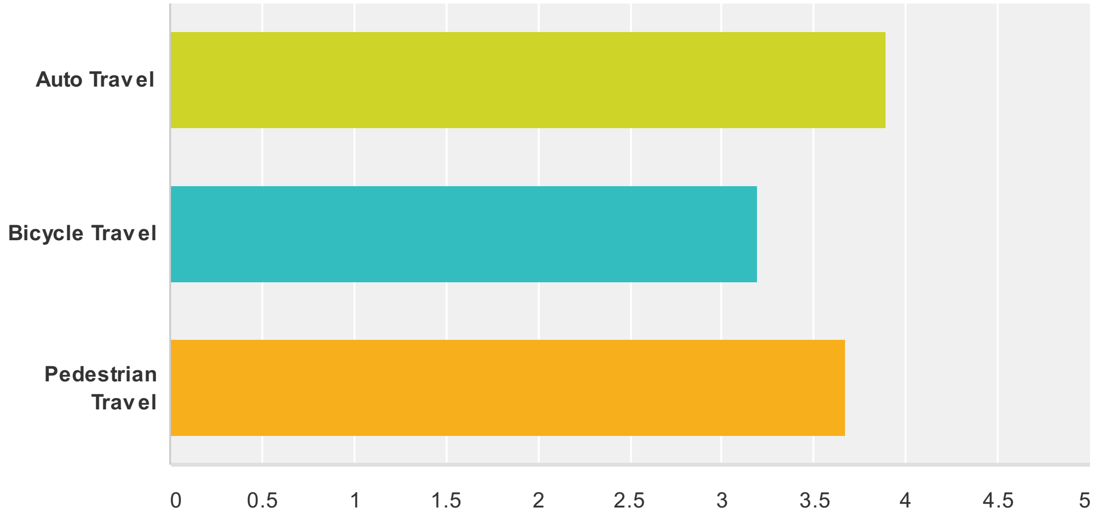
Kathy Griffin
Administrative Assistant

P:\PublicWorks\User Folders\Kathy Griffin\TAC\2014\Minutes\minutes_4-15-14.docx

Online Survey Results

Q1 Please share your opinion on the importance of the improvements to better serve following modes of transportation along this project corridor: (1 being the least important and 5 being the most important) (Please see Oregon City Vicinity Map for corridor location)

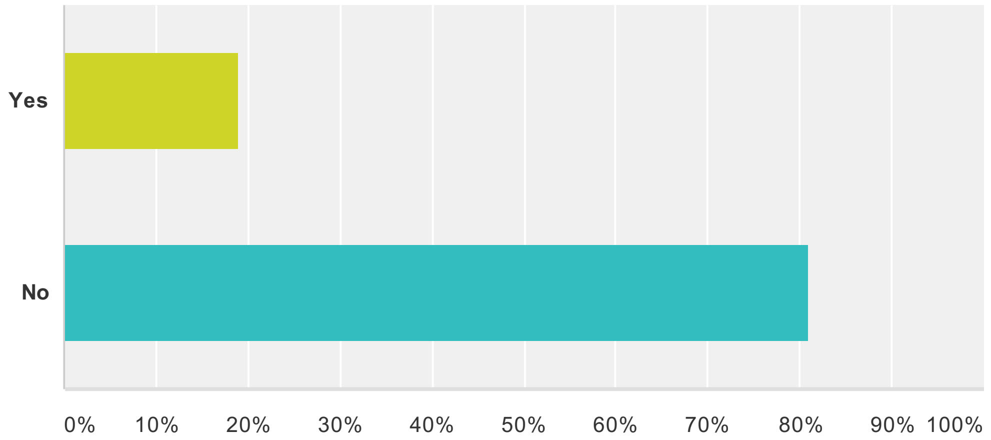
Answered: 169 Skipped: 3



	1	2	3	4	5	Total	Average Rating
Auto Travel	**13.10%** 22	**5.36%** 9	**14.88%** 25	**12.50%** 21	**54.17%** 91	168	3.89
Bicycle Travel	**20.37%** 33	**9.88%** 16	**27.16%** 44	**16.05%** 26	**26.54%** 43	162	3.19
Pedestrian Travel	**10.37%** 17	**12.80%** 21	**15.85%** 26	**21.34%** 35	**39.63%** 65	164	3.67

Q2 Do you bike along this project corridor?

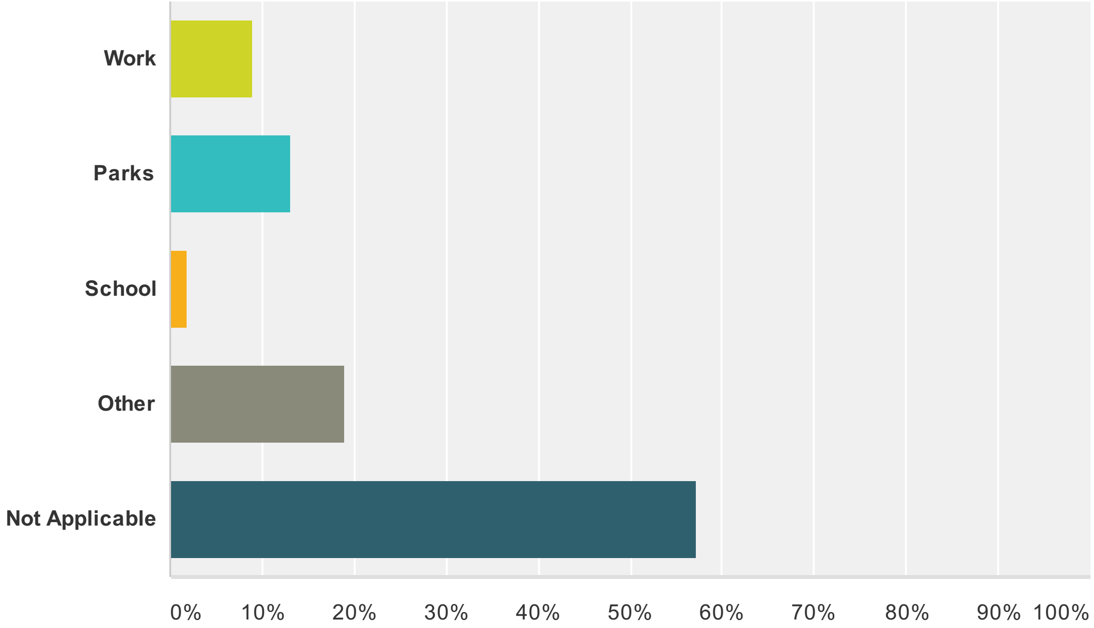
Answered: 169 Skipped: 3



Answer Choices	Responses	
Yes	**18.93%**	32
No	**81.07%**	137
Total		**169**

Q3 What is your most frequent biking destination?

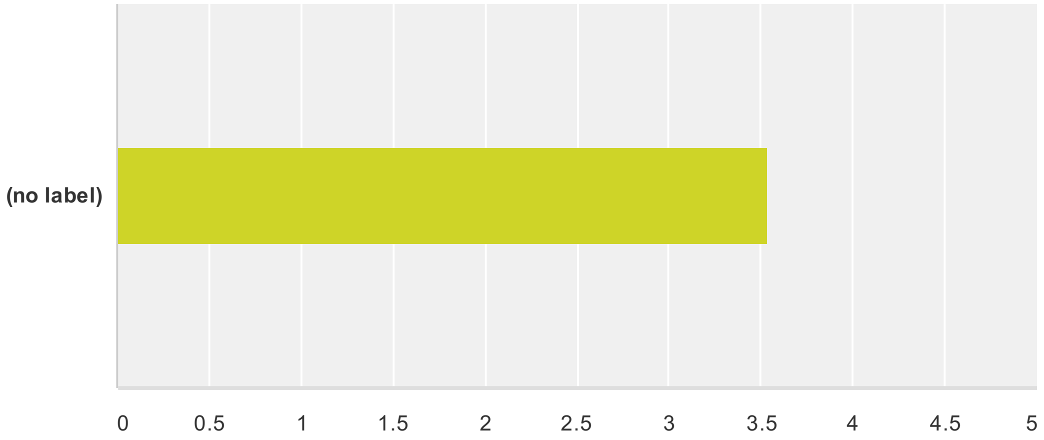
Answered: 168 Skipped: 4



Answer Choices	Responses	
Work	**8.93%**	15
Parks	**13.10%**	22
School	**1.79%**	3
Other	**19.05%**	32
Not Applicable	**57.14%**	96
Total		**168**

Q4 How comfortable do you feel biking through this project corridor on a scale of 1 to 5 (1 being “I don’t feel comfortable,” 5 being “I feel very comfortable”)?

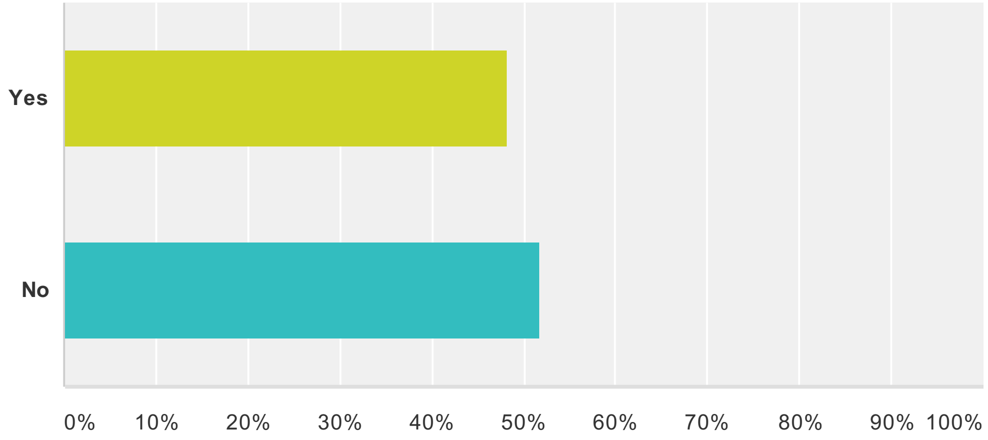
Answered: 168 Skipped: 4



	1	2	3	4	5	N/A	Total	Average Rating
(no label)	**25.60%** 43	**18.45%** 31	**10.71%** 18	**4.17%** 7	**4.17%** 7	**36.90%** 62	168	3.54

Q5 Would you bike along this project corridor if there were improved bike lanes?

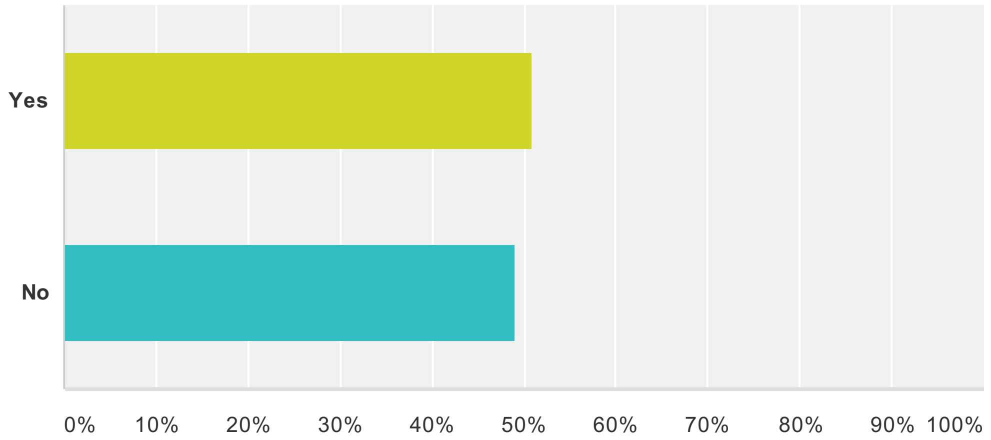
Answered: 162 Skipped: 10



Answer Choices	Responses	
Yes	**48.15%**	78
No	**51.85%**	84
Total		**162**

Q6 Do you walk along this project corridor?

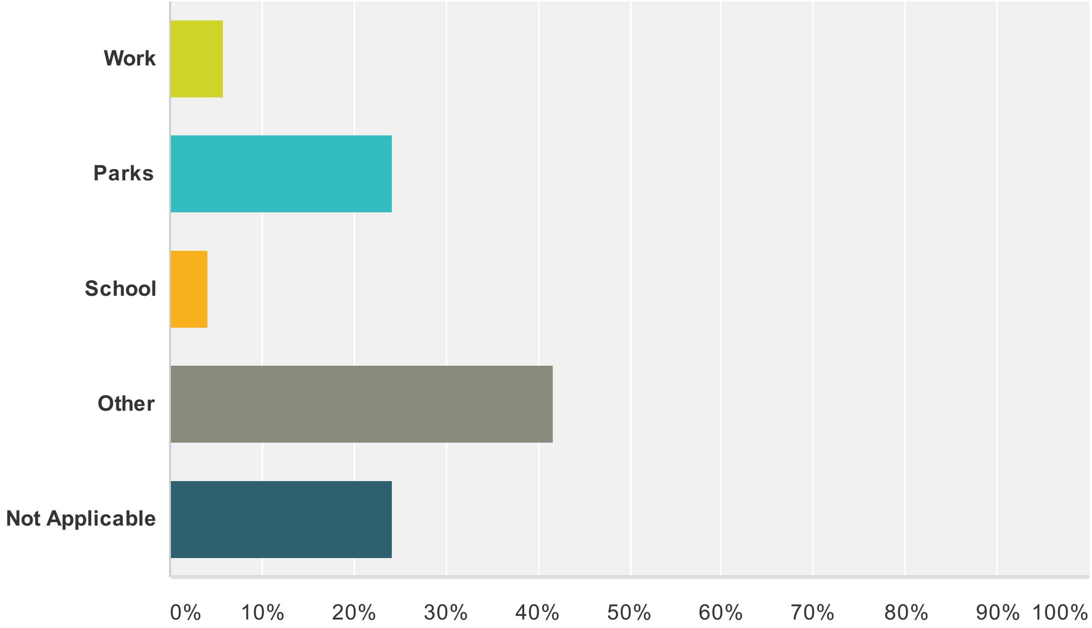
Answered: 169 Skipped: 3



Answer Choices	Responses	
Yes	**50.89%**	86
No	**49.11%**	83
Total		**169**

Q7 What is your most frequent walking destination?

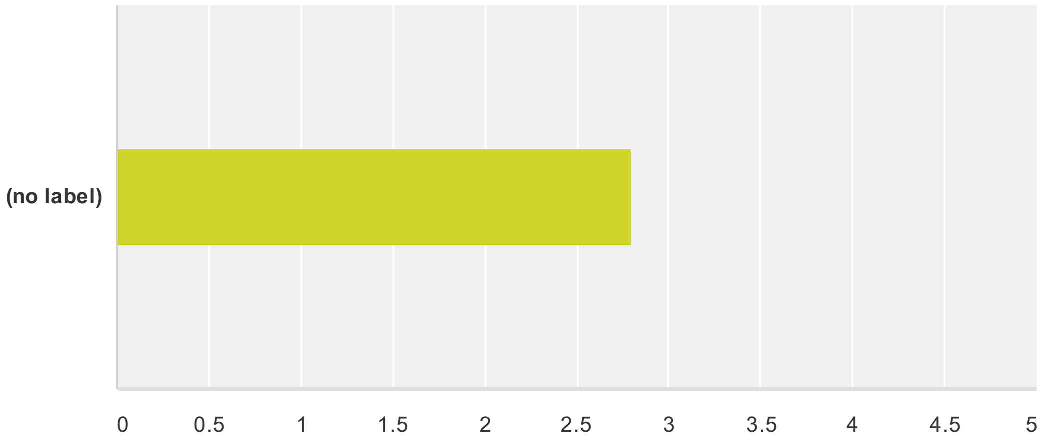
Answered: 170 Skipped: 2



Answer Choices	Responses	
Work	**5.88%**	10
Parks	**24.12%**	41
School	**4.12%**	7
Other	**41.76%**	71
Not Applicable	**24.12%**	41
Total		**170**

Q8 How comfortable do you feel walking through this project corridor on a scale of 1 to 5 (1 being “I don’t feel comfortable,” 5 being “I feel very comfortable”)? (Please see Oregon City Vicinity Map above)

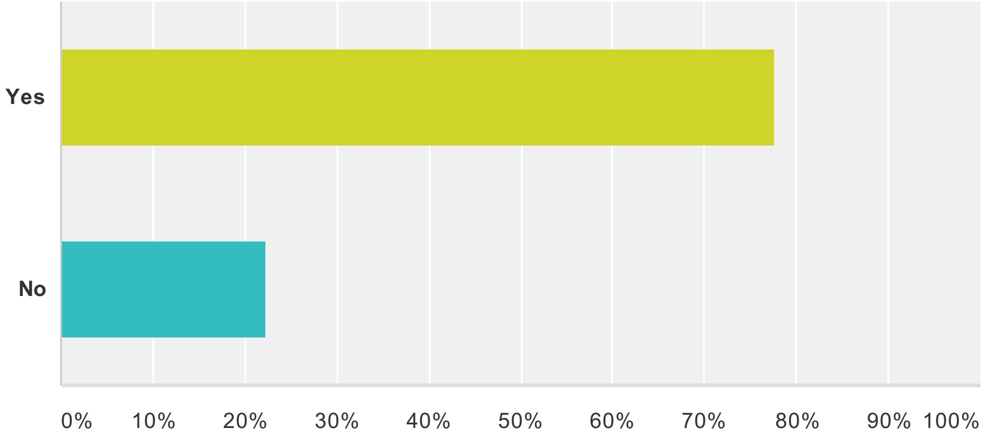
Answered: 170 Skipped: 2



	1	2	3	4	5	N/A	Total	Average Rating
(no label)	**30.00%** 51	**22.35%** 38	**20.59%** 35	**7.06%** 12	**4.71%** 8	**15.29%** 26	170	2.80

Q9 Would you walk along this project corridor if there was sidewalk?

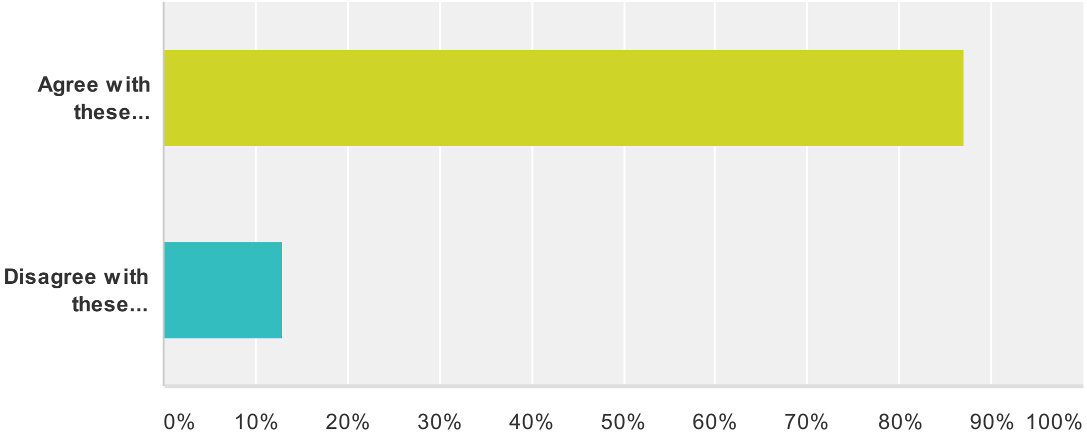
Answered: 170 Skipped: 2



Answer Choices	Responses	
Yes	**77.65%**	132
No	**22.35%**	38
Total		**170**

Q10 The City sees many great reasons for adopting a corridor plan. This graphic (see above) includes several priorities identified as some of those reasons. Do you:

Answered: 161 Skipped: 11



Answer Choices	Responses	
Agree with these priorities	**86.96%**	140
Disagree with these priorities	**13.04%**	21
Total		**161**

Q11 What other priorities would you like the City to consider?

Answered: 46 Skipped: 126

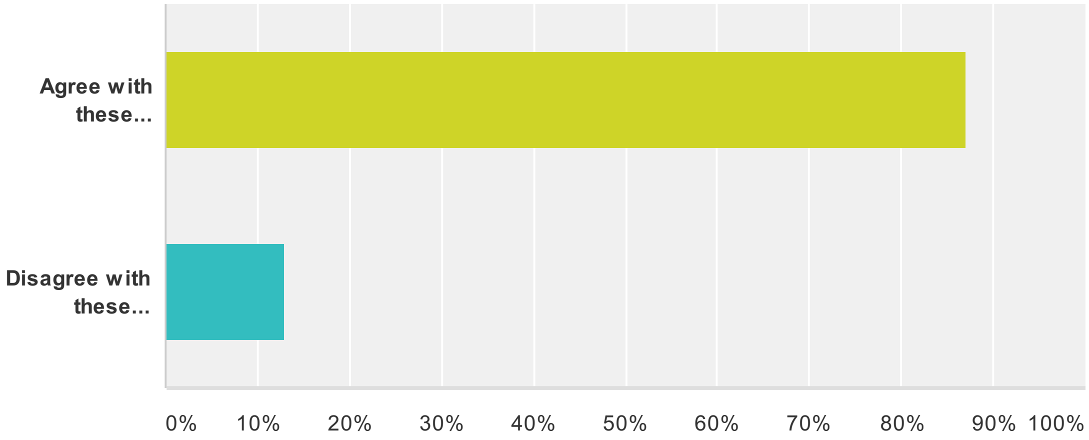
#	Responses	Date
1	I only see the need for the improvements to storm water control and pedestrian safety	5/28/2014 1:48 PM
2	The truck/freight traffic in the area that supports businesses and jobs.	5/28/2014 9:58 AM
3	I do not see biking or walking as a priority for this corridor. I think the city should prioritize opportunities for cars to make their way off the upper slope for quick egress and entrance into the neighborhoods especially when the city is opening up larger areas on south end road and central point road.	5/26/2014 8:29 PM
4	Fund penision and health care for city employees at 100% earned	5/26/2014 8:45 AM
5	Sidewalks only, not that much traffic to change the entire part.	5/24/2014 6:38 AM
6	No need to spend money on a project that only helps a few city residents.	5/24/2014 3:18 AM
7	Just fix the bumpy roads	5/23/2014 9:56 PM
8	Future growth and local acsessability to people walking, dog walking. Fifth Street is a major connection from 99E to the Hilltop Community and with the proposed housing being developed on Central Point, as well as South End, it will be even more accessed in order to reach thoroughfares such as 99E and #205. Most people in O.C. commute to their jobs, since few are in O.C.	5/23/2014 8:33 PM
9	I think sidewalks are the most important thing the city could do to increase pedestrian traffic. I also feel that the city should be responsible for all sidewalks and their maintenance. Our property taxes are high enough to address this.	5/23/2014 12:35 PM
10	Education. Often see bicyclists & pedestrians not following rules of the road & bicyclists riding bicycle in travel lane for vehs where there is also a bicycle lane. A barrier between vehicles & bicycles would be good.	5/23/2014 9:59 AM
11	This is probably covered under your "improve safety for all users", but I would like to see more speed control. 35 is a good speed limit, but many people travel faster than that.	5/23/2014 8:27 AM
12	No roundabouts. People don't like them and are confused by them. Why do planners insist on trying to force these into every project?	5/23/2014 8:27 AM
13	widen the road and add parking along the road. It's too narrow	5/23/2014 7:25 AM
14	Integrate bike-ped infrastructure with Singer Creek Park trail system.	5/22/2014 9:19 PM
15	To clarify, I agree with SOME of the priorities but parts of the surrounding area need less vehicle traffic and not more such as parts of Leland and Meyers roads. Some of the proposed "improvements" may very well lead to increased peripheral traffic. This needs to be addressed inclusively to this plan. As usual, we are only dealing with near-sighted values and ideals instead of a comprehensive plan including the values and ideals of all affected parties. Stormwater...yes. Bicycling....yes. Pedestrian safety...absolutely. Better connectivity and flow...NOT NECESSARILY!	5/22/2014 6:42 PM
16	While I agree with the idea of pedestrian and bike priorities there way to much traffic already existing. This is a neighborhood boarding almost the entire route and it is very hard trying to access Linn Ave. from side streets. Most autos are travel in access of 35 mph. I don't see any plans in section 1 for side walks and with the speed of the traffic it is very uncomfortable walking along that section. If you would lower the traffic you would have to spend the money to widen the street in section one.	5/22/2014 5:35 PM
17	Need to reduce uphill slope for bikers. Very hard for me to go up the hill on bike along Linn Ave. I am a Civil Engineer and have involved roadway / street projects. There is a way to fix it but costly.	5/22/2014 5:03 PM
18	Ensure access, connectivity and safety for the transportation disadvantaged. Construct improvements in an efficient manner. While storm water and water quality are important concerns consider separated paths with no curbs in constrained areas with limited right-of-way (ROW) so that purchase of ROW and storm drainage improvements are minimized.	5/22/2014 3:42 PM

19	Stormwater needs to be addressed.	5/22/2014 2:07 PM
20	Fix road	5/22/2014 1:12 PM
21	getting the in dire need of roads fixed	5/22/2014 12:38 PM
22	Bio swales	5/22/2014 12:38 PM
23	I don't have any specific priorities at the moment.	5/22/2014 12:08 PM
24	Change the three street (4 including 5th)names to one name.	5/22/2014 11:43 AM
25	The current speed limits are perfect for the area and do NOT need to be lowered! Speeding is NOT an issue. Second, the bike/ped access needs to be improved on Meyers from Moccasin to Leland.	5/22/2014 10:48 AM
26	I think round abouts are dangerous and that this would be a bad place to locate one as all streets are busy and in my experience EVERYONE thinks they have the right of way and expect all others to "watch out for them." A left turn requires going past at least two other oncoming streets where those drivers also feel they have the right of way. LETS JUST PUT IN SIGNAL LIGHTS....not a round about. (We are just not used to them and to have one at this heavily traveled location is not the place to learn!)	5/22/2014 10:15 AM
27	Winter issues such as ice and snow should be considered.	5/22/2014 9:12 AM
28	Fixing the miles of sidewalks already in place in the city, fixing the roads already in place, increasing vehicular access, etc. I agree with adding a sidewalk along leland, but don't make it take 2 years. It's an important corridor for vehicles and there is a lack of access in that area for detours.	5/22/2014 8:47 AM
29	I am not sure what the priorities are just based on photos but the priority area with no safe side walks should be addressed first.	5/22/2014 8:21 AM
30	Underground overhead Utilities and improve street trees quality and quantity	5/22/2014 7:56 AM
31	improve access and connectivity for school aged kids to use bikes and walk	5/22/2014 7:30 AM
32	LANE MARKING WITH REFLECTIVE PAINT OR BOTTS DOTS Improve auto traffic throughput though the corridor Set priories to what gives the most benefit to dollar cost for increasing traffic flow. e.g. consider cost per passenger mile used on the corridor The priories do not take into account the primary users of the corridor and appear to spend money in opposite relationship to the amount of use by mode. Priorities to the increased traffic that will be generated by the development at south end and TowerVista, Hazel Dell, areas which will use this corridor for exit to the freeway. Don't base your priories only on Metro's demands..	5/22/2014 7:19 AM
33	Of the items listed above Multi-Modal is the least important to me. This corridor already has a relatively high amount of bike lane area. Bicycles don't pay for the roads gasoline and diesel taxes and the City maintenance fee does. Furthermore, bicycles are an un/under regulated mode of transportation often causing more traffic hazards than automobiles.	5/22/2014 5:20 AM
34	Singer Creek Park accessablity and off street parking improvements. Current ad-hoc arrangement is only good for 2 vehicles and is not well situated for safe use.	5/21/2014 10:13 PM
35	Do not make one way portions an no left turn portions, these increase travel time and traffic congestion. There are houses on portions of the roadway but it is also a major street for up/down hill travel since Molalla avenue is so congested. Consider making the speed limit 30 instead of 25 if possible.	5/21/2014 9:17 PM
36	The round about is going to be a cluster. I go to Bend very often. They have 17. None are in a high travel area like the one planned. This is a mistake. Keep tow trucks standing by for the first two weeks. Also anger management professials there.!!!	5/21/2014 8:45 PM
37	Better lighting along Meyer, Leland and Linn Ave. It is very dark in the evenings making it dangerous for anyone on bike or foot.	5/21/2014 6:18 PM
38	Naborhood sidewalks in established areas and not just newer development! I live near Gardner and the kids all walk to and from school in the street. It's not safe for them or for the residents. I think more people would be out in the community if we had safer places to walk.	5/21/2014 5:26 PM
39	Consider using our water bill monies to do what it is designed for, fix the roadways for the automobiles they were built for. We have bike lanes already and they are too wide and restrictive to automobile traffic. I agree with the addition of sidewalks, however.	5/21/2014 5:04 PM

40	I mostly agree with the priorities, but as most OC residents work outside the city and travel by car (and will most likely continue to travel by car), I believe the main emphasis should be on auto travel with bicycle and foot traffic should be secondary. I also hope a good deal of consideration will be given to what is already working and does not need changing.	5/20/2014 10:04 PM
41	Make Molalla Avenue traffic friendly. Molalla is the main corridor through Oregon City. Make the lanes double so there is easier movement through the city, on Molalla. Leave the neighborhood roads the way they are. Bike lanes are nice to add to Leland, Meyers, Linn because it would provide safety for bicyclists away from all the traffic, (Molalla Avenue) It would be safer for cars and bicycles alike.	5/18/2014 3:26 PM
42	Promote alternative transportation modes, provide greater accessibility for transit users, enhance the appearance of the corridor, safe routes to school	5/16/2014 1:16 PM
43	Safe routes to school, reduce speeds, improve attractiveness of streetscape	5/15/2014 4:34 PM
44	less emphasis on biking. Still not a major mode of transportation in OC and way to much money and time is spent catering to the small bike community in OC	5/15/2014 9:40 AM
45	Speed reduction and traffic calming	5/15/2014 7:01 AM
46	A Trail to the top of waterboard park	5/14/2014 12:02 AM

Q12 Here are a few more reasons for adopting a plan. This graphic (see above) includes several major concerns along the corridor. Do you:

Answered: 162 Skipped: 10



Answer Choices	Responses	
Agree with these priorities	**87.04%**	141
Disagree with these priorities	**12.96%**	21
Total		**162**

Q13 What other major concerns would you like the City to consider?

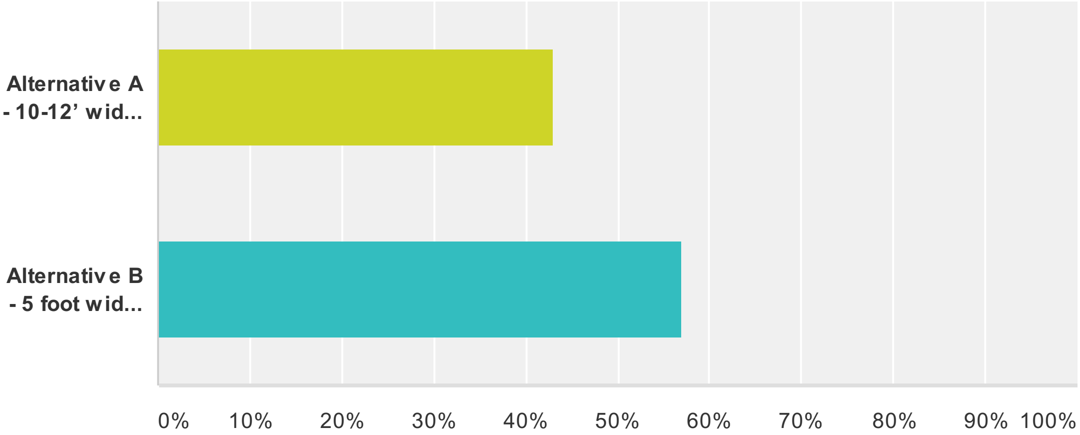
Answered: 43 Skipped: 129

#	Responses	Date
1	caution is warranted regarding stability concerns of roadway widening is planned.	5/28/2014 1:48 PM
2	Emergency vehicles such as police, repair and fire, and there need to move quickly down the road to save lives.	5/28/2014 9:58 AM
3	Speed limit on Linn is too fast.Especially from Park to Jackson. Curves through that section limit visibility and cars travel above the speed limit.	5/27/2014 12:19 PM
4	I do not think bicycles should be given as high a priority as you have. Cars, and foot traffic deserves the majority of the concern here.	5/27/2014 10:41 AM
5	not in this order...multimodal, no #3 priority of the three. auto - yes, stormwater-yes.	5/26/2014 8:29 PM
6	Route bicycle traffic to Mollala Ave since Linn is narrow in several points. Pedestrian traffic should have priority. Also, marked crosswalks where school bus stops are so as to increase visibility.	5/25/2014 1:37 AM
7	Something more than STOP signs at the Lelend/Meyers intersection. So many cars do not acknowledge the STOP signs posted.	5/24/2014 8:51 PM
8	That the city is using our money for stupid pet projects that worthless to most of the citizens.	5/24/2014 3:18 AM
9	See above comments	5/23/2014 8:33 PM
10	The simplest fix to these concerns would be to widen the street. There seems to be plenty of excess property not used by the residents.	5/23/2014 12:35 PM
11	One I would add to the "Safety" section under "specific areas of concern for vehicle crashes" would be the intersection at Linn Ave and Charman St. I live on Linn Ave and just about every week, I see someone making a left off Charman St onto Linn pull out in front of a vehicle traveling up the hill on Linn. Because of the corner and sometimes tall grass, it is extremely difficult to see cars coming up the hill on Linn when trying to turn left off Charman.	5/23/2014 8:27 AM
12	See answer 11 above.	5/22/2014 6:42 PM
13	Again, adding continuous side walks and lower the speed limit would make things safer.	5/22/2014 5:35 PM
14	Add a new bike trail called multi-user path that is under 5% slope from bottom near the library to the top. I have designed Trolley Trail from Milwaukie to Gladstone as a lead designer. Hoping someday that trail will extend to Oregon City.	5/22/2014 5:03 PM
15	I agree with the priorities but would try to limit the costs of ROW purchase and storm water improvements.	5/22/2014 3:42 PM
16	Stormwater needs to be addressed.	5/22/2014 2:07 PM
17	These plans will encourage an increase in Motor, Ped, and cycle traffic and with it the increased opportunity for accidents. The top concern should always be the preservation of life. Well placed crossing areas (not only at corners), proper auto speeds.	5/22/2014 1:23 PM
18	none	5/22/2014 12:08 PM
19	Discontinuous bike lanes are number one. Since the streets are narrow in places, peds and bikes should SHARE the area. I want this project to be fiscally conservative and not grandiose.	5/22/2014 10:48 AM
20	A bit more clamping down on speeders....follow posted speed signs. Maybe a few tickets issued....	5/22/2014 10:15 AM
21	Police and fire accessibility. The road is very narrow in places. Also storm water run off and erosion control are very important.	5/22/2014 9:12 AM
22	Don't close Electric Ave. Increase visibility for left turns onto Linn.	5/22/2014 8:47 AM
23	There are a lot of topography issues	5/22/2014 7:30 AM

24	Maximizing vehicle throughput though the area and reducing travel time for vehicles. Allowing safer areas for the bus stops in the corridor. Funding should be allocated by use, not the reverse. We keep spending a majority of funds on reducing roadway for bike lanes that are lightly used while taking away roadway for vehicles that are the heavy users. REDUCTION OF POLLUTION by increasing the throughput of vehicle travel. Let's get real - most people in Oregon City work OUTSIDE of the city, so bike and walking trails are used mostly for recreation. If we want a vibrant city, we need to provide easy and good freeway access for vehicle travel. INCREASED LANE VISIBILITY USING REFLECTIVE PAINT AND BOTTS DOTS REFLECTORS.	5/22/2014 7:19 AM
25	When the City recently revamped Leland Road several section of roadway were not adequately upgraded to include continuous sidewalks. This causes a hazard when walking. The improvements to the lower area (phase 1) are going to be expensive, There is inadequate right of way for the slopes that are present.	5/22/2014 5:20 AM
26	Speed control. The current 35 mph speed is about 5 mph too high for safe passage through several points on the corridor. 25 mph is too slow. Also, due to the steepness of the gradient, there is a tendency for up hill drivers to speed up to keep their engine rpm's "normal" and a tendency to speed going downhill as gravity pulls and it is a long use of the brakes to hold back speed. Also a problem with bikes and skateboards running down hill at speeds too high to allow save stopping for the riders.	5/21/2014 10:13 PM
27	Strongly agree with improvement at Linn/AV Davis - 4-way stop would be great	5/21/2014 9:05 PM
28	Change Mollala Ave back to 4 lanes from Holmes lane hwy 213.	5/21/2014 8:45 PM
29	Speed limit is too high for Linn Ave with all the curves, so many blind corners.	5/21/2014 6:18 PM
30	Same as above. Add more sidewalks.	5/21/2014 5:26 PM
31	I agree with the priorities but I believe you have understated the danger and inadequacy of pedestrian routes through this area. For the most part, they are unusable or non-existent.	5/21/2014 5:11 PM
32	I agree with the sidewalks, perhaps the stormwater issues, but the roadways are constrained because of the addition of wide bike lanes on both sides of the roadways. There have been VERY few crashes on Linn Avenue between 4th and 3rd streets, although visibility could be improved for Linn at AV Davis.	5/21/2014 5:04 PM
33	Bus pads for this area to move traffic along better. However there may not be enough room on the roadway, just a suggestion to look into.	5/21/2014 11:08 AM
34	Adding a round about at signal location	5/21/2014 7:49 AM
35	Please be sure if more crosswalks are planned that they are not like the ones on Molalla Avenue where medians make noticing pedestrians more difficult.	5/20/2014 10:04 PM
36	All I have to say it is about time Oregon city has started to make changes to this area. Very unsafe for kids to walk or ride their bikes to school or the Safeway area. I do not let my daughter ride her bike that direction because how unsafe it is for bikes	5/19/2014 9:24 PM
37	Go with one street name. Its a pain to give directions when this almost straight stretch has 4 names. Remember it is 5th closer to downtown.	5/19/2014 4:37 PM
38	Agree only to the degree that residents will not loose their homes to complete any of these improvements!!	5/18/2014 7:20 PM
39	reduce the speed limit. 35mph is tool fast for streets with numerous driveways ans access points. If it is truly multi-modal the existing speed is a safety issue. Provide speed cameras to enforce the speed limits.	5/18/2014 1:56 PM
40	Slow cars down and allow pedestrians to feel safe!	5/16/2014 3:35 PM
41	Bus stops along the corridor often have no amenities, lighting, sidewalks, shelters, etc. They are not safe and discourage bus use. Imagine an elderly person waiting for a bus at night, standing on gravel on the side of the road, in the dark, cars speeding past.	5/16/2014 1:16 PM
42	Native Plants, Parking at Singerhill Park	5/14/2014 12:02 AM
43	Due to safety concerns for pedestrians and cyclists, I would put "Constrained Right-of-Way / Roadway" above "Stormwater" as a priority. To discourage eastbound drivers (going uphill on Linn) from short-cutting across the white line into the shoulder area, I would suggest installing a single line of raised dots around the curve--much like along Highway 43 heading south from George Rodgers Park in Lake Oswego toward West Linn.	5/12/2014 1:47 PM

Q14 Which alternative do you prefer (see above image)?

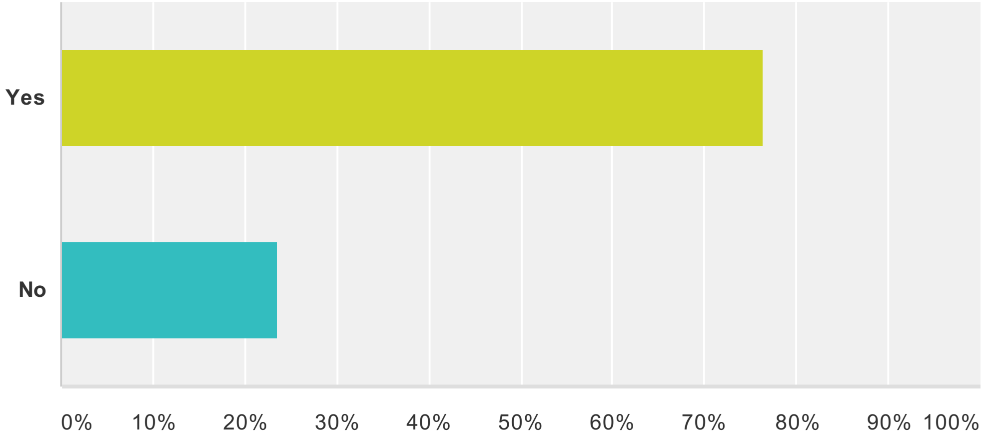
Answered: 149 Skipped: 23



Answer Choices	Responses	
Alternative A - 10-12' wide shared use path on the uphill (west) side of Linn Ave and a bike lane (only) on the downhill shoulder.	**42.95%**	64
Alternative B - 5 foot wide sidewalks on both sides and a 5 foot wide bike lane on the uphill side of Linn Avenue. Bicyclists traveling downhill would use a shared-use lane allowing for bikes and vehicles.	**57.05%**	85
Total		**149**

Q15 Due to a high level of accidents at the Electric Ave. & Linn Ave. intersection, one other plan consideration is looking at closing Electric Avenue and developing a dedicated left turn lane at Charman St. Would you be in favor of this idea?

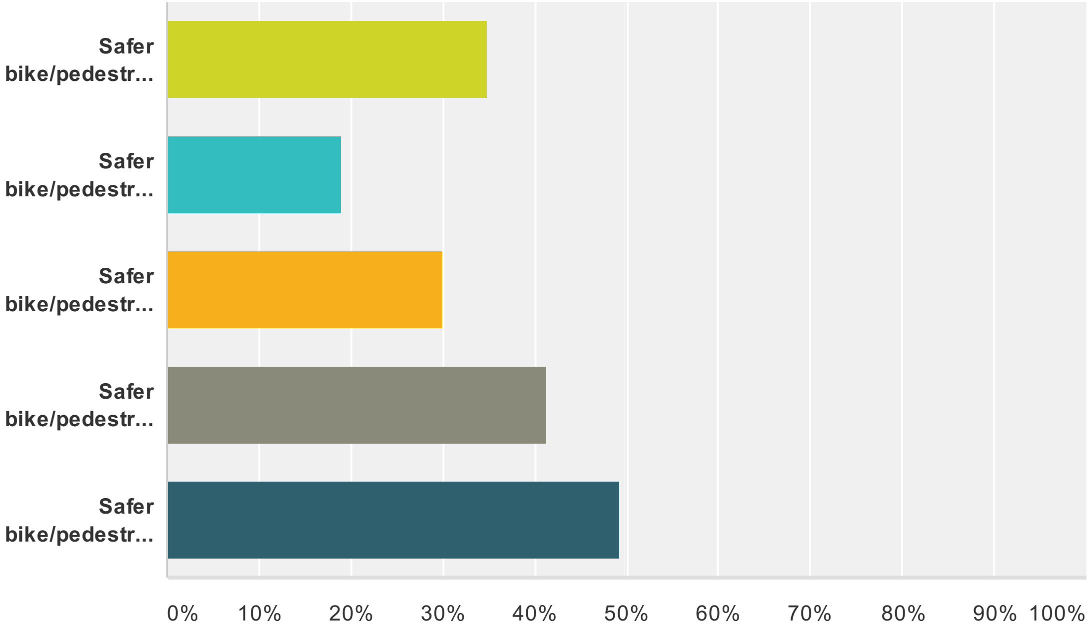
Answered: 148 Skipped: 24



Answer Choices	Responses	
Yes	**76.35%**	113
No	**23.65%**	35
Total		**148**

Q16 Besides pedestrian access along the length of the corridor we see other opportunities for improved walking and biking connectivity. Please choose your top two priorities from the following projects:

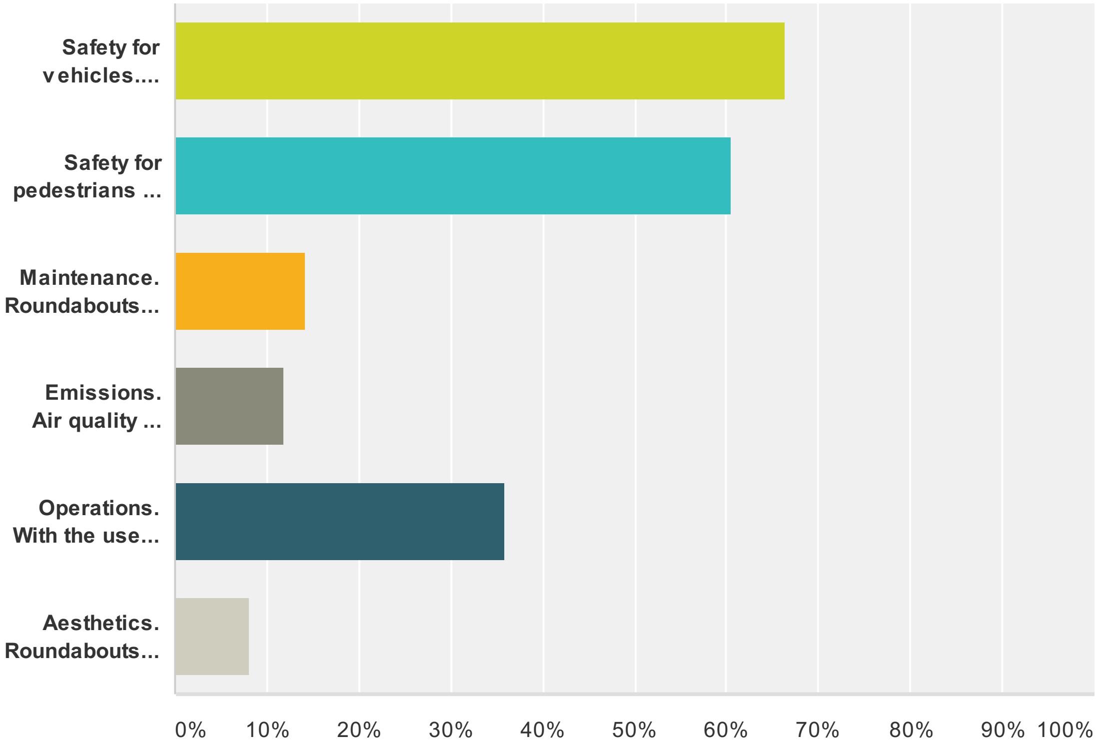
Answered: 126 Skipped: 46



Answer Choices	Responses	
Safer bike/pedestrian routes from the Rivercrest Neighborhood to Singer Creek Park	**34.92%**	44
Safer bike/pedestrian routes from Pearl Street to Singer Creek Park	**19.05%**	24
Safer bike/pedestrian routes from Holmes Lane to Singer Creek Park	**30.16%**	38
Safer bike/pedestrian routes from Molalla Avenue to Singer Creek Park	**41.27%**	52
Safer bike/pedestrian routes from Linn Avenue to Gardiner Middle School	**49.21%**	62
Total Respondents: 126		

Q17 The concept plan is looking at installing a roundabout at the Linn Ave./Warner Milne Rd./Leland Rd./Warner Parrott Rd. intersection. Roundabouts have been proven to provide many benefits to communities. Please choose your top two priorities from the following list of benefits:

Answered: 134 Skipped: 38



Answer Choices	Responses	
Safety for vehicles. Roundabouts reduce vehicle speeds and have been shown to reduce accidents by 40%, injury accidents by 75% and fatal accidents by 90%.	66.42%	89
Safety for pedestrians and bicyclists. For pedestrians, the roundabout divides the crossing into 2 stages, the pedestrian only has to look at traffic coming in one direction and the splitter island creates a “refuge” while waiting to cross the second lane. The bicyclists traveling in the roundabout become visible to motorists as they position themselves in the center of the lane and are not passed by another vehicle.	60.45%	81
Maintenance. Roundabouts reduce the long term operational and maintenance costs associated with traditional signalized intersections.	14.18%	19
Emissions. Air quality is improved by the elimination of vehicles idling while waiting for traffic signals to change.	11.94%	16
Operations. With the use of yield signs instead of stop signs or traffic signals, vehicles are able to enter the roundabout when there are adequate gaps in the traffic flow. This reduces delays and increases the capacity of the intersection.	35.82%	48

Aesthetics. Roundabouts create an area for communities to provide green space and/or art. There are no large poles, overhead wires, or signals cluttering the visual environment.	**8.21%**	11
Total Respondents: 134		

Q18 What else would you like to share with the City to help inform the final plan?

Answered: 52 Skipped: 120

#	Responses	Date
1	The roundabout idea is fantastic. We have lived on Canemah Court for 20 years and the haphazard way these streets comes together has long needed a fix. Development off of South End Road and Leland have only exacerbated the problem. Thanks for your great work and vision. -Paul Collins	5/30/2014 8:18 AM
2	Whatever the plan, lane striping is important for safety. The center and side lane stripes should be bright enough to be seen even on the darkest and wettest of nights. The striping always starts out that way, but does not seem to be well maintained once it starts to fade. This is Oregon -- it rains a lot here! Buy the kind of paint that works in this climate!	5/29/2014 2:22 PM
3	I do not agree that a roundabout at this location is the best choice.	5/28/2014 10:00 AM
4	That is a horrible idea to put a 5leg roundabout here. People speed through those things as fast as possible like it's a race. The one on Stafford road in west linn is a good example of this bad idea. I feel like there will be even more accidents. I know this 5 road intersection is busy and probably hard to engineer a safe and efficient road. Good luck	5/27/2014 10:57 PM
5	I often use all segments of this plan as running routes but prefer other routes due to the very narrow shoulders, lack of sidewalks or bike/multi-use lanes, and lack of LIGHTING. Only the segment from Park to Warner Milne/Warner Parrot has adequate lighting, and is also the only segment with any sidewalks. It would be very nice to see the entire corridor connected and safer for all users.	5/27/2014 11:40 AM
6	hopefully the turn circle will have an inner and outer lane although I think that most of the cars will only do a a180 thru the circle jamming up the outside lane.	5/26/2014 9:08 PM
7	I don't feel that there is a need to add a 4 way stop at AV Davis and Linn. There is already a 4 way stop a block down.	5/26/2014 10:53 AM
8	1) If you close Electric Avenue, traffic from Charman to Linn Ave heading downhill will be backed up by those wanting to head uphill from Charman to Linn Ave. 2) It's also a chancy left turn lane from Charman to Linn, with low visibility of traffic coming uphill on Linn. You don't often see a vehicle approaching from the left on Linn until you are part way from Charman onto Linn. Traffic needs to slow down on Linn coming uphill. Are accidents really at Electric and Linn or are they at Charman and Linn?	5/26/2014 10:03 AM
9	Nice ideas to improve biking but only if bikes are going to pay for it. Please don't tax me for bicyclists.	5/25/2014 1:41 AM
10	I think putting a round about at the intersection of linn ave/warner milne/leland etc would cause more accidents. Leave it with stop lights controlling the taffic flow	5/24/2014 11:07 PM
11	Leave it as is and save our money.	5/24/2014 3:20 AM
12	Please look at the roundabout at 172nd off Highway 212. It is beautiful and well designed. I do NOT think a 1 lane roundabout at the above intersections would be wise or safe. I drive this many times a day and know if trucks and buses are there the roundabout needs to be at least 2 lanes wide. Your premise #4 that "vehicles are able to enter the roundabout when there are adequate gaps in the traffic flow" does not apply to this intersection. There are NEVER adequate gaps At least now people can show their good manners, by allowing gaps to occur. I do not understand how pedestrians would only have to look one way. Can you please explain that to me.	5/24/2014 12:47 AM
13	I've seen round abouts used very successfully in many small towns/cities which are connected to major arterials. They always include designated pedestrian crosswalks at the intersections. Since the autos are traveling at reduced speeds, it is easy for them to stop for pedestians.	5/23/2014 8:40 PM
14	I think putting a lot of money into bike lanes on Pearl Street is a waste. That is too steep of a hill for bikes either up or down. Sidewalks would be the best solution there.	5/23/2014 12:39 PM
15	No roundabouts. It's so busy there that this would TOTALLY slow down the traffic flow here. NO NO NO	5/23/2014 7:27 AM

16	This is not near enough information to process to have any degree of responsibility in coming to planning decisions regarding these matters!	5/22/2014 6:47 PM
17	Add an roundabout is a great idea. I have worked with roundabout in Happy Valley's 172nd Ave project as Civil Engineer.	5/22/2014 5:10 PM
18	hate roundabouts	5/22/2014 5:10 PM
19	Regarding question 15. - I don't feel that I am an expert so I think an option of "Don't know" would have been a good idea. Regarding queston 16. - I couldn't really read the map so I couldn't make a recommendation.	5/22/2014 4:35 PM
20	NO ROUNDABOUT	5/22/2014 2:10 PM
21	I love roundabouts. Greatly increases flow of traffic no waiting for a light to change that no one is using. Much less frustration that leads to chance taking and accidents. I used to turn left onto Stafford road from Rosemont and some days it could take a very long time after the roundabout was put in it was a dream and it slowdown the speeding of the through traffic.	5/22/2014 1:34 PM
22	no aroundabout	5/22/2014 1:17 PM
23	I wish Oregon City could incorporate more round-abouts in the community. When you travel to European countries and experience round-abouts, you get a much better appreciation for them. Don't have to pay for costly upkeep of lights, cut emissions, and they can contain plants for improved air quality.	5/22/2014 12:44 PM
24	none	5/22/2014 12:12 PM
25	I have witnessed roundabouts in other states and they are not liked by those who drive (nor I) them elsewhere. They slow down the sensible driver and then there are THE OTHERS! I do not think they provide most of the above mentioned positives.....(RE: aesthetics....weeds grow too profusely in the green spots we already have) I do frequently use the area involved as have friends in that part of town and prefer that route to Warner-Milne for my Credit Union so even though it is not my part of town...I do go there but only by car.	5/22/2014 10:30 AM
26	A change of this magnitude can create a great deal of concern, frustration and confusion if implemented. Older drivers could become potentially frightened and "freeze up". Additionally, I would want to be certain that PGE, the school district, etc. weigh in on this as they will have larger vehicles to maneuver. Signage for each leg will be CRITICAL.	5/22/2014 10:06 AM
27	I do not believe the safety for vehicles number. Also at this intersection currently, speed signs and the school keep the vehicle speeds low. I don't think that will stay the same with a roundabout although they work very well in some places. I doubt the safety for pedestrians as well.	5/22/2014 9:28 AM
28	The roundabout is great for 3-4 way intersections, but this is a 5 street intersection in a developed portion of the city. Unfortunately, there is so much traffic converging at that location it is going to be very congested unless you increase the diameter of the roundabout which will impede upon the businesses and properties in the area, as depicted in the image above. The turn from warner parrot to central point will be very difficult for long vehicles (bus, school bus, trucks/trailers, motorhomes) to make. Additionally, drivers are stupid and can't handle navigating roundabouts. I would support dedicated right turn lanes from leland to warner milne, and linn to warner parrot	5/22/2014 8:59 AM
29	Would like to understand the budget numbers behind the roundabout compared to a signalized intersection. Taking into account lower maintenance and other factors as shown above.	5/22/2014 8:01 AM
30	If the goal of the project is to provide better multimodial opportuniities, why is the City considering a roundabout. Roundabout are more dangerous for the visually impaired. Roundabouts cause pedestrians and wheel chairs to travel farther to negogiate the roundabout. Roundabouts are not always cheaper to maintain than a traffic signal. Often times you are trading the cost of one maintenance activity for another activity. Roundabouts are great for vehicle safety and operations. The aesthetic aspects of roundabouts is only be scored based on the values of the community. Roundabouts are a great tool and I'm glad that the City is considering a roundabout at this interection. There is already enough information about roundabouts. Please present benefits of the roundabout at this site objectively. Some of the value choices given for a roundabout are a bit of a stretch. As design professionals, I think you should work on presenting the information about roundabouts more neutrally	5/22/2014 7:45 AM
31	I am SO HAPPY that you have included Central Point road!!! YEA!!!! It would be nice to plant the center of the circle or have city art placed there. Nice job on adding Central Point!!! As much as possible eliminate overhead power and utility lines as part of the plan.,	5/22/2014 7:33 AM

32	I don't like the round about idea. Round abouts are confusing.	5/22/2014 7:29 AM
33	This project is long overdue. However, there are going to be significant costs to completing this project. Right of way (roundabout and Linn phase 1) and sight distance issues (Linn at Electric/Charman) are going to come up, storm water management/mitigation is going to be required along the project entirety. These issues can be expensive to deal with.	5/22/2014 5:28 AM
34	If there is a roundabout, there still needs to be clear and sensible access to residences and businesses in the area.	5/21/2014 9:20 PM
35	Safer bike/ped space beginning at transition of 5th/Linn to Charman, particularly uphill	5/21/2014 9:09 PM
36	The round about is a mistake!!!!!! The curve just north of Pearl St should have a white line with bumps on the inside curve for traffic traveling sout on Linn Ave to keep people from cutting the corner. Bikes or pedestrian safety. Most cars cut the corner. That is why the paint strip is missing. I use Electric street and Charman 2 to 5 times a day and I can not remember the last accidebt I say there.	5/21/2014 8:56 PM
37	I don't think a roundabout is a good thing to put on that corner, there is too much car traffic and foot traffic crossing the roads there. You would need a crosswalk with a light there for sure. You would just be stopping up the traffic then.	5/21/2014 6:29 PM
38	The plan seems to bring up the primary issues. I would like to hear similar alternatives for safety improvements, bicycle paths, and pedestrian corridors along South End Road and/or Center Street to provide safer ways to connect the South End neighborhood with the McLoughlin area and downtown.	5/21/2014 5:19 PM
39	While roundabouts are shown to work, they work in areas where people actually use them properly and use signals as they should. The current roundabout at Clackamas River Drive is more dangerous because no one uses proper turn signals to indicate which roadway they are turning onto, thus delaying the potential cars from moving into the roundabout. I think if this were to occur, better police presence and enforcement of traffic laws should take place.	5/21/2014 5:12 PM
40	I understand what the statistics say about round abouts, but I don't believe they work that way in the real world. This intersection is incredibly busy and the thought of trying to negotiate a round about with all the traffic is daunting.	5/21/2014 5:09 PM
41	Not in favor of a roundabout they are not widely used in the states and I feel would confuse too many drives.	5/21/2014 11:16 AM
42	Roundabouts are a bad idea at the proposed intersection. I am sure a good highway engineer could come up with a much better plan. A separate lane for the four right hand turns would reduced a lot of the congestion. Take away the 7-11 entry off Central Point would help tremendously.	5/21/2014 8:59 AM
43	Concept plan for segment 1: How are you going to gain an extra 15 feet for sidewalks and bike lanes? I would not like to see the driving lanes get any narrower. Have there been problems with the intersection at Linn and Warner Milne? I travel through that area daily and have not noticed any issues. Pedestrians use the crossing signals and drivers seem to obey the traffic signals. If there is not a problem, I do not see any reason to spend a lot of funds to redo the intersection.	5/20/2014 10:15 PM
44	This is a pretty busy intersection and designed poorly. I am curious to see how ths will keep accidents and traffic down during peek hours. Morning traffic to Gardner will be crazy. I assume their were some kind of traffic studies for a similar intersection. I am not sold around about will work. How are pedestrians going to get through the roundabout with out a light for car to yield too? Lots a of young kids cross this interesection	5/19/2014 9:35 PM
45	If you want bikes to use the downhill bike lane on Linn, then sewers, vegetation, poor pavement, all need to be removed. It is easy to hit the posted speed limits on this stretch and any type of irregularity to the pavement is a real danger at speed.	5/19/2014 4:44 PM

46	Providing access to singer creek park should not be a top concern. Providing access to the Middle school and Gaffney Lane Elementary School should be the top priority. I think a roundabout is a terrible idea. There is way too much traffic there and they are very confusing. With the closure of King and Mt Pleasant grade schools, children all the way down by Rivercrest park are now attending Gaffney Lane, and they should have safe access to their school, without having to navigate through an uncontrolled roundabout. In my experience, drivers do not like them, do not like having to wait for an open spot, and get very aggressive with their driving. They dart out and will not be watching for pedestrians. Also, why spend the limited money that the city has on changing what we already have and is working. Those dollars should be used to FIRST put sidewalks and bike lanes all the way down Linn, Leland, Myers, and Gaffney Lane....not stopping at Mocassin. If the sidewalks are stopped at Mocassin, children are still not able to safely walk to Gaffney Lane School. I love the fact that the city is looking at ways to improve this major stretch of road, but I urge you to use your dollars more wisely. Do not reinvent the wheel, just put in sidewalks and bike lanes. Fix what needs fixing and save the beautifying for when there is more money to spend. I have been told that the city would like to fix the Gaffney Lane McVey intersection, sidewalks, and crosswalk, but they do not have the money to do so for many years unless they receive a grant to help with the cost. If the above project happens with adding all this access to a little used park and completely redoing an intersection that is already usable, there would be some very disappointed Gaffney Lane community members. If you don't have the money to fix a dangerous area next to a grade school, how are you getting the money to do unnecessary projects. Asking our school volunteers and neighborhood association volunteers to team up and apply for grants to fix roads and sidewalks is a good idea in theory. But for inexperienced lay people, it is very time consuming and not an easy task. Then passing over that area with dollars that you apparently do have, is a little hard to swallow. Please consider the safety of our children and their families having access to their schools, more used parks, stores, bus stops, and churches over beautifying and providing access to an unsafe park that most people do not use.	5/19/2014 11:24 AM
47	NO ROUNDABOUTS! PERIOD!!!!!! IF YOU HAVE TROUBLE UNDERSTANDING THE WORD NO-- ASK OREGON CITY RESIDENTS!!!!	5/18/2014 7:26 PM
48	I feel that this intersection is much to busy for a roundabout . I think it will create lots of danger. People don't know how to drive in the darn things. I avoid them just for that reason.	5/17/2014 10:33 PM
49	Alternative A for Section 1 of Linn Avenue - the downhill bike lane could be separated by bollards or bumps. Vehicles travel at high speeds down Linn, and if there was a physical barrier between the car lane and bike lane, cyclists would be much safer and more comfortable. Consider bus stops on this section of the corridor as well. What are Trimet's needs? Are shelters a potential?	5/16/2014 1:23 PM
50	The feeling of a neighborhood road, not a major thoroughfare like Molalla. if it felt like this with heavy pedestrian, bike and bus use, people in a hurry who want to drive fast would avoid it and use Molalla instead.Right now it seems to be used as an expressway	5/15/2014 7:11 AM
51	Large Public Art in the roundabout, Like a tall statue and native plants	5/14/2014 12:07 AM
52	I would suggest completing the sidewalk and bike lane connection eastbound on Meyers Road all the way to Gaffney Lane. Currently, there is 50-foot section just before the stop sign at Gaffney Lane that does not include a sidewalk or bike lane. I cycle along this corridor frequently and have almost fallen off my bike trying to negotiate between an auto and the edge of the pavement. The shoulder line comes right to the edge of the pavement, so when trying to "ride the line" the chances of someone's tire slipping off the pavement causing a fall is high. An eastbound cyclist approaching the intersection at Gaffney Lane must come out of the bike lane and onto the street before stopping at the stop sign. If an automobile happens to be approaching the stop sign at the same time (a frequent occurrence), then the cyclist must decide to do one of 3 things.... 1) stop at the end of the bike lane and wait for the car to pass by, 2) try to ride the line between the car and the edge of the pavement (dangerous and not recommended), and 3) ride in the middle of the road and hope that a) the motorist sees you and b) does not harass you for taking the entire lane. It seems strange to bring this project all the way to Moccasin Way on Meyers Road only to leave a dangerous eastbound disconnect only a couple of blocks away. If we're going to all the trouble to create connectivity on Meyers Road, we may as well complete the entire connection.	5/12/2014 2:15 PM

Open House Meeting

LINN AVE/LELAND RD/MEYERS RD CORRIDOR CONCEPT PLAN - SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL
Eileen Dale	1321 Linn Ave 97045	503-656-4080	eileendale@gmail.Com
Jim Dale	12368 S. Neil Era Rd 97045	503-656-4080	bigjimdale@gmail.Com
Norma Belding	142 ETHEL ST OR 97045	421 73 98	
John Moore	19336 Meyers Rd OC ORE 97045	503-657-6688	
Janet Mauldin	14268 Maple Lane Ct. OC	503-785-8540	Janet.mauldin@orecity.k12.or.us
Amy Fuller	19356 Mayfly Ct OC OR 97045	503.656.7080	office@firstpresoc.org
Chrystal Frazier	19168 Sunrise Way, OC 97045-6748	5036574730	frazierdc@comcast.net
Glenn Pyle	18940 Dallas St Oregon City	503-6888477	—
Betty SAVAGE	P.O. BOX 425 WILSONVILLE OR 97070	503 628 1968	
Henry Mackenroth	912 5th St. OR CITY	503-650-4378	HNMACK@Q.COM
Moreen Johnston	1105 5th STREET, O.C.	503-655-5609	—
John K. Anderson	16179 Widman Ct. O.C.	503-850-4655	—
Faith Leith	13531 Clairmont #93 O.C.	503-522-6063	faith23@comcast.net
Deborah Mellen	12552 Anita Pl. OC	503-654-1561	—
Denise Godie	13239 Gaffney Ln	—	deniegodie@gmail.c
Roger Fowler-Thias	1309 HAZEL ST O.C.	503-650-2387	CFTRFT@comcast.NET
JOHN LIPSCOMB	603 Glenwood Blvd	503-657-9903	LIPPY@Q.Com
Lottie Waddell	929 Hazelwood Dr OC	503-657-9013	waddellcity@q.com (Q)
DALE MAYFIELD	830 LAURELWOOD CT OC	—	—

LINN AVE/LELAND RD/MEYERS RD CORRIDOR CONCEPT PLAN - SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL
Linda Lord.	142 Holmes Lane, O.C.		
Sandie Jelinek	1161 Netzel St. OC.		
LeAnn Hergert	115 Park Drive	503.656.6212	RLHergert@gmail.com
Joyce Goodwin	15965 S Henrici Rd OC 97045	503-656-8935	goodwinoc@bctonline.com
Oscar N Bryan	1106 Johnson ST	503 657-8232	
KARIN MOREY	1208 Linn Ave #5 OC	503-880-3439	KARIN.MOREY@GMAIL.COM
Diane LeDoux	409 Jackson St OC	503-650-6042	diane.dancingfrog@gmail.com
Cindy Washington	18764 Leland Rd. OC	503 490 6502	crwashington@comcast.net
Ted & Sharon Thonstad	19612 Alexis Ct, OC	503-557-2361	slthonstad@comcast.net
Gene Tupper	19165 Elder Tree Ct - OC	503 656 4535	gtupper@gri.com
Mark Fortmiller	19416 Prospector Terr.	503-312-1618	fortmillermc@MSN.com
Tom O'Brien			tom.obrien4@comcast.net
JOHN FOX	20150 S. Leland RD	503 984-2024	
DON BABST	19516 S LELAND OC	503 655 2453	
Christina Fowler-Thma	1309 Hazel ST. OC		cftrft@comcast.net
Margaret Beyer & Bill Graham	150 A.V. Davis Rd OC	503 656 9564	BRACKENN@YAHOO.COM
Rebecca Fox	20150 S. Leland Rd	503-309-9403	bjfox2000@hotmail.com
Lynda Cone-Hart	12403 Cominger Dr		lconehart@aol.com
Shawn Omman	905 Johnson St.	503-313-4409	
Barry Boozhaus	19141 Lot Whitcomb	503-310-4768	
Tina Lyman	19439 Meyers Rd.	503-260-4217	t-lyman@juno.com
Laura Sadowski		503-646-4246	lauras@plaidpantry.com
KATHY LONG	15885 S. WILSHIRE CIR.	503-632-0131	KATHYADAMS98@YAHOO.COM
Simon Mueller	874 Linn Ave	503-964-1741	
Will Roberts	13410 Gerb Woods Dr. OC	503-557-8852	
Cody/Tonya Fadness	303 LINN AVE	503.502.2569	
Amy Mueller	874 Linn Ave		Amy-Mueller@hotmail.com
Joyce + William Gifford	1324 Beaver Ln		email@smALLFLAGS.com
Joseph Marek	1005 Clearbrook Dr	723 9142	racerjoe97045@yahoo.com
Carol Pauli	102 Glenwood Ct		
RICHARD CRAVEN	19710 SCHAEFER DR. O.C.		RICHARD.E.CRAVEN@GMAIL.COM
DON THOMAS	116 HOOD St O.C.	503-657-9197	DRAGON@ARACNET.COM
Suzanne Hennig	12160 S. Meadowlawn Dr., Oregon City		
Eric & Cindy Bryant	1225 Linn Ave, OC	503-807-9648	northwests@comcast.net
GARY GRAVES	19197 Captains Ct. OR City	503-750-8238	tightlines44@gmail.com

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Eric Cindy Bryant

Address (optional): 1225 LINN AVE Oregon City OR

Phone (optional): 503-807-8648 **Email (optional):** northwests@comcast.net

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☒	Segment 2 - Linn: Park Dr to Warner Milne Rd
☐	Segment 3 - Leland: Warner Milne to Clairmont Wy	☐	Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: We have concerns on the roundabout & the constant flow of traffic down Linn. Currently we have alot of difficulty getting out of driveway with the traffic light as is. A roundabout will definitely keep a constant flow in front of our house.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: GARY GRAVES

Address (optional): 19197 Captains Ct

Phone (optional): 503-260-8238 **Email (optional):** tightlines44@gmail.com

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☐	Segment 2 – Linn: Park Dr to Warner Milne Rd
☑	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: I'm a big fan of roundabouts, having used them in Portland for 20 yrs. + more recently in France - where we traveled by car for a month. They are extensive in France, in cities, small towns, and in the country. We saved a

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

huge amount of time (and some gas) using these roundabouts.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Laura Sadowski

Address (optional):

Phone (optional):

Email (optional): lauras@plaidpantry.com

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 – Linn: 5th to Park Dr	☐	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: Concerned w/ roundabout + medians having negative impact on our business. Plaid Pantries has documented sales + property impacts due to medians restricting in/out to business. All negative. Customers go elsewhere rather than wait out any changes.

Return Comment Form to City staff at open house. You may also email comments to iburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: DON THOMAS

Address (optional): 116 Hood St

Phone (optional): 503-657-9197

Email (optional): DRAGON@ARACNET.COM

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 – Linn: 5th to Park Dr	☑	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: SPEEDING DOWN HOOD St to MIDDLE School (TBG) ONE WAY INTO School IGNORED LEAVING FROM School to LINN (DOWN HOOD) WOULD Like to see the ONE WAY INFORCED

I LIKE THE IDEA OF A ROUNDABOUT (CLACKAMAS' SEEMS TO BE A SUCCESS

Return Comment Form to City staff at open house. You may also email comments to iburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Betty Savage

Address (optional): 26097 NE Batteville Rd Wilsonville OR

Phone (optional): 503-678-1918 **Email (optional):**

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy
☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Need to be at any meeting as I
am owner of Savage mini mall.
ON the development in question.

Return Comment Form to City staff at open house. You may also email comments to lburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Warren Ritchie

Address (optional):

Phone (optional): **Email (optional):** bluesttruck@yahoo.com

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy
☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: fixing sidewalks and the most pressing issues
I rate the actual roundabout as not necessary.
No proof is given for it's need or importance.

Return Comment Form to City staff at open house. You may also email comments to lburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Moreen Johnston

Address (optional):

Phone (optional):

Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply):

☒ Segment 1 - Linn: 5th to Park Dr

☐ Segment 2 - Linn: Park Dr to Warner Milne Rd

☐ Segment 3 - Leland: Warner Milne to Clairmont Wy

☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: sidewalk + bike path sould be on only one side (A)
The Roundabout is bad idea, pedestrians do not have lights to cross with. Much to much traffic for Round About

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name:

Address (optional):

Phone (optional):

Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply): ALL

☒ Segment 1 - Linn: 5th to Park Dr

☒ Segment 2 – Linn: Park Dr to Warner Milne Rd

☒ Segment 3 – Leland: Warner Milne to Clairmont Wy

☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: You need consistancy in your siggnage. Some have "existing" in red while others have "proposed" in red.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Ted Thonstad

Address (optional): 19612 Alexis Court, Oregon City

Phone (optional): 503-557-2361

Email (optional): atthonstad@comcast.net

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☐	Segment 2 - Linn: Park Dr to Warner Milne Rd
☐	Segment 3 - Leland: Warner Milne to Clairmont Wy	☐	Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Concern is Round About handling volume of Traffic at intersection especially if only one lane. Also does not have any pedestrian control.

If I put my school district hat on I would be concerned about school buses making the turns as well as getting through at high traffic times.

Return Comment Form to City staff at open house. You may also email comments to iburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Simon Mueller

Address (optional): 874 Linn Ave

Phone (optional):

Email (optional): Simonmueller228@hotmail.co

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☑	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: would like to see the Round about put in

I think it could help a lot.

Return Comment Form to City staff at open house. You may also email comments to iburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Joyce Goodwin

Address (optional): 15965 S Henrici Road, OC

Phone (optional): 503-656-9935 **Email (optional):** goodwincc@bctonline.com

Segment(s) for which your Comments are Applicable (check all that apply):

☑	Segment 1 - Linn: 5th to Park Dr	☑	Segment 2 - Linn: Park Dr to Warner Milne Rd
☑	Segment 3 - Leland: Warner Milne to Clairmont Wy	☑	Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Much thought has gone into this proposal. I especially like the pedestrian/bicycle friendly streets and the roundabout. Keep speed limits below 35mph.

Return Comment Form to City staff at open house. You may also email comments to iburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Tom O'Brien

Address (optional):

Phone (optional): **Email (optional):**

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☐	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: CONGRATULATIONS ON A SENSABLE APPROACH TO THE TRAFFIC CIRCLE.

Return Comment Form to City staff at open house. You may also email comments to lburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: NORMA BELDING

Address (optional): 142 ETHEL ST

Phone (optional): 503 421 7398 Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 – Linn: Park Dr to Warner Milne Rd
☐ Segment 3 – Leland: Warner Milne to Clairmont Wy
☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: TOTAL COST B/4 VOTING ON THIS? — IS THIS SUBJECT TO VOTE?
? Why should OR City alone pay for this?
[illegible] SEEMS TO BE WALKING TRAFFIC IS EXCUSE TO MAKE A
ROUNDABOUT — I GET THE FEELING THIS IS A DONE DEAL!!

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org

DO WE GET TO VOTE ON THIS ? ?

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Amy Fuller

Address (optional): 19356 Mayfly Ct. Oregon City, OR 97045

Phone (optional): 503.656.7444 Email (optional): office@firstpresoc.org

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy
☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Round about - the one by Home Depot is so confusing to everyone I talk to. I work @ the Pres. Church & live off of Pease so this will be a headache for me everyday of the week. Poor choice of traffic correction

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: John Lipscombe

Address (optional): 103 Glenwood Ct

Phone (optional): 503-657-9903 **Email (optional):** Lippy@Q.com

Segment(s) for which your Comments are Applicable (check all that apply):

☑ Segment 1 - Linn: 5th to Park Dr	☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy	☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Really needed for sidewalks
Don't like the Round a Round thing
at all

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Steve Moore

Address (optional): 905 Johnson St

Phone (optional): **Email (optional):**

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr	☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy	☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: The concept of the round around
is unthinkable. It's only for the
bycicles.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Sandra Jelinek

Address (optional): 116[illegible] Hetzel St.

Phone (optional):

Email (optional): sandiejelinek@gmail.com

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy
☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: Major concern about pedestrian crossing at roundabout.
Relocation of church sign & access to church on Warner Milne
* Left turn access for apt complex on Warner Milne
* Carpenter building at corner of Williams & pavement on Williams

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org

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Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Faith Leith

Address (optional): 13531 Clairmont Way #93 O.C.

Phone (optional): 503-522-6063

Email (optional): faith23@comcast.net

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 - Linn: Park Dr to Warner Milne Rd
☐ Segment 3 - Leland: Warner Milne to Clairmont Wy
☐ Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments:

Love the roundabout. Needs to be 2 lanes to handle heavy flow. Driveway access to businesses are problematic.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Betty Johnson

Address (optional):

Phone (optional):

Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 – Linn: Park Dr to Warner Milne Rd
☐ Segment 3 – Leland: Warner Milne to Clairmont Wy
☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: I think your Wallis Engineering Consultant needs to know the names of streets - Holmes - Ethel - Park Dr - Gaffney - Nor have they ever watched Kids Walking am or pm -

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Lynda Cone-Hart

Address (optional):

Phone (optional):

Email (optional): lconehart@aol.com

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr
☑ Segment 2 – Linn: Park Dr to Warner Milne Rd
☐ Segment 3 – Leland: Warner Milne to Clairmont Wy
☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: The round about is insane due to the amount of traffic that flows through the intersection It would be worse than 39th + Glisan in Portland

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Leland Hergert

Address (optional): 115 Park Drive

Phone (optional): 503 656 6219

Email (optional): LHergert

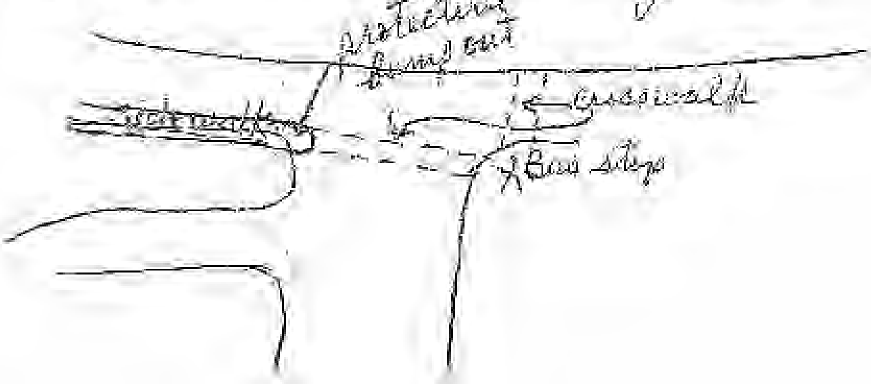
Segment(s) for which your Comments are Applicable (check all that apply):

☒ Segment 1 - Linn: 5th to Park Dr
☐ Segment 2 – Linn: Park Dr to Warner Milne Rd
☐ Segment 3 – Leland: Warner Milne to Clairmont Wy
☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: Regarding the ending curve of sidewalk from Linn towards Harding and Park. I think it would be much safer to slant and start at a crosswalk that continues to the South side of Park + Linn. Traffic

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org

seriously comes up Linn and often does a quick hairpin turn onto Harding. If the sidewalk follows the curve pedestrians would be encouraged to proceed crossing Harding and be blindsided. To clearly direct across Park toward the bus stop at Linn + Park is much safer. Also visibility is impaired for vehicles when the bus is stopped + people are getting off the bus and hidden by the bus itself. If there could be a definate, straight + somewhat protected approach to the crosswalk would be great.



OREGON CITY

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: LeAnn Hergert

Address (optional): 115 Park Drive

Phone (optional): 503·656·6212 **Email (optional):** RLHergert@gmail.com

Segment(s) for which your Comments are Applicable (check all that apply):

☒	Segment 1 - Linn: 5th to Park Dr	☐	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: I belive it would be safer to place pedestrian and bike traffic on the east side of Linn Ave rather than the west side because of the blind inside corner where 5th transitions to Linn. I think it would be safer →

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org

to push back the retaining wall and use the space
djacent to the wall for car traffic only. Then the
5'-15' on the east side to be split with raised
idewalk and asphalt 2 way bike lane. I say this
ecause I just walked the Vera Katz Esplande with my
aughter and was almost struck by a bicyclist on
occasions and a skateboard once. It was very tense
ather than relaxing because cyclists dont share well.
r alternatively put pedestrians on a raised walk on
he west since the curb would help protect on the
blind curve and put 2-way bike lane on the east.
P.S. I just looked at the presentation board for Segment
i Meyers Road and its design is lovely. Pretty vegitation
nd perfect seperation of cars, bikes and humans. Use a
of this plan for Linn. Same for Segment 3-Leland.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Rebecca Fox

Address (optional):

Phone (optional):

Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply):

☐ Segment 1 - Linn: 5th to Park Dr

☐ Segment 2 – Linn: Park Dr to Warner Milne Rd

☐ Segment 3 – Leland: Warner Milne to Clairmont Wy

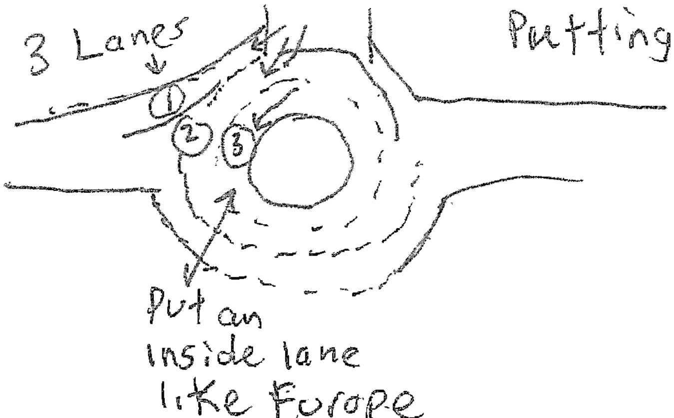
☐ Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: The roundabout; I oppose this project as I do not think this is a prudent use of money, I do not feel that this intersection is "broken" as it works well at this time. I think if the city would wait untill people perceive a need then they citizens will welcome a solution. At this time they don't

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

see a need, only an inconvienience and waste of funds. However, I don't believe opposition can't stop what the city intends to do. So, my concerns are to honor the needs ~~and~~ of the business ~~owner~~ owner and to →

build a very well designed roundabout. The current model would benefit from a 2-3 lane roundabout instead of a 1-2 lane roundabout. I hope they would do this as the one on Boreland Rd/Stafford Rd with 2 inside lanes. It works. Go to Bend/Sunriver and the one-lane roundabouts Do NOT work without producing insanity!! Also, the government has no guilt for Putting this cost on new develpment which is wrong and a very sad commentary on "public Service". The public serves the city? over 27,000 Tax? On a new home? really? Thats more than my salary. Please build this thing right



Reduce single file traffic please!

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: Christine Fowler Thea

Address (optional): 1309 Hazel St

Phone (optional):

Email (optional): cftrft@comcast.net

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn:. 5th to Park Dr	☐	Segment 2 – Linn: Park Dr to Warner Milne Rd
☐	Segment 3 – Leland: Warner Milne to Clairmont Wy	☐	Segment 4 – Meyers: Clairmont Wy to Moccasin Wy

Comments: We are in favor of the plan to create sidewalks, rain gardens & bike lanes. Love it. Please consider changing speed limit to no higher than 30mph for this residential area.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Linn Avenue, Leland Road & Meyers Road Corridor Plan

COMMENT FORM

Name: John Moore

Address (optional): 19336 Meyers Rd

Phone (optional): 503-657-6688

Email (optional):

Segment(s) for which your Comments are Applicable (check all that apply):

☐	Segment 1 - Linn: 5th to Park Dr	☐	Segment 2 - Linn: Park Dr to Warner Milne Rd
☐	Segment 3 - Leland: Warner Milne to Clairmont Wy	☒	Segment 4 - Meyers: Clairmont Wy to Moccasin Wy

Comments: plan and build only what would increase safety. 12' traffic lanes 6' ft sidewalks only. fill ditches Bike lanes in future, if property can be non effected.

Return Comment Form to City staff at open house. You may also email comments to jburrell@orcity.org.

Trimet Comments

Jane Vail

From: John Burrell <jburrell@ci.oregon-city.or.us>
Sent: Monday, July 14, 2014 9:46 AM
To: Jane Vail
Cc: David Brokaw
Subject: RE: agenda email

Jane,
I just sent you the response from TriMet. As far as the meetings with the property owners; (1) the church was Ok with the roundabout, they just want to make sure that when we actually go to the design phase & property acquisition that we work with them to minimize the impacts and get their input on site restoration/landscaping. The painting company was Ok with the roundabout, they just want to make sure that we don't adversely impact their access to their site. The strip mall owner (Betty Savage) was opposed to any taking of her property to construct the roundabout. (2) The school district is in favor of construction of sidewalks to the school and other walking/biking improvements for the other access points – they stated that they would look into doing on-site improvements in conjunction with any new sidewalk construction.

That is all the information that I have – it is from memory so this is the documentation.
Thanks,
JB

From: Jane Vail [mailto:jane.vail@walliseng.net]
Sent: Monday, July 14, 2014 8:29 AM
To: John Burrell
Cc: David Brokaw
Subject: RE: agenda email

Hello John,

Thank you for letting me know about the NA meetings. I do have three other potential sources of records I wanted to ask you about. Even if they aren't meeting minutes per say, notes or emails would help fill in the documentation gap.

Firstly, were there any additional comments from Trimet? I recall an email from Jeff Owens saying that they would be looking at the plan and potentially providing additional feedback. The window for putting that feedback in the plan is closing if we finalize the plan soon.

Secondly, is there any documentation associated with the City's meetings with property owners for potential ROW acquisition associated with the roundabout?

And lastly, are there any comments/documentation associated with the City's meeting with the School District regarding access to Gardiner Middle School?

Thank you,

Jane

From: John Burrell [mailto:jburrell@ci.oregon-city.or.us]
Sent: Monday, July 14, 2014 7:04 AM
To: Jane Vail

Jane Vail

From: John Burrell <jburrell@ci.oregon-city.or.us>
Sent: Monday, May 19, 2014 10:10 AM
To: John M. Lewis; David Brokaw; Jane Vail
Subject: FW: Corridor plan

All,
Please see below the response from Jeff Owen with TriMet. I have saved his reply in the project files and will add any additional responses received in relations to the roundabout.
JB

From: Owen, Jeffrey [mailto:OwenJ@TriMet.org]
Sent: Monday, May 19, 2014 9:52 AM
To: John Burrell
Cc: Pete Walter; Kelly Moosbrugger; O'Connell, Grant
Subject: RE: Corridor plan

Hi John,

Thanks for sharing the plans. Below is some quick feedback:

- I would advocate for sidewalk infill to be prioritized where it links residents to bus stops where there are gaps, such as on: 4th St., Oak, Charman, Park Dr, Holmes Lane, Ethel/AV Davis, Williams St., and Hood leading to the middle school
- Re-evaluate marked crosswalks of Linn where bus stop pairs are on both sides of the road, and consider adding to and/or improving existing crosswalks with more visible treatments (fresh paint, signage, maybe even rectangular rapid flashing beacons)
- It looks like a few bus stop icons are missing from Warner Milne Road
- If Mt. Pleasant Elementary school is still operating near Linn and Warner Parrott Road, that icon should be added as well

That's my quick feedback – If more is ideal, let me know. I believe a few others at TriMet are taking a closer look at the proposed roundabout concept, so I will leave that feedback to those who deal more with operations of the bus line.

Thanks,

Jeff Owen
Active Transportation Planner, TriMet
owenj@trimet.org l 503-962-5854
trimet.org/bike l trimet.org/walk

From: John Burrell [mailto:jburrell@ci.oregon-city.or.us]
Sent: Friday, May 16, 2014 2:04 PM
To: Owen, Jeffrey
Cc: Pete Walter; Kelly Moosbrugger
Subject: Corridor plan

Jeff,

Attached is a plan that shows the extent of the corridor in the plan that is being developed. It extends from 5th & Jackson to Moccasin Way. The plan sheet shows the existing bus stops along the corridor. Also attached is layout for a future roundabout at the Linn/Warner Milne/Leland intersection. Let me know if you have any questions/comments/concerns. I am available to meet on Monday morning if you feel that would be helpful. Our planners had mentioned that maybe we should invite you to the pre-app meeting at the City's planning department site. The pre-app is next Tuesday morning @ 10:ooam.
Thanks,
John

John M. Burrell, EIT, CPESC
Project Manager
Erosion Control Program Manager
City of Oregon City
PO Box 3040
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Oregon City, Oregon 97045
503.496.1556 phone
503.969.4196 cell
503.657.7892 fax
jburrell@orcity.org
www.orcity.org

Effective June 1, 2013, hours at the Public Works/Engineering Counter at City Hall, 625 Center Street, will be Monday through Thursday, 9 AM to 4 PM. The counter will be closed each Friday to walk-in customers; however, appointments may be scheduled by calling 503.657.0891.

We value your business and appreciate your understanding. Friday counter closures will help ensure staff can remain efficient and able to focus on work received during regular business hours. Thank you.

City Hall hours remain Monday through Friday, 8 AM to 5 PM (except holidays).

Jane Vail

From: John Burrell <jburrell@ci.oregon-city.or.us>
Sent: Friday, July 18, 2014 6:29 AM
To: Jane Vail; David Brokaw
Cc: John M. Lewis
Subject: FW: Summary of HRB meeting for the Linn Avenue Corridor Plan

Dave & Jane,
Please see Christina's summary of the HRB meeting, this can go in the public involvement section.
Thanks,
JB

From: Christina Robertson-Gardiner
Sent: Thursday, July 17, 2014 3:19 PM
To: John Burrell
Subject: Summary of HRB meeting for the Linn Avenue Corridor Plan

John,

Please include the summary below for your project files.

The Board met on June 24, 2014. John Burrell, project manager with Public Works provided an overview of the process during the work session portion of the meeting. After general discussion, the Historic Review Board provided direction on two items 1. No additional review will be required for work being done in the small area of the project located within the McLoughlin Conservation District. 2. As part of the 2011 citywide survey project, the Rivercrest neighborhood was identified for potential creation of an historic district and the Board looked at this plan to see how the Rivercrest area may be affected by the prospered plan. In this case, the Board found that Linn Avenue has existed as a city/county road long before the platting of the Rivercrest subdivision and holds distinct characteristic different from the neighborhood. The Board saw the existence of sidewalks in many portions of Linn Avenue and found that the project will not adversely affect the historic significance of the Rivercrest Neighborhood which has a historic landscape little to no sidewalks.

The Board thanked Mr. Burrell and encouraged planning staff to continue to keep them in the loop with future Public Works project that may affect existing or future historic resources.

Christina Robertson-Gardiner AICP
Planner
crobertson@orcity.org
City of Oregon City
Community Development Division
PO Box 3040
221 Molalla Avenue
Oregon City, Oregon 97045
503-496-1564 Direct phone
503-722-3789 City phone
503-722-3880 fax

Website: www.orcity.org | Recorder Page

Appendix H

Cost Estimates

Phase I
Gardiner Middle School Pedestrian Improvements
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$13,853
Traffic Control	1	L.S.	$6,026
Erosion Control	1	L.S.	$2,969
Sidewalk and Curb	2,200	LF	$155,000
Signing and Striping	1	L.S.	$5,900
Stormwater	1	L.S.	$4,000
Fence Improvements	1	L.S.	$3,000
Pedestrian-Activated Signal	1	L.S.	$30,000
Construction Subtotal			*$220,748*
Construction and Project Contingency at 30%			*$66,224*
Construction Total			***$286,972***
Right-of-way			
Right-of-way			$107,560
Right-of-way Contingency at 40%			$43,024
Right-of-way Total			***$150,584***
Engineering and Permitting			
Design Engineering and Administration at 13%			$37,306
Construction Engineering Services at 12%			$34,437
Environmental Permitting			$10,000
Engineering and Permitting Total			***$81,743***
PROJECT GRAND TOTAL			**$519,299**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 3% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Multi-modal improvements include sidewalks on Ethel St, Hood St, and Laurel Ln.
6. Landscaping includes excavation, soil, and light landscaping.
   Signing and striping improvements include crosswalks on Linn Ave and Holmes Ln.
7. Stormwater improvements include quantity and quality treatment (assumed necessary for new impervious surfaces).
8. Pedestrian-activated signal at AV Davis Rd/Ethel St on Linn Ave is TSP project #C28.

Phase I
Gardiner Middle School Pedestrian Improvements
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

9. ROW needs determined through Oregon City GIS maps.
10. All ROW is assumed to be partial strip takes. No relocations are assumed.
11. Environmental Permitting is lump sum.

Phase II
Singer Creek Connectivity Improvements
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering — Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$15,677
Traffic Control	1	L.S.	$6,719
Erosion Control	1	L.S.	$3,359
Sidewalk and Curb	1	L.S.	$27,000
Asphalt Pathway	1	L.S.	$63,000
Retaining Wall	1	L.S.	$58,000
Signing and Striping	1	L.S.	$25,000
Stormwater Improvements	1	L.S.	$3,700
Lighting	1	L.S.	$47,250
Construction Subtotal			*$249,704*
Construction and Project Contingency at 30%			*$74,911*
Construction Total			***$324,616***
Right-of-way			
Right-of-way			$29,400
Right-of-way Contingency at 40%			$11,760
Right-of-way Total			***$41,160***
Engineering and Permitting			
Design Engineering and Administration at 13%			$42,200
Construction Engineering Services at 12%			$38,954
Environmental Permitting			$50,000
Engineering and Permitting Total			***$131,154***
PROJECT GRAND TOTAL			**$496,929**

ASSUMPTIONS:

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Multi-modal improvements include shared-use path through non-roadway portions of improvements and sidewalk and curb through roadway portions.
3. Mobilization at 7% of construction subtotal.
4. Temporary traffic control at 3% of construction subtotal.
5. Erosion control at 1.5% of construction subtotal.
6. Signing and Striping to include crosswalks at Pearl Street and Wayfinding signage.

Phase II
Singer Creek Connectivity Improvements
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

7. Stormwater improvements include quality and treatment (assumed necessary for new impervious surfaces).
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Phase III
Segment 1 - Linn Ave: 5th Street to Park Drive
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$176,655
Traffic Control	1	L.S.	$75,709
Erosion Control	1	L.S.	$37,855
Multi-modal Improvements	4,718	LF	$842,644
Retaining Walls	1	LS	$758,000
Signing and Striping	1	L.S.	$80,000
Stormwater Improvements	1	L.S.	$159,000
Linn Avenue Sanitary Sewer Replacement	1	L.S.	$470,000
Pedestrian-Activated Signal	1	L.S.	$30,000
Speed Warning System	1	L.S.	$25,000
Lighting	1	L.S.	$159,000
Construction Subtotal			*$2,813,863*
Construction and Project Contingency at 30%			*$844,159*
Construction Total			***$3,658,021***
Right-of-way			
Right-of-way			$146,810
Right-of-way Contingency at 40%			*$58,724*
Right-of-way Total			***$205,534***
Engineering and Permitting			
Design Engineering and Administration at 13%			$475,543
Construction Engineering Services at 12%			$438,963
Environmental Permitting			$50,000
Engineering and Permitting Total			***$964,505***
PROJECT GRAND TOTAL			**$4,828,061**

ASSUMPTIONS:

1. ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 3% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Multi-modal improvements include pavement rehabilitation, shared use path on the west side of Linn Ave, curbs, and widened shoulder.

Phase III
Segment 1 - Linn Ave: 5th Street to Park Drive
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

6. Geometric improvements include road realignment to reduce curvature between 4th and Oak St, road realignment of Pearl and Oak Sts at Linn Ave, addition of a left turn onto Charman St, and closure of Electric St. No costs are associated with closure of Electric St, as specific uses for the closed street have not been designed.
7. Retaining wall costs are based on walls necessary due to roadway widening. Extents of walls based on topography from Oregon City GIS, which is based on LIDAR. Quantity estimates are conservative to account for unknowns due to heavy tree cover throughout Segment 1 and tree cover's effect on LIDAR accuracy.
8. Landscaping includes excavation, soil, and light landscaping.
9. New sanitary and waterline utility construction not included.
10. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
11. The Linn Avenue Sewer Replacement project defined in Oregon City's Sanitary Sewer Master Plan has been included in this cost estimate.
12. Signing and Striping to include all striping within segment limits, relocation of existing signs, and installation of new signs and posts. Wayfinding signage is not included.
13. Pedestrian-activated signal at Charman Street is TSP project #C32.
14. Speed warning system at Glenwood Ct is TSP project #D19.
15. ROW needs determined through Oregon City GIS maps.
16. All ROW is assumed to be partial strip takes, with no relocations or condemnations.
17. ROW is assumed at a unit price of $10/SF.
18. Environmental Permitting is lump sum.

Phase IV
Central Point Road Operational Enhancement (Roundabout)
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 8/6/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$113,000
Traffic Control	1	L.S.	$113,000
Erosion Control	1	L.S.	$24,000
Roundabout	1	L.S.	$1,004,000
Signing and Striping	1	L.S.	$60,000
Stormwater	1	L.S.	$75,000
Landscaping	1	L.S.	$54,000
Pedestrian-Activated Signals	1	L.S.	$150,000
Lighting	1	L.S.	$250,000
Construction Subtotal			*$1,843,000*
Construction and Project Contingency at 30%			*$552,900*
Construction Total			***$2,395,900***
Right of Way			
Right of Way			$179,750
Right of Way Contingency at 50%			$89,875
Right of Way Total			***$269,625***
Engineering and Permitting			
Design Engineering and Administration at 13%			$311,467
Construction Engineering Services at 12%			$287,508
Environmental Permitting			$50,000
Engineering and Permitting Total			***$648,975***
PROJECT GRAND TOTAL			**$3,314,500**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Landscaping includes excavation, soil, and light landscaping.
6. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
7. Signing and striping assumed to include all striping within roundabout limits, all signing within roundabout limits and directional signing leading up to roundabout.
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Phase V
Segment 3 - Leland Rd: Linn Ave to Meyers Rd
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering | Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$88,816
Traffic Control	1	L.S.	$38,064
Erosion Control	1	L.S.	$19,032
Multi-modal Improvements	4,525	LF	$613,700
Landscaping	1	LS	$124,000
Signing and Striping	1	L.S.	$72,800
Stormwater Improvements	1	L.S.	$142,300
Pedestrian-Activated Signal	1	L.S.	$30,000
Lighting	1	L.S.	$286,000
Construction Subtotal			*$1,414,712*
Construction and Project Contingency at 30%			*$424,414*
Construction Total			***$1,839,126***
Right-of-way			
Right-of-way			$187,570
Right-of-way Contingency at 40%			$75,028
Right-of-way Total			***$262,598***
Engineering and Permitting			
Design Engineering and Administration at 13%			$239,086
Construction Engineering Services at 12%			$220,695
Environmental Permitting			$50,000
Engineering and Permitting Total			***$509,781***
PROJECT GRAND TOTAL			**$2,611,505**

ASSUMPTIONS:

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 3% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Multi-modal improvements include pavement rehabilitation, sidewalk and bike lanes on both sides of Leland Road.
6. Limits of Segment 3 improvements are assumed to extend up to the limits of the
7. Signing and Striping to include all striping within segment limits, relocation of existing signs, and installation of new signs and posts. Wayfinding signage is not included.

Phase V
Segment 3 - Leland Rd: Linn Ave to Meyers Rd
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

8. Pedestrian-activated signal at Hiefield Court is TSP project #C18.
9. Landscaping includes excavation, soil, and light landscaping.
10. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
11. ROW needs determined through Oregon City GIS maps.
12. All ROW is assumed to be partial strip takes. No relocations are assumed.
13. Environmental Permitting is lump sum.

Phase VI
Segment 4 - Meyers Rd: Leland Rd to Moccasin Wy
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$97,601
Traffic Control	1	L.S.	$41,829
Erosion Control	1	L.S.	$20,915
Multi-modal Improvements	3,445	LF	$486,500
Landscaping	1	LS	$111,600
Signing and Striping	1	L.S.	$54,000
Stormwater Improvements	1	L.S.	$100,600
Meyers Road C Sewer Extension	1	L.S.	$400,000
Pedestrian-Activated Signal	1	L.S.	$30,000
Lighting	1	L.S.	$211,600
Construction Subtotal			*$1,554,645*
Construction and Project Contingency at 30%			*$466,393*
Construction Total			***$2,021,038***
Right-of-way			
Right-of-way			$521,060
Right-of-way Contingency at 40%			$208,424
Right-of-way Total			***$729,484***
Engineering and Permitting			
Design Engineering and Administration at 13%			$262,735
Construction Engineering Services at 12%			$242,525
Environmental Permitting			$50,000
Engineering and Permitting Total			***$555,259***
PROJECT GRAND TOTAL			**$3,305,781**

ASSUMPTIONS:

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 3% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Multi-modal improvements include pavement rehabilitation, sidewalk and bike lanes on both sides of Meyers Road.

Phase VI
Segment 4 - Meyers Rd: Leland Rd to Moccasin Wy
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

6. Signing and Striping to include all striping within segment limits, relocation of existing signs, and installation of new signs and posts. Wayfinding signage is not included.
7. Pedestrian-Activated signal at Moccasin Way is TSP project #C15.
8. Landscaping includes excavation, soil, and light landscaping.
9. The Meyers Road C Sewer Extension project defined in Oregon City's Sanitary Sewer Master Plan has been included in this cost estimate.
10. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
11. ROW needs determined through Oregon City GIS maps.
12. All ROW is assumed to be partial strip takes. No relocations are assumed.
13. Environmental Permitting is lump sum.

Phase VII
Segment 2 - Linn Ave: Park Dr to Leland Rd
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering — Date: 8/5/2014
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$43,925
Traffic Control	1	L.S.	$18,825
Erosion Control	1	L.S.	$9,413
Multi-modal Improvements	1,518	LF	$336,000
Landscaping	1	LS	$44,000
Signing and Striping	1	L.S.	$65,000
Stormwater Improvements	1	L.S.	$25,000
Pedestrian-Activated Signal	1	L.S.	$30,000
Lighting	1	L.S.	$127,500
Construction Subtotal			*$699,663*
Construction and Project Contingency at 30%			*$209,899*
Construction Total			***$909,561***
Right-of-way			
Right-of-way			$0
Right-of-way Contingency at 40%			$0
Right-of-way Total			***$0***
Engineering and Permitting			
Design Engineering and Administration at 13%			$118,243
Construction Engineering Services at 12%			$109,147
Environmental Permitting			$50,000
Engineering and Permitting Total			***$277,390***
PROJECT GRAND TOTAL			**$1,186,952**

ASSUMPTIONS:

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 3% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Multi-modal improvements include pavement rehabilitation, sidewalk and bike lanes on Linn Ave where sidewalk and bike lanes are currently absent.
6. Limits of Segment 2 improvements extend up to limits of proposed roundabout.
7. No new roadway pavement was assumed for this segment.

Phase VII
Segment 2 - Linn Ave: Park Dr to Leland Rd
Planning Level Opinion of Cost

ASSUMPTIONS (continued from previous page):

8. Signing and Striping to include all striping within segment limits, relocation of existing signs, and installation of new signs and posts. Wayfinding signage is not included.
9. Pedestrian-activated signal at Park Drive is TSP project #C31. Pedestrian-activated signal AV Davis Rd/Ethel Street is not included in this estimate (included in estimate for Gardiner Middle School Pedestrian Improvements.
10. Landscaping includes excavation, soil, and light landscaping.
11. Stormwater improvements include quality and treatment (assumed necessary for new impervious surfaces).
12. No ROW Acquisition required. ROW needs determined through Oregon City GIS maps.
13. Environmental Permitting is lump sum.

Appendix I

References

LIST OF REFERENCES

1. American Association of State Highway and Transportation Officials. *Roadside Design Guide*. 2006.
2. City of Oregon City. *2013 Oregon City Transportation System Plan*. Prepared by DKS Associates, June, 2013.
3. City of Oregon City. *Draft Sanitary Sewer Master Plan*. Prepared by Brown and Caldwell, January 30, 2014.
4. City of Oregon City. *City of Oregon City Five Year Pavement Maintenance Plan*. Prepared by Murray, Smith & Associates, Inc., December 30, 2011.
5. City of Oregon City. *City of Oregon City Water Distribution System Master Plan*. Prepared by West Yost Associates, January 2012.
6. City of Oregon City. *Oregon City Drainage Master Plan*. Prepared by OTAK, Inc., January 1988.
7. City of Oregon City. *Oregon City Municipal Code: A Codification of the General Ordinances of the City of Oregon City, Oregon*. Available at http://library.municode.com/index.aspx?clientId=16540
8. City of Oregon City. *Oregon City Trails Master Plan*. Prepared by Alta Planning + Design, October 2004.
9. U.S. Department of Transportation Federal Highway Administration. *Manual on Uniform Traffic Control Devices*. 2009.

Appendix J

Final Plans

Segment 1 - Linn Avenue: 5th Street to Park Drive

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014

Legend

- - - Existing Edge of Pavement
▬ Existing Sidewalk or Asphalt Path
▨ Existing Lot Line
🟩 Existing City Park
▨ Proposed Roadway
▨ Proposed Sidewalk
— Proposed Edge of Pavement

Segment 2 - Linn Avenue: Park Drive to Leland Road

Linn Avenue, Leland Road and Meyers Road Corridor Plan
August 2014

Legend

- Existing Edge of Pavement
- Existing Sidewalk or Asphalt Path
- Existing Lot Line
- Existing City Park
- Proposed Roadway
- Proposed Sidewalk
- Proposed Edge of Pavement

Segment 3 - Leland Road: Linn Avenue to Meyers Road

Linn Avenue, Leland Road and Meyer Road Corridor Plan
August 2014

Legend

Existing Edge of Pavement
Existing Sidewalk or Asphalt Path
Existing Lot Line
Proposed Roadway
Proposed Sidewalk
Proposed Edge of Pavement

Segment 4 - Meyers Road: Leland Road to Moccasin Way

Linn Avenue, Leland Road and Meyers Road Corridor PlanA
August 2014

Appendix K

Intersection Control Analysis

DKS

720 SW Washington St.
Suite 500
Portland, OR 97205
503.243.3500
www.dksassociates.com

MEMORANDUM

DATE: April 8, 2015

TO: John Lewis, City of Oregon City
John Burrell, City of Oregon City
Dave Brokaw, Wallis Engineering

FROM: Nate Schroeder, P.E., PTOE
Jordin Ketelsen

SUBJECT: **Linn Ave Concept Plan – Intersection Control Analysis** P#13220-000

The purpose of this memorandum is to provide a summary of the intersection control analysis that was completed for the intersections of Linn Ave/Warner Milne Rd/Leland Rd/Warner Parrott Rd and Central Point Rd/Warner Parrott Rd. The work completed as part of this analysis builds off of the previous work completed at these intersections in the Linn Avenue Concept Plan.[1] The project study area shown in Figure 1.

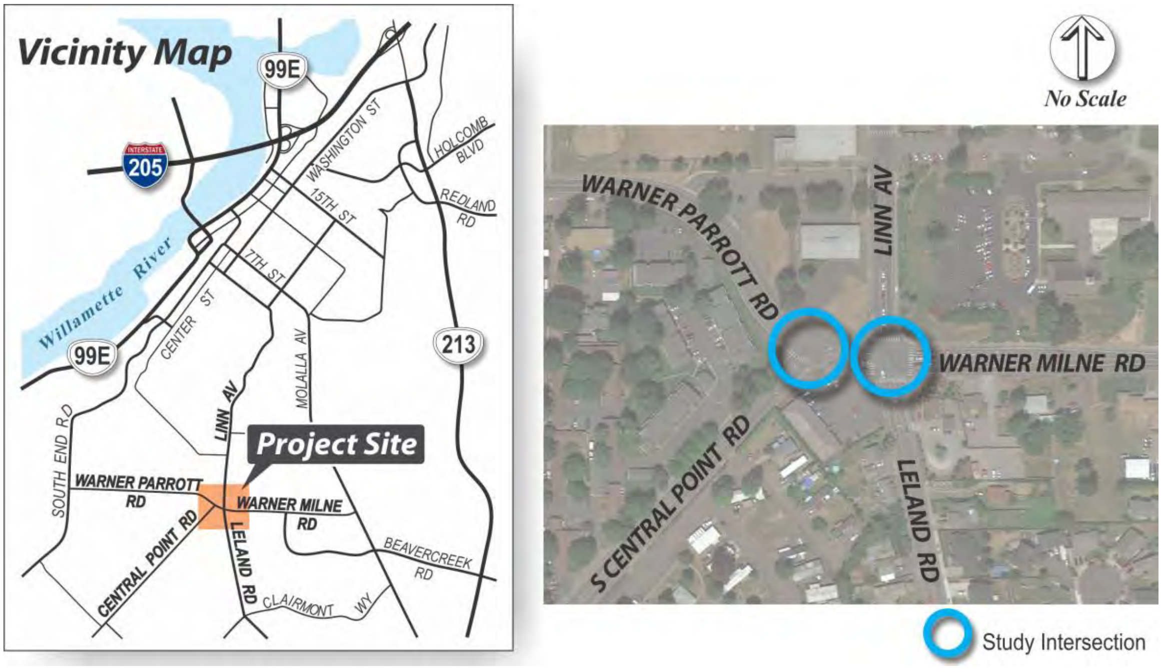

Figure 1: Project Study Area

The following sections discuss a summary of prior studies, system context, traffic volumes, a description of future alternatives, intersection operations analysis for each alternative, and a comparison summary.

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[1] Oregon City, *Linn Avenue Concept Plan*, 2013-current.

SUMMARY OF PRIOR STUDIES

While these intersections have been the topic of discussion for quite some time, and even included as part of previous work, a comprehensive evaluation of intersection control alternatives was not conducted until this time. A summary of the past work involving these two study intersections is provided in the sections below.

Oregon City Transportation System Plan

Oregon City recently completed an update to their Transportation System Plan (TSP)[2] in an effort to prepare for and accommodate future transportation growth in the most efficient manner possible. As part of the update, it was determined that the intersection of Central Point Rd/Warner Parrott Rd would not meet the mobility targets identified in the adopted TSP. Based on input from key stakeholders, the selected improvement for addressing the deficiency at Central Point Rd/Warner Parrott Rd was a roundabout at the Warner Parrot Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, which is identified as project D34 in the adopted TSP. No detailed alternatives analysis was completed during the update, due to the high level nature of TSP analysis, support for the roundabout, and it's inclusion in the previous version of the TSP.

Oregon City Roundabout Alternatives & Linn Ave Concept Plan

The Oregon City Roundabout Alternatives project[3] provided preliminary hand drawn sketches of different roundabout configurations that could be constructed at the intersection of Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd. The sketches were intended to be illustrative in nature, and no detailed operational analysis or evaluation was completed as part of this work. The concepts developed as part of this work provided a starting point for future analysis, and were later refined as part of the Linn Avenue Concept Plan project.[4] No alternatives evaluation was included as part of this work, as it was assumed that a roundabout was the preferred intersection control type based on its inclusion in the TSP.

SYSTEM CONTEXT

Identifying the system in which an intersection operates is important to determine the factors that contribute to its overall function. The existing and future contexts of the study intersections are discussed in the sections below, which include the roadway network, nearby intersections, pedestrian and bicycle facilities, transit facilities, intersection collision analysis, and a general discussion on alternative system context impacts.

Roadway Network

The transportation characteristics of the key roadways near the study area are shown in Table 1 and include jurisdiction, functional classification, posted speed, number of travel lanes, presence of sidewalks and/or bike lanes, as well as transit facilities.

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[2] Oregon City, *Transportation System Plan*, June 2013.

[3] *Oregon City Roundabout Alternatives*, DKS Associates, 2008.

[4] However, the work completed for the Linn Avenue Concept Plan was intended to verify the needed geometry for a roundabout at this location.

The functional classification is a key roadway characteristic because it specifies the purpose of the facility[5] and is a determining factor of applicable cross-section, access spacing, and intersection performance standards.

Table 1: Key Roadway Characteristics in Project Vicinity

Roadway	Jurisdiction	Functional Classification	Posted Speed	Number of Lanes	Sidewalks	Bike Lanes	Transit
Warner Parrott Road	Oregon City	Minor Arterial	30 mph	3-4[a]	Yes	Yes	No
Warner Milne Road	Oregon City	Minor Arterial	30 mph	2	Some	Yes	Route 33
Central Point Road	Oregon City	Collector	35 mph	2	Yes	Yes	No
Linn Avenue	Oregon City	Minor Arterial	35 mph	2	Yes	Yes	Route 33
Leland Road	Oregon City	Minor Arterial	35 mph	2	Some	Yes	No

[a] Warner Parrott Road is a four-lane cross section in between the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd and Central Point Rd/Warner Parrott Rd study intersections.

As shown, all of the key roadways are under the jurisdiction of Oregon City and the majority of the roadways are classified as minor arterials, with the exception of Central Point Rd that is classified as a collector. Most roadways are two-lane facilities, with the exception of Warner Parrott Rd that has two travel lanes and a center turn lane west of the Central Point Rd/Warner Parrott Rd intersection and one travel lane and one left-turn lane in each direction between the two study intersections.

Warner Milne Rd and Leland Rd have gaps in the sidewalk facilities near the study intersections, but all roadways have bike lanes. TriMet's Route 33 serves the study area along Warner Milne Rd and Linn Ave.

Nearby Intersections

Most of the intersections adjacent to the two study intersections are unsignalized including Linn Ave/AV Davis Rd/Ethel St to the north, Warner Parrott Rd/Canemah Rd to the west, Central Point Rd/Shenandoah Dr to the southwest, and Leland Rd/Pease Rd to the south. The Warner Milne Rd/Beavercreek Rd intersection to the east of the project study area is the only signalized intersection.

Pedestrian and Bicycle Facilities

Sidewalks are present near both study intersections except for some gaps on the southeast corner of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. Pedestrian push-buttons and crosswalks are present along all four legs of the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection and only a single striped crosswalk is present on the southern leg of the Central Point Rd/Warner Parrott Rd intersection.

All roadways have bike lanes near the study intersections. Additionally, there are bicycle push-button detectors at all four corners of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

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[5] The primary purpose of an arterial is to provide mobility, whereas at the opposite end of the spectrum, a local road is primarily concerned with site access. Collector roadways provide a transition between arterials and local roads.

Further understanding of the existing pedestrian and bicycle volumes at the study intersections was provided by intersection turn movement counts were taken on Tuesday, December 2nd, 2014. Table 2 displays the existing pedestrian and bicycle volumes at study intersections during the PM peak hour.

Table 2: PM Peak Hour Pedestrian and Bicycle Volumes at Study Intersections

Study Intersection	**PM Peak Hour Volume**	
	Pedestrian	*Bicycle*
Central Point Rd/Warner Parrott Rd	4	3
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	10	2
Total	**14**	**5**

As shown, more pedestrians frequent the study are than bicyclists and the majority of pedestrians crossed at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

Transit Facilities

Route 33-McLoughlin travels bi-directionally along Linn Ave and Warner Milne Rd, turning at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. This route has 15 minute headways on weekdays in the morning and afternoon and serves four bus stops in the project vicinity; two on Warner Milne Rd (TriMet Stop IDs 6121 and 6120) and two stops on Linn Ave (TriMet Stop IDs 3418 and 9559).

The First Presbyterian Church Park and Ride is located just north of the project vicinity on the southeast corner of the Linn Ave/Williams St intersection.

Intersection Collision Analysis

Collision analysis was performed for the study intersections to identify intersection-related trends. This analysis considered data from the past five years (2009-2013), which was obtained from the ODOT Crash and Analysis Reporting Unit and is located in the appendix.[6]

Table 3 shows a detailed crash rate compared to the published 90th percentile rates[7] in ODOT's Analysis Procedure Manual Table 4-1.[8] Intersections with crash rates close to or over the 90th percentiles rates should be flagged for further analysis. As shown, the intersection crash rate for the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is below the 90th percentile crash rates for other statewide urban, four-legged, signalized intersections. However, the Central Point Rd/Warner Parrott Rd intersection has a crash rate slightly higher than the statewide 90th percentile crash rate for urban, three-legged, unsignalized intersections.

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[6] Oregon Department of Transportation, Crash Analysis and Reporting Unit.

[7] The 90th percentile values represent 90th percentile crash rates from a study of 500 intersections in Oregon. The crash rates are grouped by rural/urban, signalized/unsignalized, and 3-leg/4-leg intersections.

[8] Analysis Procedures Manual, Version 2, February 2014, Chapter 4, Table 4-1.

Table 3: Study Intersection Collision Analysis (2009-2013)

Intersection	Collisions (by Severity)			Collisions per Year	Intersection Crash Rate	90th Percentile Rate
	Injury	*PDO*[a]	***Total***			
Central Point Rd/Warner Parrott Rd	5	6	11	2.2	**0.50**	0.47
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	9	7	16	3.2	0.46	0.86

[a]PDO = Property damage only.
Bolded intersection crash rates indicate a value higher than the 90th percentile rates.

Further investigation was performed for the Central Point Rd/Warner Parrott Rd intersection to assess whether there are any clear trends in the collision data. Table 4 shows the collision data from 2009 through 2013 broken down by the type of collision. As shown, the most prevalent collision types were turning movement collisions as they make up 55 percent of the total collisions occurring at this intersection during the past five years. Furthermore, half of the turning collisions at this intersection involve the northbound left-turning movement. These turning collisions could be caused by the close proximity of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, limited sight distance with the presence of queued vehicles, the intersection geometry itself (e.g. the curvature and skew of the roadways), or the requirement to cross three lanes of traffic to complete the left-turning movement.

Table 4: Collision Breakdown by Collision Type (2009 through 2013)

Intersection	Turn	Fixed Obj.	Bike[a]	Side-Swipe	Rear-End	Total
Central Point Rd/Warner Parrott Rd	6	3	1	1	1	11

[a] The collision involving a cyclist was a "Turn"-type collision and therefore is not included in the total.

Alternative System Context Impacts

All future alternatives include either unsignalized, signalized, or roundabout intersections. None of these intersection types are expected to significantly disrupt the system context of the surrounding area. Since this alternative evaluation category is not likely to aid in the alternatives comparison, a general system context discussion for the various alternatives are included in the sections below.

Alternatives Involving Signalized Intersection(s)

Although the majority of surrounding intersections are unsignalized, there are many other signalized intersections in Oregon City and drivers are expected to understand traffic laws regarding signalized intersections and to be familiar handling the intersection process. It is also anticipated that push-button detectors and marked cross-walks at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection will accommodate pedestrians at the intersection. Bike lanes that connect into the existing bicycle network in the area are easily accommodated with signalized intersections. Transit will be able to maneuver the intersection with relative ease due to prior experience with signalized and stop-controlled intersections and it is unlikely for alternatives involving signalized intersections to necessitate the modification of any existing transit facilities.

Alternatives Involving a Roundabout Intersection

The nearest existing roundabout in Oregon City is at the intersection of Washington St and Clackamas River Dr, but there are several other intersections identified in the Oregon City TSP that are planned to be roundabout controlled in the future. A roundabout in the study area is not anticipated to severely disrupt the current system context, but this option may not be as familiar to users as a signalized intersection. An effort to accommodate pedestrians and cyclists through clear signing and striping may be required for alternatives including roundabout intersections due to unfamiliarity with the multimodal aspects of roundabouts. Existing transit facilities may need modification due to the pull-up and pull-out space transit vehicles need to operate safely at a bus stop along a roadway, but transit should be able to maneuver the intersection.

TRAFFIC VOLUME DEVELOPMENT

For the Oregon City TSP update process, PM peak hour traffic counts were collected at both study intersections, but during different days. Those counts were collected in 2011 and 2012.[9] The 2035 future volumes were then developed based on those counts.

For this study, we wanted to both verify that the future counts developed for the Oregon City TSP update still apply, as well as collect data at both study intersections during the PM peak hour period (4 p.m.- 6 p.m.) to ensure consistency between the two intersections. On Tuesday, December 2nd 2014, PM peak hour turn movement counts were collected at both study intersections. These new counts were consistent with the 2011 and 2012 counts, which helped validate the development of the future 2035 traffic volumes. Collecting the counts during the same peak hour also verified that the volume distribution between the two intersections as developed for the 2035 future year volumes resembled existing conditions.

Based on the new PM peak hour counts collected in 2014, we concluded that the 2035 volumes developed for the Oregon City TSP update accurately capture projected future volumes and are the future volumes used in this study. All intersection volume data is located in the appendix.

Volume adjustments for each alternative were based on a qualitative assessment of the surrounding roadway network and an assumed origin and destination for the affected vehicles. The resolution of the regional travel demand model was too large to adequately reflect volume adjustments based on the relatively minor geometric change being proposed for each alternative.

FUTURE ALTERNATIVES

Five alternatives for addressing future transportation needs at the study intersections were considered as part of this analysis. These improvement alternatives were developed based on input received from key stakeholders, City staff, and the previously completed TSP. A description of the No-Build scenario and each alternative are included in the sections below. Conceptual drawings for each alternative developed by Wallis Engineering are provided in the appendix..

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[9] At the Warner Parrot Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection counts were collected on Wednesday, October 3, 2012. At the Central Point/Warner Parrott Rd intersection counts were collected on Thursday, April 21, 2011.

No-Build

The No-Build scenario assumes that no changes to the study intersections will occur before the year 2035. Currently, the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is a four-leg, signalized intersection that allows all movements and the Central Point Rd/Warner Parrott Rd intersection is a three-leg, unsignalized intersection that allows all movements. The future 2035 volumes for the No-Build scenario are displayed in Figure 2.

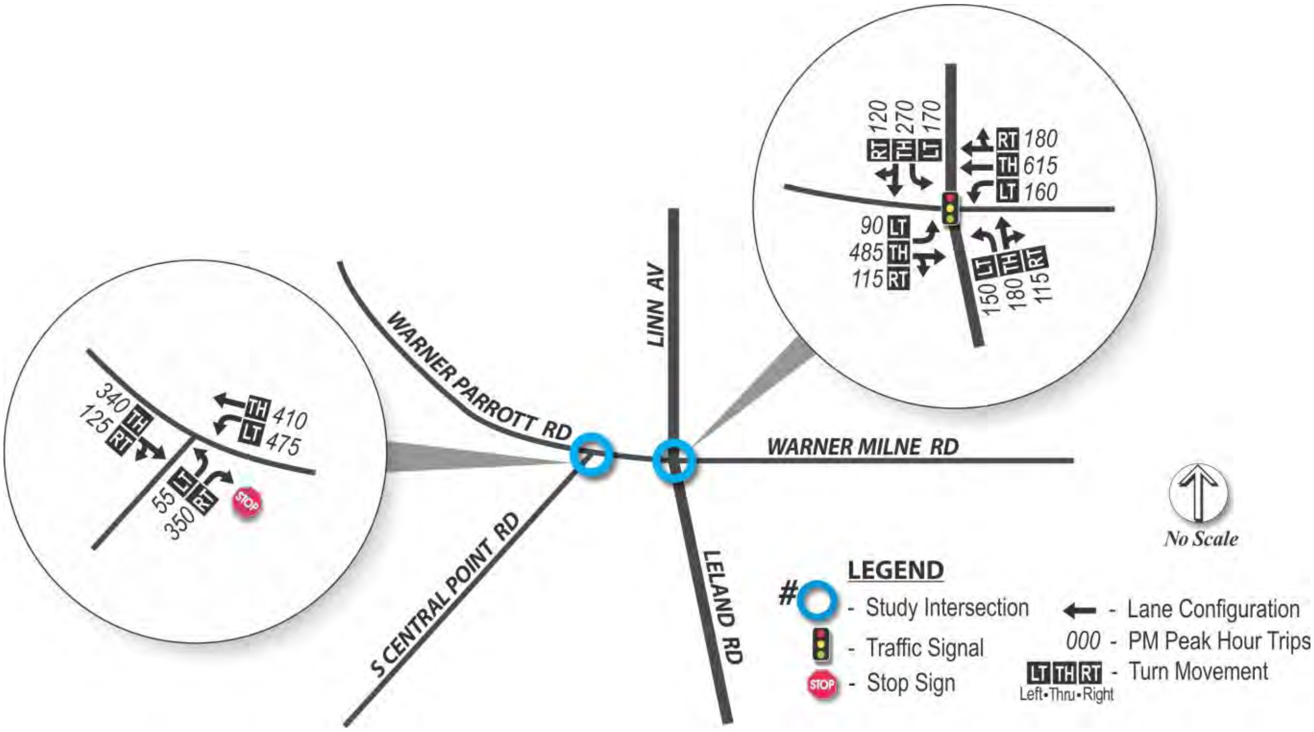

Figure 2: 2035 No-Build Intersection Volumes

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

This alternative includes the restriction of left-turns from Central Point Rd by the installation of a median along Warner Parrott Rd or a channelizing island at Central Point Rd. Left-turns onto Central Point Rd would still be allowed. The displaced left-turns would be accommodated by allowing an eastbound U-turn at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. However, this movement would be restricted to passenger cars only since intersection widening required to accommodate larger vehicles would necessitate significant reconstruction and would have impacts to pedestrian crossing movements and vehicular operations.[10]

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[10] An SU-30 design vehicle performing the eastbound U-turn movement at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection was simulated in Autoturn by Wallis Engineering and was found to require significant intersection widening.

As shown in Figure 2, 55 northbound left-turns are projected to occur at the Central Point Rd/Warner Parrott Rd intersection during the PM peak hour. Since this alternative restricts the northbound left-turn, volume adjustments were made to re-allocate these vehicles through the study area as shown in Figure 3.

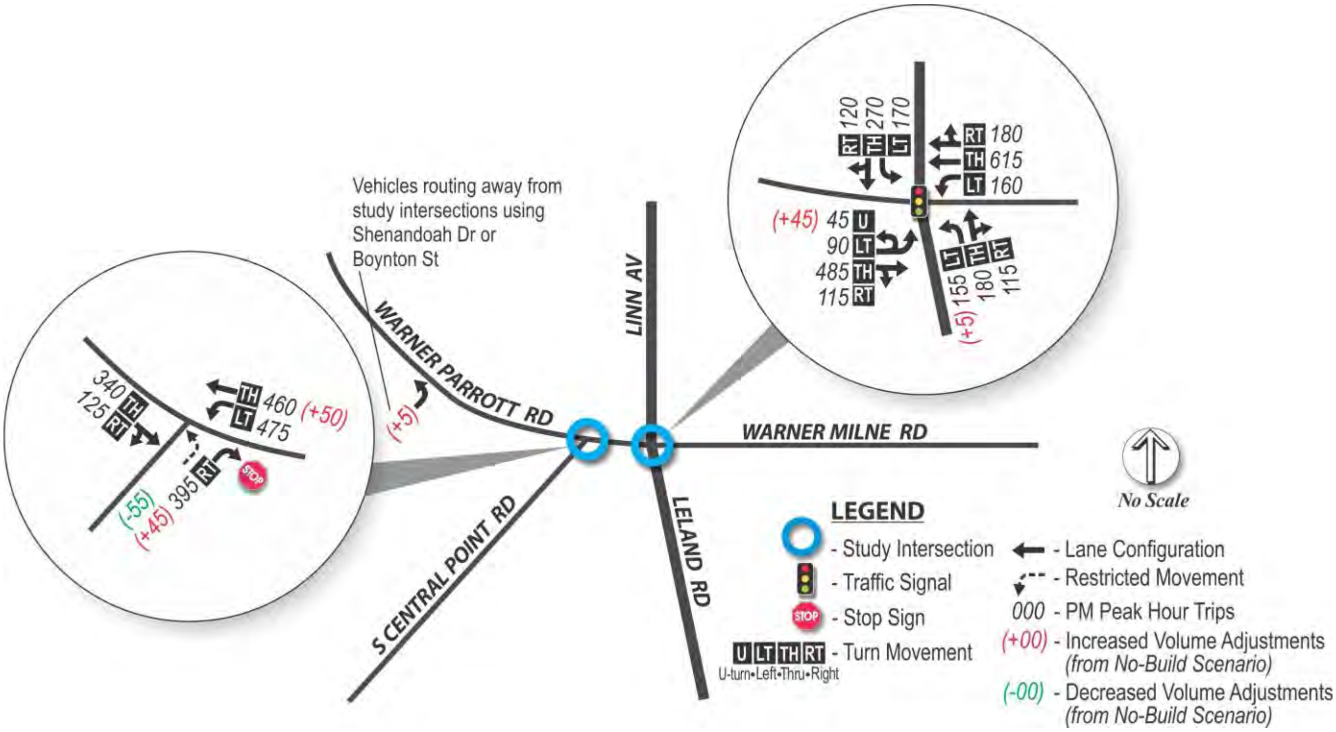

Figure 3: 2035 Intersection Volumes for Alt 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

In this alternative, it was assumed that the majority of these displaced vehicles (45 during the PM peak) would simply utilize the U-turn at the adjacent signal (i.e. northbound vehicles turn right at the Central Point Rd/Warner Parrott Rd intersection then make a U-turn at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection), because of this movement is the most similar to the existing northbound left-turn movement. Five of the vehicles were assumed to avoid the Central Point Rd/Warner Parrott Rd intersection and instead use an alternate route, such as Pease Rd, to access Leland Rd to turn left at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

The remaining five vehicles were anticipated to avoid both study intersections and find an alternate route such as Shenandoah Dr or Boynton St to access Warner Parrott Rd west of the project study area. Since a relatively small number of vehicles are anticipated to re-route away from both study intersections, the traffic operations at surrounding intersections are not likely to be severely impacted, but these drivers may experience extended travel time.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

This alternative also includes the closure of the northbound left-turn at the Central Point Rd/Warner Parrott Rd intersection by the installation of a median along Warner Parrott Rd or a channelizing island at Central Point Rd. However, unlike Alternative 1, no U-turn would be available at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. Since this alternative also includes the closure of the northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection, the volumes currently making this turn during the PM peak hour were re-distributed accordingly.

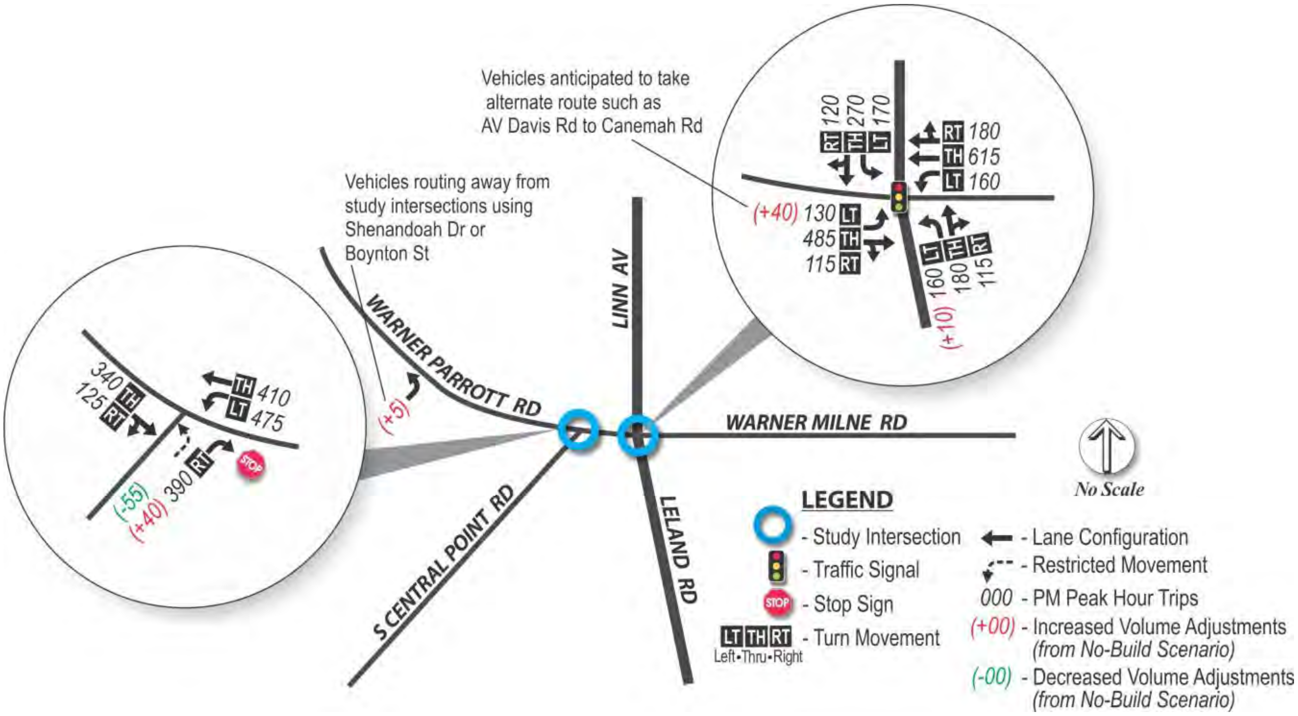

Figure 4: 2035 Intersection Volumes for Alt 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

Forty of these northbound vehicles were assumed to turn right at the Central Point Rd/Warner Parrott Rd intersection, then turn left at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, then take a parallel route (most likely AV Davis Rd onto Canemah Rd) to access Warner Parrott Rd west of the study area. Ten of the vehicles were assumed to forgo the Central Point Rd/Warner Parrott Rd intersection and instead use an alternate route, such as Pease Rd, to access Leland Rd and turn left at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

The remaining five vehicles are anticipated to avoid both study intersections and find an alternate route, such as Shenandoah Dr or Boynton St, to access Warner Parrott Rd west of the project study area. Since a relatively small amount of vehicles are anticipated to re-route away from both study intersections, the surrounding intersections are not likely to be severely impacted although these drivers may experience extended travel time.

Alternative 3: Both Intersections Signalized

In this alternative both study intersections are fully signalized, which allows for all movements to be accommodated. However, due to the close proximity of the study intersections, the two signals would need to operate as one intersection.

Due to the increased convenience of having a signalized northbound left-turn at the Central Point Rd/Warner Parrott Rd intersection, ten northbound vehicles turning left were assumed to migrate from the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to the Central Point Rd/Warner Parrott Rd intersection as shown below in Figure 5.

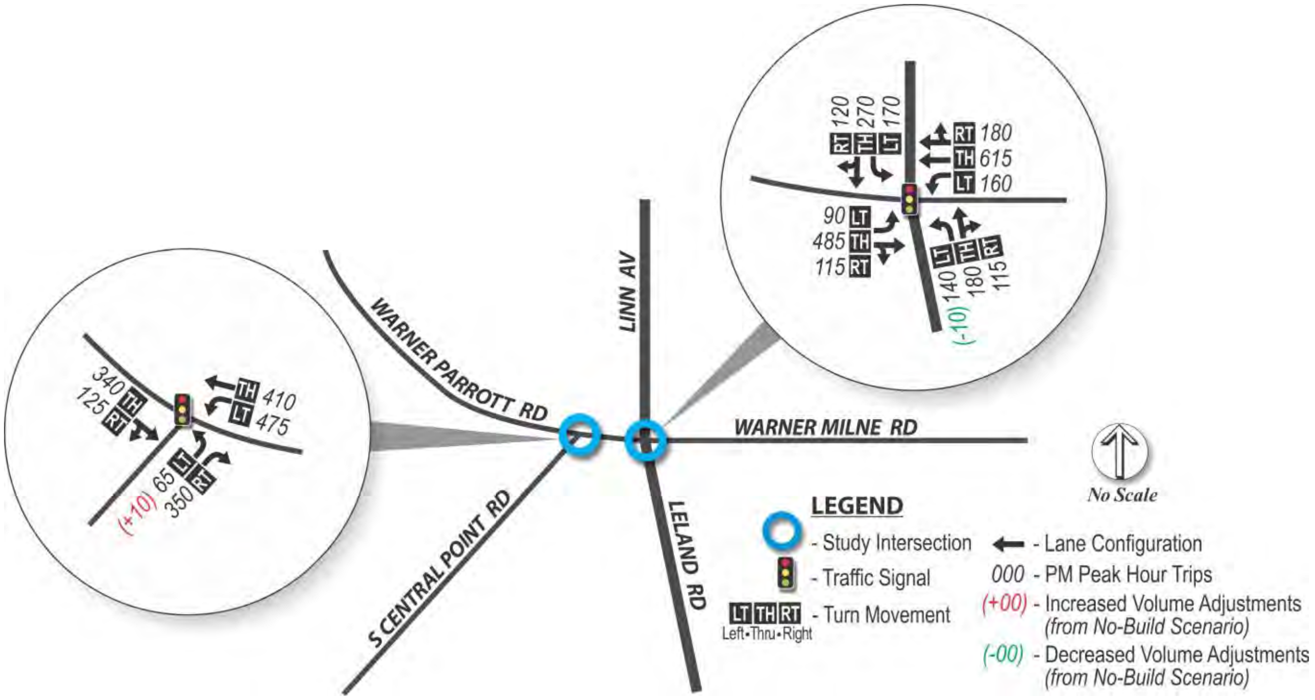

Figure 5: 2035 Intersection Volumes for Alt 3: Both Intersections Signalized

Alternative 4: Four-Leg Roundabout

In this alternative, northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection would be restricted by the installation of a median along Warner Parrott Rd. Left-turns onto Central Point Rd would still be allowed. The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection would be converted into a four-legged roundabout, which would accommodate the displaced northbound left-turning vehicles from Central Point Rd/Warner Parrott Rd via the eastbound U-turn movement.

The roundabout considered in this alternative includes two lane approaches for each of the legs. However, the removal of one approach lane on the south leg (Leland Ave) was also evaluated and is discussed further in the Intersection Operations section for Alternative 4.

Since this alternative also includes the closure of the northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection, the volumes currently making this turn during the PM peak hour were re-distributed in a way that is identical to Alternative 1. The intersection volumes used for Alternative 4 are shown in Figure 6.

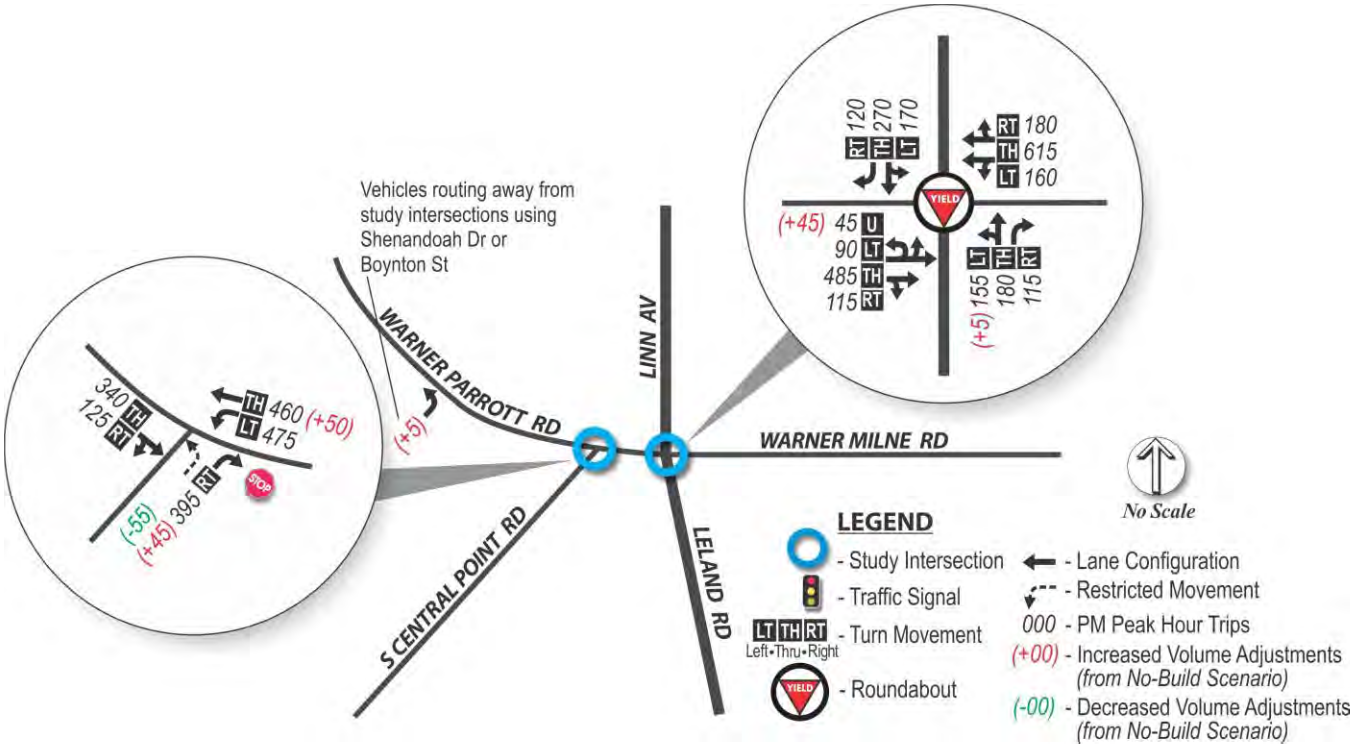

Figure 6: 2035 Intersection Volumes for Alt. 4: Four-Leg Roundabout

Alternative 5: Five-Leg Roundabout

In this alternative, a five-legged roundabout was considered that combined both study intersections into one. The five-legged roundabout results in a larger roundabout, but no turn movements are restricted. The approaches to the roundabout were all two-lane.

Since both intersections are merged into a single intersection in this alternative, the distribution of the 2035 PM peak hour volumes were determined by general destination and origin assumptions using the turn-movement counts collected as part of this analysis and are described in Figure 7.

Based on the distribution of westbound traffic at the Central Point Rd/Warner Parrott Rd intersection, 46 percent of traffic on that approach is destined for Warner Parrott Rd and the remaining 56 percent is destined for Central Point Rd. These percentages were then applied to the southbound right, westbound through, and northbound left movements at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to estimate how these movements might re-distribute with the single intersection.

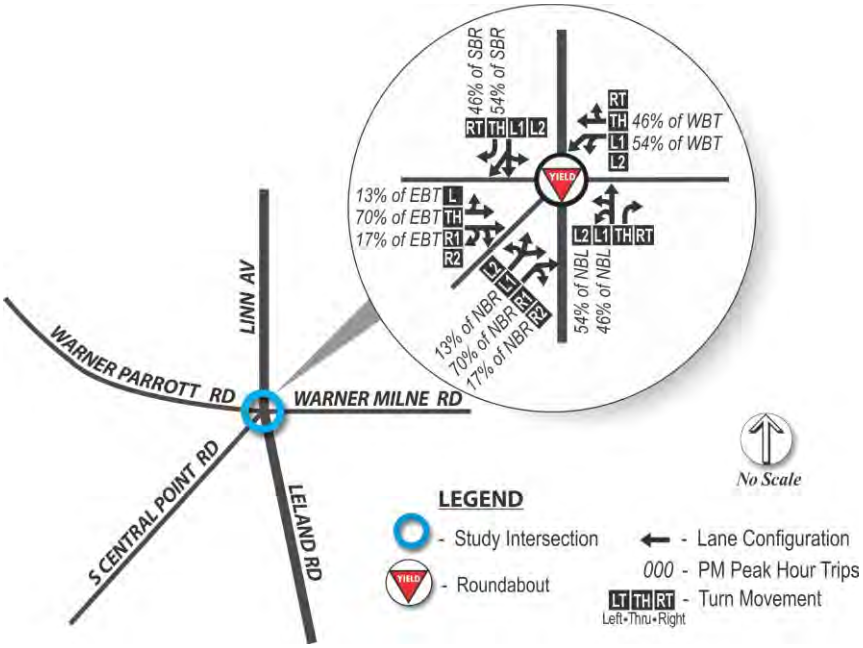

Figure 7: Intersection Volume Adjustments for Alt. 5: Five-Leg Roundabout

In the eastbound direction at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, 70 percent of the traffic was determined to be destined for Warner Milne Rd, 17 percent destined for Linn Ave, and 13 percent destined for Leland Rd. These percentages were applied to the eastbound volume and northbound left-turn volume at Central Point Rd/Warner Parrott Rd to estimate how these movements might re-distribute with the single intersection. Figure 7 shows the combined intersection volumes that were used for Alternative 5.

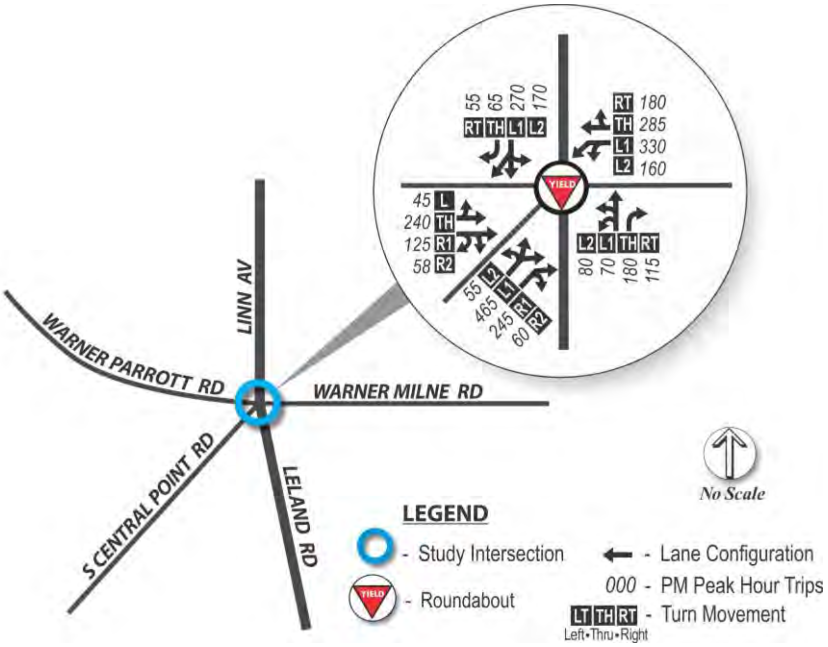

Figure 8: 2035 Intersection Volumes for Alt 5: Five-Leg Roundabout

FUTURE ALTERNATIVES EVALUATION

Each of the alternatives was evaluated based on several criteria to provide a comparison of the alternatives to each other, and to the No-Build scenario. These criteria included intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety. The following sections discuss the mobility standards for Oregon City, as well as a summary of the present worth analysis completed for each of the transportation alternatives.

Mobility Standards

Agency mobility standards often require intersections to meet level of service (LOS) or volume-to-capacity (v/c) intersection operation thresholds.

- The **intersection LOS** is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- The **volume-to-capacity (v/c) ratio** represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the v/c ratio approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, as seen by the formation of excessive queues.

Two adopted documents contain language regarding the mobility standards for both signalized and unsignalized intersections in Oregon City. The first is Oregon City's TSP and the second is the Oregon City Municipal Code.[11] The language from both documents agrees that the mobility standard for signalized intersections as a whole requires a v/c ratio less than 0.99. However, the mobility standard language in both documents differs in regards to unsignalized intersections. According to the TSP, unsignalized mobility standards are given as v/c ratios that may not exceed 0.99 for the worst intersection movement, which is typically the side street. On the other hand, Oregon City's Municipal code refers to mobility standards for unsignalized intersections as a v/c ratio that may not exceed 0.99 for the main street movement and specifically states that there is no mobility standard for the side street movement.

In this document, mobility standards will be reported in accordance with Oregon City's TSP language. However, a discussion of the Oregon City Municipal Code mobility standards will be discussed as applicable. The mobility standards for signalized and unsignalized intersections from both the City's TSP and Municipal Code are summarized in Table 5.

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[11] Oregon City, Oregon - Code of Ordinances, August 25, 2014.

Table 5: Applicable Study Intersection Mobility Standards

Document	Traffic Control	Mobility Standard	Applicable Intersection Movement
		v/c Ratio	
Oregon City's TSP	Signalized	0.99	Intersection as a whole
	Unsignalized	0.99	Worst intersection movement (Critical movement)
Oregon City Municipal Code	Signalized	0.99	Intersection as a whole
	Unsignalized	0.99	Worst major-street movement

No-Build

Table 6 provides the results of the intersection operations analysis completed for the future No-Build scenario. As shown, the critical movement of the Central Point Rd/Warner Parrott Rd intersection does not meet Oregon City's TSP v/c standard for unsignalized intersections although the major street v/c is below 0.99 and therefore does meet the Oregon City Municipal Code's mobility standards for unsignalized intersections. In light of differing mobility standards, it is important to note that motor vehicle queuing and overall intersection performance drastically decreases as the critical movement (northbound left) approaches a v/c above 0.99. The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection does meet mobility standards in year 2035.[12]

Table 6: 2035 No-Build Intersection Operations

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/F	> 100s	1.38
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	45.4	0.91

Signalized intersection:	**Unsignalized intersection:**
Delay = Average Intersection Delay (sec.)	Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service	LOS = Major Street LOS/Minor Street LOS
v/c= Intersection Volume-to-Capacity Ratio	v/c= Critical Movement Volume-to-Capacity Ratio

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn.

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 3. Due to the added eastbound U-turn at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, a saturation flow adjustment was made to the

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[12] Detailed reports for the HCM intersection analysis for the No-Build scenario as well as all five alternatives are provided in the appendix.

eastbound left turns as per research completed by the North Carolina State University for the North Carolina Department of Transportation.[13] The saturation flow adjustments are provided in the appendix. Table 7 provides the results of the intersection operation analysis.

Table 7: 2035 Intersection Operations for Alt. 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	52.8	0.92

Signalized intersection:	Unsignalized intersection:
Delay = Average Intersection Delay (sec.)	Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service	LOS = Major Street LOS/Minor Street LOS
v/c= Intersection Volume-to-Capacity Ratio	v/c= Critical Movement Volume-to-Capacity Ratio

As shown, both intersections meet the mobility standards under future year conditions during the PM peak hour. Compared to the No-Build scenario, an increase of over 30 seconds of delay from the No-Build scenario at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is expected under this alternative.

Under this alternative, the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario which is due to the restriction of the northbound left-turn movement on the Central Point Rd intersection leg (critical movement).

Right-of-way/Access Impacts

Limited impacts to accesses are anticipated under this alternative. All existing access to adjacent businesses will remain open, but the Central Point Rd northbound left-turn will be restricted. However, the added U-turn movement at the adjacent intersection should help minimize the impact of removing that turn movement. No right-of-way acquisition is expected for this alternative. The two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City's intersection minimum access spacing requirements for minor arterials.[14]

Construction/Maintenance Costs

Construction costs for this alternative would likely be relatively minor. Costs would include the construction of the center median along Warner Parrott Rd, and signal modifications to accommodate for the added eastbound U-turn movement. There would also be ongoing maintenance costs affiliated with the signalized intersection, which is expected to be similar to the existing maintenance costs for this intersection and typically include equipment replacement, signal timing updates, power, etc.

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[13] *Effects of Increased U-Turns at Intersections of Divided Facilities and Median Divided Versus Five Lane Undivided Benefits*, North Carolina State University, August 2004. (Research conducted for the North Carolina Department of Transportation).
[14] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

A construction cost estimate for this alternative was developed by Wallis Engineering, and found to be approximately $115,000.[15]

Safety

The poor traffic operations expected at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection and the anticipated queuing on the northbound approach of the Central Point Rd/Warner Parrott Rd intersection and eastbound approach between the intersections may cause an increase in collisions within the study intersections. When an intersection is over capacity (has a v/c ratio greater than 1.0) and experiences a significant amount of delay, the potential for drivers to become impatient and act more recklessly (e.g. running-red lights) increases.

Since the U-turn movement isn't especially common in the State of Oregon, drivers may be unfamiliar with the practice and the added conflict point. For instance, drivers making a southbound right from Linn Ave during a red-light are used to yielding for either the westbound through movement or northbound left-turn movement. In this alternative, drivers wanting to make a southbound right must also yield to the eastbound U-turn movement, which may require additional signage or operational changes (e.g. no turn on red) to help drivers understand how to navigate each intersection turning movement safely.

Although the current crash rate at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection isn't expected to change drastically under this alternative, the Central Point Rd/Warner Parrott Rd intersection could expect a decrease in accidents arising from northbound vehicles making left-turns due to the movement restriction.

Typically, a wide variety of collision types occur at signalized intersections, the most severe of which are head-on, turning, and "T-bone" collisions. These collision types often have a higher frequency of injuries and fatalities than other types of collisions such as side-swipe or rear-end collisions. However, signalized intersections would provide a protected crossing for pedestrians using the intersection.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn.

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 4. Table 8 provides the results of the intersection operations analysis.

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[15] Planning level construction costs estimates for all five alternatives are provided in the appendix.

Table 8: 2035 Intersection Operations for Alt 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.1	0.53
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	46.8	0.92

Signalized intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
v/c= Intersection Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c= Critical Movement Volume-to-Capacity Ratio

As shown, both study intersections meet mobility standards under 2035 PM peak hour conditions. It is important to note that this alternative causes minor rerouting through other intersections (see the *Volumes Adjustment Summary* section in this memorandum). Those impacts are not assessed in this study, but are expected to be minor.

Under this alternative, the intersection delay at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is projected to stay similar to that of the No-Build scenario and the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario which is due to the restriction of the northbound left-turn movement on the Central Point Rd intersection leg (critical movement).

Right-of-way/Access Impacts

Limited, if any, accesses are anticipated to be adversely affected for this alternative. All existing access to adjacent businesses will remain open, however, the Central Point Rd northbound left-turn will be restricted. Right-of-way acquisition is not expected for this alternative. Additionally, the two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City's intersection minimum access spacing requirements for minor arterials.[16]

Construction/Maintenance Costs

Construction costs for this alternative are expected to be minimal, and would be limited to the construction of the center median along Warner Parrott Rd. No modifications to the existing traffic signal are anticipated as part of this alternative. The ongoing maintenance costs affiliated with signalized intersections are expected to be similar to existing maintenance costs for this intersection and typically include equipment replacement, signal timing updates, power, etc.

A construction cost estimate for this alternative was developed by Wallis Engineering, and was found to be approximately $45,000.

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[16] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

Safety

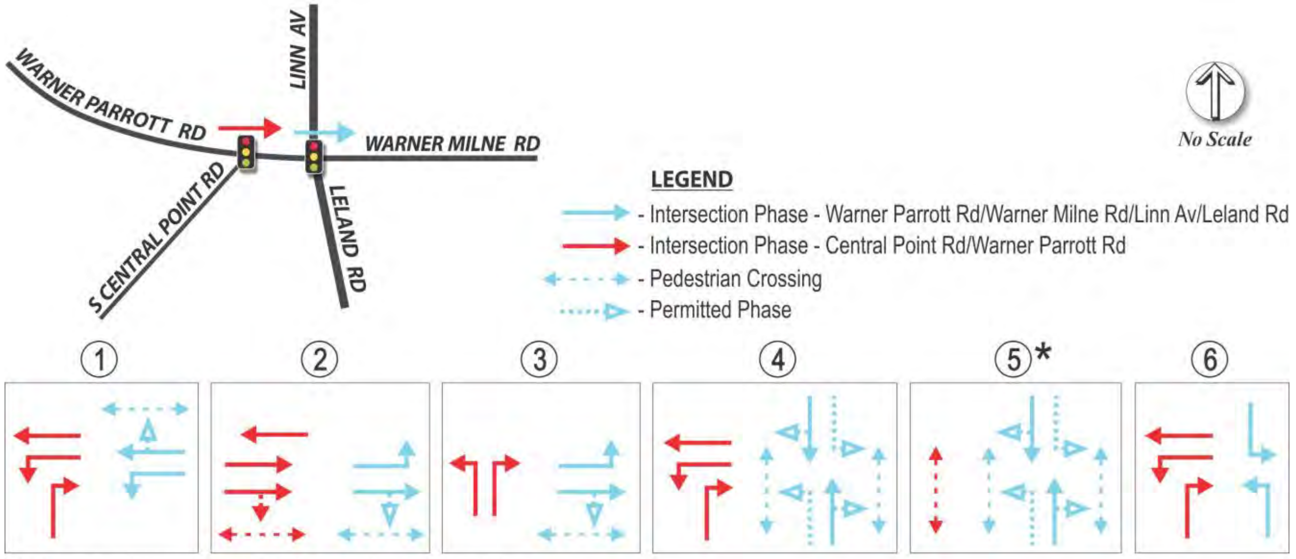
This alternative is not expected to change the safety of the study intersections significantly from existing conditions. However, it is important to note that the main types of collisions occurring at signalized intersections have a greater incidence of injury than other types of collisions. Although the current crash rate at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection isn't expected to change drastically under this alternative, the Central Point Rd/Warner Parrott Rd intersection could expect a decrease in accidents arising from northbound vehicles making left-turns due to the movement restriction.

Alternative 3: Both Intersections Signalized

A discussion of the coordinated signal phasing used for this alternative as well as the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 3: Both Intersections Signalized.

Coordinated Signal Phasing

Signalizing two intersections in such close proximity to each other create challenges in providing adequate through movement and not trapping vehicles between the two intersections. To help address these challenges, the two intersections will need to operate as one intersection, with signal phases carefully coordinated to allow for through movement and to prevent conflicts. To maintain a clear area between the two intersections, the eastbound and westbound phases need to operate using split phase timing. Split phase timing allows all the movements from one approach to flow through the intersection, instead of allowing through movements in two directions. This type of signal timing is typically less efficient than other types, but necessary in this case to provide adequate time for the through movement. The analysis maintained all four pedestrian crossings at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, and includes two pedestrian crossings at the Central Point Rd/Warner Parrott Rd intersection. The proposed signal phasing is shown below in Figure 9.



* *Phase necessary if a pedestrian crossing is desired for the east and west legs of the Central Point/Warner Parrott Rd. intersection.*

Figure 9: Proposed Signal Phasing for Alternative 3 (Both Intersections Signalized)

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 5. Table 9 provides the results of the intersection operations analysis.

Table 9: 2035 Intersection Operations for Alt. 3: Both Intersections Signalized

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Maintaining all Pedestrian Crossings				
Central Point Rd/Warner Parrott Rd	0.99	C	20.2	0.53
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	F	151.1	1.12
Without Pedestrian Crossings on the East and West Legs of Central Point Rd/Warner Parrott Rd				
Central Point Rd/Warner Parrott Rd	0.99	B	16.8	0.49
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	E	67.1	1.02

Signalized intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
v/c = Intersection Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, the Warner Parrott Rd/Warner Milne Rd/Linn Av/Leland Rd intersection does not meet mobility standards under this alternative. Furthermore, an increase of over 20 seconds of delay from the No-Build scenario at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is expected under this alternative. This alternative was also analyzed without the pedestrian crossing on the east leg of Central Point Rd/Warner Parrott Rd. By eliminating this pedestrian crossing, more green time can be allocated to other movements and operations improve, but still do not meet mobility standards.

The split phase timing works well keeping the westbound area between the two intersections clear because the westbound through movement at Central Point Rd is served during four of the five phases shown in the proposed signal phasing. However, in the eastbound direction the block between the two intersections can become fully queued. Due to the northbound and southbound traffic demands at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, as well as the split phase eastbound-westbound signal timing, there is limited green time for the eastbound movement. The northbound right from Central Point Rd continuously fills that block, yet cannot proceed through the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. This scenario creates a significant northbound vehicle queue on Central Point Rd although the delay of the critical movement approach is projected to significantly increase from the No-Build scenario at this location.

Since the intersection operations for this alternative fails to meet Oregon City's mobility standards, it is excluded from any further evaluation.

Alternative 4: Four-Leg Roundabout

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 4: Four-Leg Roundabout.

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 6. Table 10 provides the results of the intersection operations analysis.

Table 10: 2035 Intersection Operations for Alt. 4: Four-Leg Roundabout

Intersection	**Operating Standard**	**PM Peak Hour**		
	v/c	*LOS*	*Delay*	*v/c*
Two-Lane Approach for all Four Roundabout Legs				
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	C	26.6	0.77
Two-Lane Approach for all but the South Leg (Leland Ave)				
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	49.3	0.91

Roundabout intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service
v/c = Critical Movement Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, the two study intersections operate with v/c ratios well below the mobility standard for Oregon City, in both four-legged options. However, at the conceptual stage, it is recommended that the scenario including a two-lane approach for all legs be carried forward for the evaluation. Taking this approach is likely to result in a conservative estimate of the potential impacts associated with this alternative. The possibility of phased construction could be considered as part of the final design process if needed.

The critical movement delays at both study intersections are expected to decrease at both study intersections under this alternative when compared with the No-Build scenario.

Right-of-way/Access Impacts

The Central Point Rd northbound left-turn will be restricted in this alternative and all existing accesses to adjacent businesses will remain open. However, the east and west driveways accessing the strip mall have the potential to be restricted to right-in, right-out only depending on the final configuration and design of the roundabout. These decisions would be made as part of the final design phase of the project, which is not expected to occur until funding is secured for the project. Even with these potential access restrictions, all movements from both intersections would be able to enter/exit the strip mall without going beyond the two study intersections.

This alternative would require right-of-way acquisitions to construct the proposed roundabout and realigned roadways. Based on the current concept for this alternative, approximately 5,000 square feet of right-of-way would need to be acquired. Additionally, the two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City's intersection minimum access spacing requirements for minor arterials.[17]

Construction/Maintenance Costs

The cost of construction for this alternative is expected to be significantly higher than the construction costs other alternatives with signalized intersections. The major reason for this is the significant amount of new road construction and changes to roadway alignment that are needed to initially construct the roundabout. The cost associated with acquiring right-of-way is also a factor in the higher cost for this alternative as compared to the traffic signal alternatives.

Ongoing maintenance cost of a roundabout controlled intersection is highly dependent on the landscaping treatment. Options can range from high maintenance costs that include irrigation, regular pruning, and cleaning statues or other art work, to low maintenance cost options that may include a simple concrete island or pavers. Other ongoing costs could include lighting, maintaining signs related to the roundabout, and pedestrian crossing treatments.

A construction cost estimate for this alternative was developed by Wallis Engineering, and was found to be approximately $3,220,000.

Safety

Vehicles at roundabouts generally travel at slower speeds, which results in less severe collisions. Furthermore, the main collision types that occur at roundabout intersections (side-swipe or rear-end) typically have a lesser incidence of injury than other collision types. Studies show that roundabouts can reduce injury crashes by 72% to 80%[18,19].

Current guidance is to provide pedestrian crossing treatments for multi-lane approaches to roundabouts, as it can be difficult for visually impaired pedestrians to cross multiple lanes of an unsignalized facility. Therefore, pedestrian-activated flashers were assumed to be necessary at each crossing. The type of crossing treatment will need further review during the final design phase. Cyclists have the option to travel on the sidewalk or to circulate with traffic at an intersection with a roundabout configuration. For cyclists that choose to circulate with traffic, the relative speed between the cyclist and the adjacent motor vehicles is likely to be similar thus reducing the risk of high-impact collisions.

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[17] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

[18] Insurance Institute for Highway Safety. Website Accessed 1/12/2015 : http://www.iihs.org/iihs/topics/t/roundabouts/qanda

[19] Eisenman, S.; Josselyn, J.; List, G.; Persaud, B.; Lyon, C.; Robinson, B.; Blogg, M.; Waltman, E.; and Troutbeck, R. 2004. Operational and safety performance of modern roundabouts and other intersection types. Final Report, SPR Project C-01-47. Albany, NY: New York State Department of Transportation.

Another safety consideration for this alternative is the vehicle queue created by the westbound left turn movement at Warner Parrott Rd/Central Point Rd. Existing observations revealed that vehicles making this movement queue through the adjacent signalized intersection occasionally during the PM peak hour. With volumes increasing by 2035, the queuing would likely grow more frequent. This vehicle queueing would likely be similar in Alternatives 1 and 2. However, with a roundabout there is some added complexity to the vehicle queue. With a signalized intersection at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, drivers can see the vehicle queue as they approach and choose not to enter the intersection. In the case of a roundabout, a driver might not be aware of the vehicle queue until they are in the roundabout, causing them to stop in the circulating roadway, which would then impact other movements through the roundabout as well.

Alternative 5: Five-Leg Roundabout

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 5: Five-Leg Roundabout.

Intersection Operations

Intersection operations analysis was performed for the combined study intersection during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 8. Table 11 provides the results of the intersection operations analysis.

Table 11: 2035 Intersection Operations for Alt. 5: Five-Leg Roundabout

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Two-Lane Approach for all Five Roundabout Legs				
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd/Central Point Rd	0.99	C	31.1	0.83
Two-Lane Approach for all but the South Leg (Leland Ave) and the South-East Leg (Central Point Rd)				
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd/Central Point Rd	0.99	E	62.5	0.97

Roundabout intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service
v/c = Critical Movement Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, both roundabout scenarios have v/c ratios under the maximum standard for Oregon City. Similar to what was stated for Alternative 4, at the conceptual stage it is recommended that the scenario including a two-lane approach for all legs be carried forward for the evaluation. Furthermore, taking this approach is likely to result in a conservative estimate of the potential impacts associated with this alternative. The possibility of phased construction could be considered as part of the final design process if needed.

Under this alternative, the intersection delay at the Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is projected to increase slightly when compared to the No-Build scenario and the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario.

Right-of-way/Access Impacts

No motor vehicle movements will be restricted in this alternative and all existing accesses to adjacent businesses will remain open, however, the east and west driveways for the strip mall has the potential to be restricted to right-in, right-out only and would require further analysis in the design phase. Even though this access restriction is not definite, all movements from both intersections would be able to enter and exit the site without going beyond the adjacent roundabout.

This alternative would require a significant amount of right-of-way acquisitions to construct the proposed roundabout and realigned roadways. Based on the current concept for this alternative, approximately 7,000 square feet of right-of-way would need to be acquired.

Construction/Maintenance Costs

The cost of construction for this alternative is expected to be significantly higher than the construction costs other alternatives with signalized intersections. The major reason for this is the significant amount of road construction and changes to roadway alignment that are needed to initially construct the roundabout. It is also anticipated that this alternative would be slightly more expensive than the four-legged roundabout in Alternative 4, due to the increased size of the roundabout required to accommodate the fifth leg. There is also more roadway alignment modifications required for this alternative compared to Alternative 4. The cost associated with acquiring right-of-way is also a factor in the higher cost for this alternative as compared to the traffic signal alternatives.

Similar to Alternative 4, the ongoing maintenance cost of a roundabout controlled intersection is highly dependent on the landscaping treatment. Options can range from high maintenance costs that include irrigation, regular pruning, and cleaning statues or other art work, to low maintenance cost options that may include a simple concrete island or pavers. Other ongoing costs could include lighting, maintaining signs related to the roundabout, and pedestrian crossing treatments.

A construction cost estimate for this alternative was developed by Wallis Engineering, and found to be approximately $3,350,000.

Safety

Similar to Alternative 4, a roundabout is expected to decrease the number of injury crashes by about 70%. Since this alternative includes a five-leg roundabout with complex lane geometry, driver confusion may occur and more conflict points for potential collisions exist for this alternative compared to others.

However, conflict points are not the only important factor in analyzing intersection safety. It is also important to discuss the general collision-types associated with roundabout intersections. The main collision types that occur at roundabouts (side-swipe, rear-end) typically have a lesser incidence of injury than other collision types. Furthermore, vehicles at roundabouts generally travel at slower speeds which results in less severe collisions.

Current guidance is to provide pedestrian crossing treatments for multi-lane approaches to roundabouts, as it can be difficult for visually impaired pedestrians to cross multiple lanes of an unsignalized facility. Therefore, pedestrian-activated flashers were assumed to be necessary at each crossing. The type of crossing treatment will need further review during the final design phase. Cyclists have the option to travel on the sidewalk or to circulate with traffic at an intersection with a roundabout configuration. For cyclists that choose to circulate with traffic, the relative speed between the cyclist and the adjacent motor vehicles is likely to be similar thus reducing the risk of high-impact collisions.

Present Worth Analysis

A present worth analysis was completed in order to determine the relative, present-day cost of each of the five alternatives. This analysis is included in the appendix. While the present worth analysis includes only those costs which are quantifiable, unquantifiable costs should also be considered.

Quantifiable Costs

Costs associated with construction delay, crashes, construction, and maintenance were estimated for each alternative. A short discussion of each of these quantifiable costs is included below.

Delay Costs

Traffic operations are based on the 2035 PM peak year analysis completed for each alternative. The cost associated with PM peak hour delay incorporates the average hourly cost of a passenger vehicle ($26.68) and for a heavy truck ($31.80)[20]. Using the hourly costs, along with existing traffic data (to establish the percent of passenger vehicles and heavy trucks), the average cost of PM peak hour delay for each alternative can be computed using the following equation:

$$\begin{gathered} Annual\ PM\ Peak\ Hour\ Delay\ Cost = \\ Total\ Peak\ Hour\ Delay\ (hrs) \times Adjusted\ Hourly\ Value\ Based\ on\ Percentages\ of\ Vehicle\ Types\ \times \\ 261\ (Total\ Weekdays\ in\ a\ Year) \end{gathered}$$

These hourly costs can then be converted to an annual cost by multiplying them by the number of weekdays in a year. Using this methodology represents a conservative annual cost, because it excludes any delay that might occur outside of the weekday PM peak hour (i.e. weekends, AM peak hour).

Safety Costs

Annual safety benefits were calculated based on which crashes, over a five year period, could be prevented with the geometric changes of each alternative. The cost of a crash is associated with the level of severity. For the purposes of this evaluation, the following AASHTO[21] established costs for the various severity levels were used:

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[20] The Value of Time-Travel: Estimates of the Hourly Value of Time for Vehicles in Oregon 2011. Oregon Department of Transportation Programs and Economic Analysis Unit. November 2012.

[21] American Association of State Highway and Transportation Officials (AASHTO). Highway Safety Manual. 1st Edition. 2010. Table 7-1.

- Property damage only = $7,400
- Injury crash = $79,000
- Fatal crash = $4,008,900

Five years of crash data was analyzed, so the savings is divided by five to obtain annual crash savings. The general equation used to compute the crash savings for each alternative is displayed below:

$$\begin{aligned}Annual\ Crash\ Savings \\ &= \frac{[\#of\ Fatal\ Crashes\ Reduced\ \times \$4{,}008{,}900]}{5} \\ &+ \frac{[\#of\ Injury\ Crashes\ Reduced\ \times \$79{,}000]}{5} + \frac{[\#\ of\ PDO\ Crashes\ Reduced\ \times \$7{,}400]}{5}\end{aligned}$$

For each alternative, the northbound left turn from Central Point Road to Warner Parrot Road is eliminated, which prevents one injury and two PDO crashes (over five years). For alternatives 1 and 2, these are the only crashes prevented.

Roundabouts typically result in less severe crashes than a typical traffic signal, with studies documenting a 72% to 80% reduction in injury crashes. This present worth analysis applied a conservative estimate, reducing 70% of injury crashes to PDO crashes at the roundabout intersections. For alternative 4, converting 70% of the injury crashes at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to PDO crashes, equated to five crashes. For alternative 5, a 70% reduction in injury crashes was applied to both intersections (after accounting for the crashes prevented by eliminating the northbound left turn movement from Central Point Road to prevent double counting). For the five lane roundabout the 70% reduction equated to eight injury crashes being reduced to PDO crashes.

Construction Costs

A preliminary cost estimate was completed for all alternatives except the No-Build Alternative, with a planning-level approach to costs. The estimates include costs associated with design, construction, permitting, and Right-of-Way acquisition. Each cost estimate is included in the appendix.

Maintenance Costs

Maintenance costs for each alternative were also estimated. For Alternatives 1, 2, and 3, these are from signal maintenance. For Alternatives 4 and 5, costs are associated with landscaping maintenance. Maintenance of pavement or utilities within the intersection was not included, because these would be relatively the same for all alternatives.

Unquantifiable Costs

There are a number of significant costs which are not addressed in the present worth analysis. However difficult to quantify, these costs should be considered when determining the most optimal design solution.

Opportunity

There are significant costs for each project resulting from lost opportunities. Construction of each alternative would require funds. These funds, applied elsewhere, represent opportunities for improvements elsewhere. The greater the cost of the alternative, the larger the loss of opportunity to construct other improvements. For example, the construction of Alternative 5 (the 5-leg roundabout) would require a large amount of funds that could alternatively be used to construct other, perhaps greater-needed improvements.

Construction Delay

The traffic delays associated with construction are difficult to quantify, but represent significant costs to users – and to destination businesses within the project area. The more extensive the scope of work for each alternative, the greater the construction delay impacts - and their associated costs.

Impacts to Private Businesses

The construction impacts to private businesses and roadway users would vary substantially between the various alternatives. The significant reconfiguration of the intersection as required by Alternatives 4 and 5 would necessitate the reconfiguration of private properties within the intersection, such as driveways and roadway frontages. These costs to private property owners are not quantifiable at this level of planning.

Public Right-of-Way

The construction of Alternatives 4 or 5 would require a portion of Right-of-Way at the northwest corner of the intersection. Though this property is owned by the City, its use for a roundabout would have an associated cost to the City due to the inability to use it for another purpose.

COMPARISON SUMMARY

A summary table comparing each of the five alternatives plus the No-Build scenario is displayed in Table 12. The table is color coded, with light green shading indicating a more favorable factor (such as lower cost, or better traffic operations), yellow shading indicating a less favorable factor, and orange indicating the least favorable outcome (such as higher cost, lower safety improvements, etc).

Overall, the roundabout alternatives (alternatives 4 and 5) show the greatest benefit for operations and safety, but also have the largest construction cost, which includes right-of-way acquisition. Alternatives 1 and 2 have a much more modest construction cost, yet the operational benefits and safety benefits are not nearly what can be achieved with the roundabout options. Alternative 3, where both intersections are signalized, does not meet operational standards. Based on future traffic operations and potential savings related to safety, Alternative 5 is recommended as the long-term preferred alternative for these study intersections. If a short-term solution is desired, Alternative 1 or 2 could be implemented at a significantly lower cost.

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Suite 500
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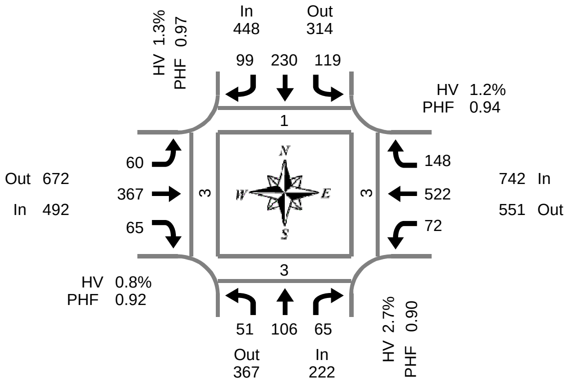
Appendix

Peak Hour Turn Movement Counts

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Leland Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	11	24	12	0	32	51	19	0	12	81	12	0	21	113	38	0	426	2	0	0	0
4:15 PM	9	29	15	0	27	56	19	0	16	85	16	0	18	125	32	0	447	1	0	0	1
4:30 PM	13	24	17	0	27	60	26	0	17	77	18	0	24	131	27	1	461	0	2	0	0
4:45 PM	9	21	20	0	33	52	23	0	13	94	18	0	20	125	34	1	462	0	0	2	1
5:00 PM	12	28	13	0	33	57	26	0	15	81	19	0	17	139	42	1	482	0	0	1	0
5:15 PM	14	28	15	0	27	60	23	0	19	101	13	0	17	119	36	0	472	1	1	0	2
5:30 PM	16	29	17	0	26	61	27	0	13	91	15	0	18	139	36	0	488	0	2	0	0
5:45 PM	13	25	11	0	23	53	22	0	15	87	16	0	20	114	32	0	431	1	1	0	0
Total Survey	97	208	120	0	228	450	185	0	120	697	127	0	155	1,005	277	3	3,669	5	6	3	4

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	222	367	589	0	448	314	762	0	492	672	1,164	0	742	551	1,293	2	1,904	1	3	3	3
%HV	2.7%				1.3%				0.8%				1.2%				1.3%				
PHF	0.90				0.97				0.92				0.94				0.98				

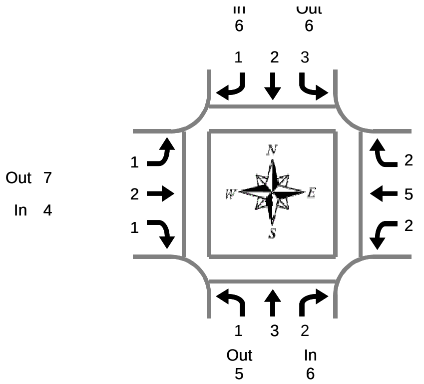
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	51	106	65	222	119	230	99	448	60	367	65	492	72	522	148	742	1,904
%HV	2.0%	2.8%	3.1%	2.7%	2.5%	0.9%	1.0%	1.3%	1.7%	0.5%	1.5%	0.8%	2.8%	1.0%	1.4%	1.2%	1.3%
PHF	0.80	0.91	0.81	0.90	0.90	0.94	0.92	0.97	0.79	0.91	0.86	0.92	0.90	0.94	0.88	0.94	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	42	98	64	0	119	219	87	0	58	337	64	0	83	494	131	2	1,796	3	2	2	2
4:15 PM	43	102	65	0	120	225	94	0	61	337	71	0	79	520	135	3	1,852	1	2	3	2
4:30 PM	48	101	65	0	120	229	98	0	64	353	68	0	78	514	139	3	1,877	1	3	3	3
4:45 PM	51	106	65	0	119	230	99	0	60	367	65	0	72	522	148	2	1,904	1	3	3	3
5:00 PM	55	110	56	0	109	231	98	0	62	360	63	0	72	511	146	1	1,873	2	4	1	2

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Leland Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	0	1	2	2	0	0	2	0	2	0	2	1	2	0	3	9
4:15 PM	0	1	0	1	0	1	1	2	2	1	1	4	0	1	1	2	9
4:30 PM	2	1	0	3	1	0	2	3	1	2	0	3	2	0	0	2	11
4:45 PM	0	0	1	1	2	0	0	2	0	1	1	2	1	3	0	4	9
5:00 PM	0	2	0	2	0	0	1	1	0	0	0	0	0	1	1	2	5
5:15 PM	0	1	0	1	0	1	0	1	1	0	0	1	1	0	1	2	5
5:30 PM	1	0	1	2	1	1	0	2	0	1	0	1	0	1	0	1	6
5:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	2	1	3	4
Total Survey	4	6	3	13	6	3	4	13	4	7	2	13	5	10	4	19	58

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound Warner Parrott Rd			Westbound Warner Parrott Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	5	11	6	6	12	4	7	11	9	7	16	25
PHF	0.25			0.21			0.11			0.28			0.22

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	3	2	6	3	2	1	6	1	2	1	4	2	5	2	9	25
PHF	0.08	0.25	0.50	0.25	0.25	0.25	0.08	0.21	0.08	0.10	0.13	0.11	0.17	0.31	0.25	0.28	0.22

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	3	2	2	7	5	1	3	9	3	6	2	11	4	6	1	11	38
4:15 PM	2	4	1	7	3	1	4	8	3	4	2	9	3	5	2	10	34
4:30 PM	2	4	1	7	3	1	3	7	2	3	1	6	4	4	2	10	30
4:45 PM	1	3	2	6	3	2	1	6	1	2	1	4	2	5	2	9	25
5:00 PM	1	4	1	6	1	2	1	4	1	1	0	2	1	4	3	8	20

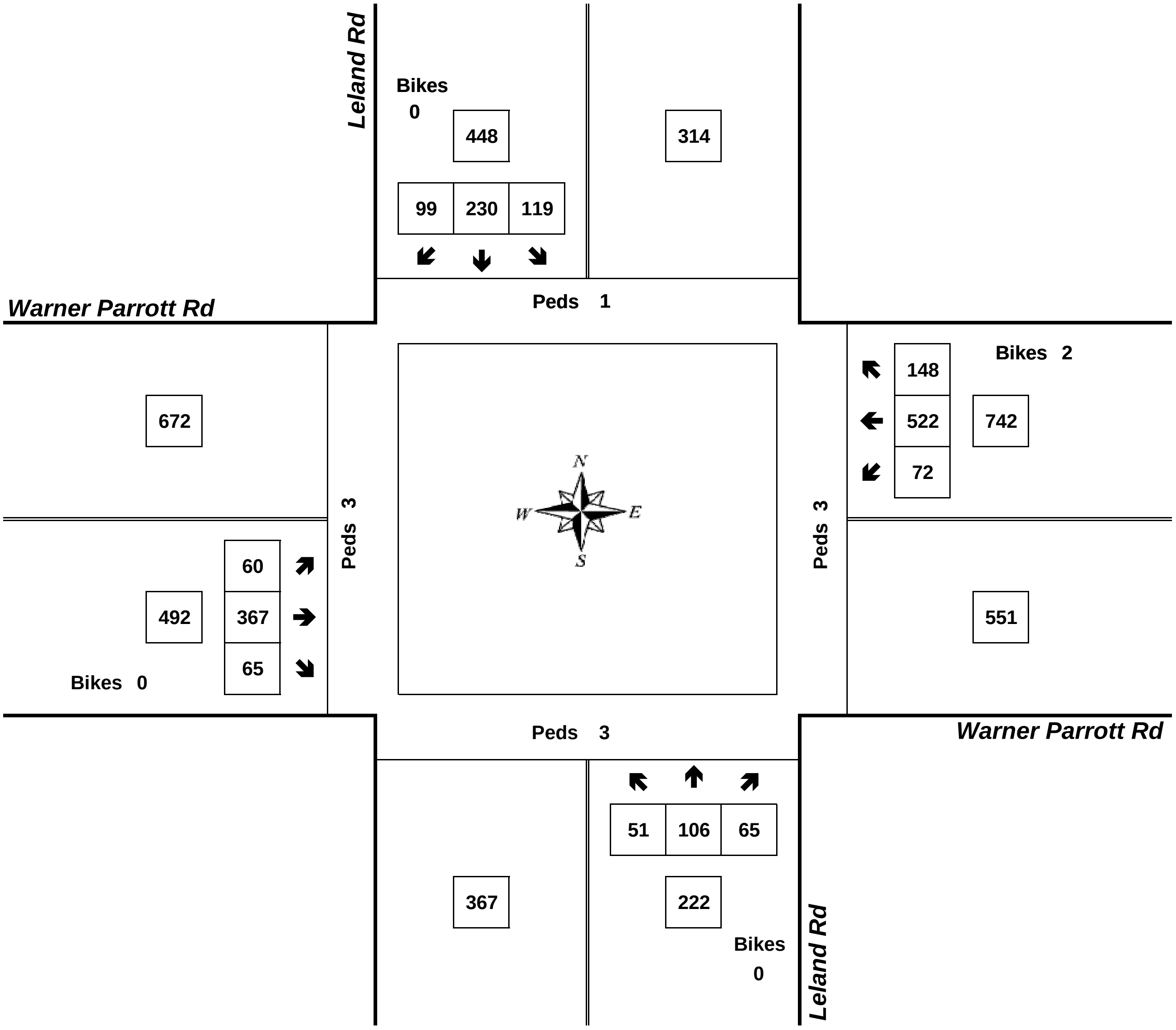
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Leland Rd & Warner Parrott Rd

4:45 PM to 5:45 PM
Tuesday, December 02, 2014



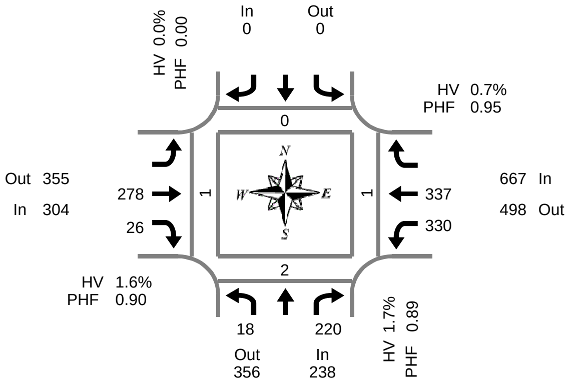
Approach	PHF	HV%	Volume
EB	0.92	0.8%	492
WB	0.94	1.2%	742
NB	0.90	2.7%	222
SB	0.97	1.3%	448
Intersection	0.98	1.3%	1,904

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Central Point Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval	Pedestrians Crosswalk			
Time	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes	Total	North	South	East	West
4:00 PM	5		50	0				0		60	8	0	80	69		0	272	0	2	0	0
4:15 PM	5		55	0				0		62	5	0	68	81		0	276	0	1	0	0
4:30 PM	4		45	0				0		67	7	0	84	82		1	289	0	0	2	0
4:45 PM	2		52	0				0		75	9	0	80	79		0	297	0	0	0	0
5:00 PM	6		56	0				0		61	6	0	75	91		0	295	0	0	0	1
5:15 PM	6		61	0				0		72	7	0	85	82		0	313	0	2	1	0
5:30 PM	4		51	0				0		70	4	1	90	85		2	304	0	0	0	0
5:45 PM	6		42	0				0		71	6	0	74	77		0	276	0	0	0	0
Total Survey	38		412	0				0		538	52	1	636	646		3	2,322	0	5	3	1

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	238	356	594	0	0	0	0	0	304	355	659	1	667	498	1,165	2	1,209	0	2	1	1
%HV	1.7%				0.0%				1.6%				0.7%				1.2%				
PHF	0.89				0.00				0.90				0.95				0.97				

By Movement	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	18		220	238				0		278	26	304	330	337		667	1,209
%HV	11.1%	NA	0.9%	1.7%	NA	NA	NA	0.0%	NA	1.1%	7.7%	1.6%	0.6%	0.9%	NA	0.7%	1.2%
PHF	0.75		0.90	0.89				0.00		0.93	0.72	0.90	0.92	0.93		0.95	0.97

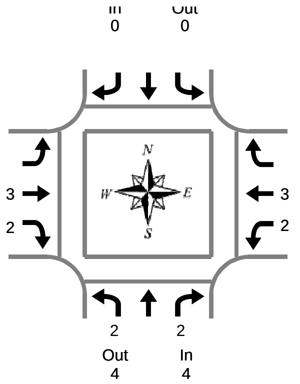
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval	Pedestrians Crosswalk			
Time	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes	Total	North	South	East	West
4:00 PM	16		202	0				0		264	29	0	312	311		1	1,134	0	3	2	0
4:15 PM	17		208	0				0		265	27	0	307	333		1	1,157	0	1	2	1
4:30 PM	18		214	0				0		275	29	0	324	334		1	1,194	0	2	3	1
4:45 PM	18		220	0				0		278	26	1	330	337		2	1,209	0	2	1	1
5:00 PM	22		210	0				0		274	23	1	324	335		2	1,188	0	2	1	1

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Central Point Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				Interval
Time	L		R	Total				Total		T	R	Total	L	T		Total	Total
4:00 PM	1		1	2				0		2	1	3	2	1		3	8
4:15 PM	2		0	2				0		1	0	1	1	2		3	6
4:30 PM	0		2	2				0		1	1	2	3	1		4	8
4:45 PM	0		1	1				0		2	0	2	1	2		3	6
5:00 PM	0		0	0				0		0	1	1	0	1		1	2
5:15 PM	1		1	2				0		0	1	1	1	0		1	4
5:30 PM	1		0	1				0		1	0	1	0	0		0	2
5:45 PM	0		0	0				0		0	0	0	1	1		2	2
Total Survey	5		5	10				0		7	4	11	9	8		17	38

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By	Northbound			Southbound			Eastbound			Westbound			
Approach	Central Point Rd			Central Point Rd			Warner Parrott Rd			Warner Parrott Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	4	8	0	0	0	5	5	10	5	5	10	14
PHF	0.17			0.00			0.21			0.13			0.16

By	Northbound				Southbound				Eastbound				Westbound				
Movement	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	2		2	4				0		3	2	5	2	3		5	14
PHF	0.17		0.17	0.17				0.00		0.19	0.25	0.21	0.08	0.15		0.13	0.16

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				Interval
Time	L		R	Total				Total		T	R	Total	L	T		Total	Total
4:00 PM	3		4	7				0		6	2	8	7	6		13	28
4:15 PM	2		3	5				0		4	2	6	5	6		11	22
4:30 PM	1		4	5				0		3	3	6	5	4		9	20
4:45 PM	2		2	4				0		3	2	5	2	3		5	14
5:00 PM	2		1	3				0		1	2	3	2	2		4	10

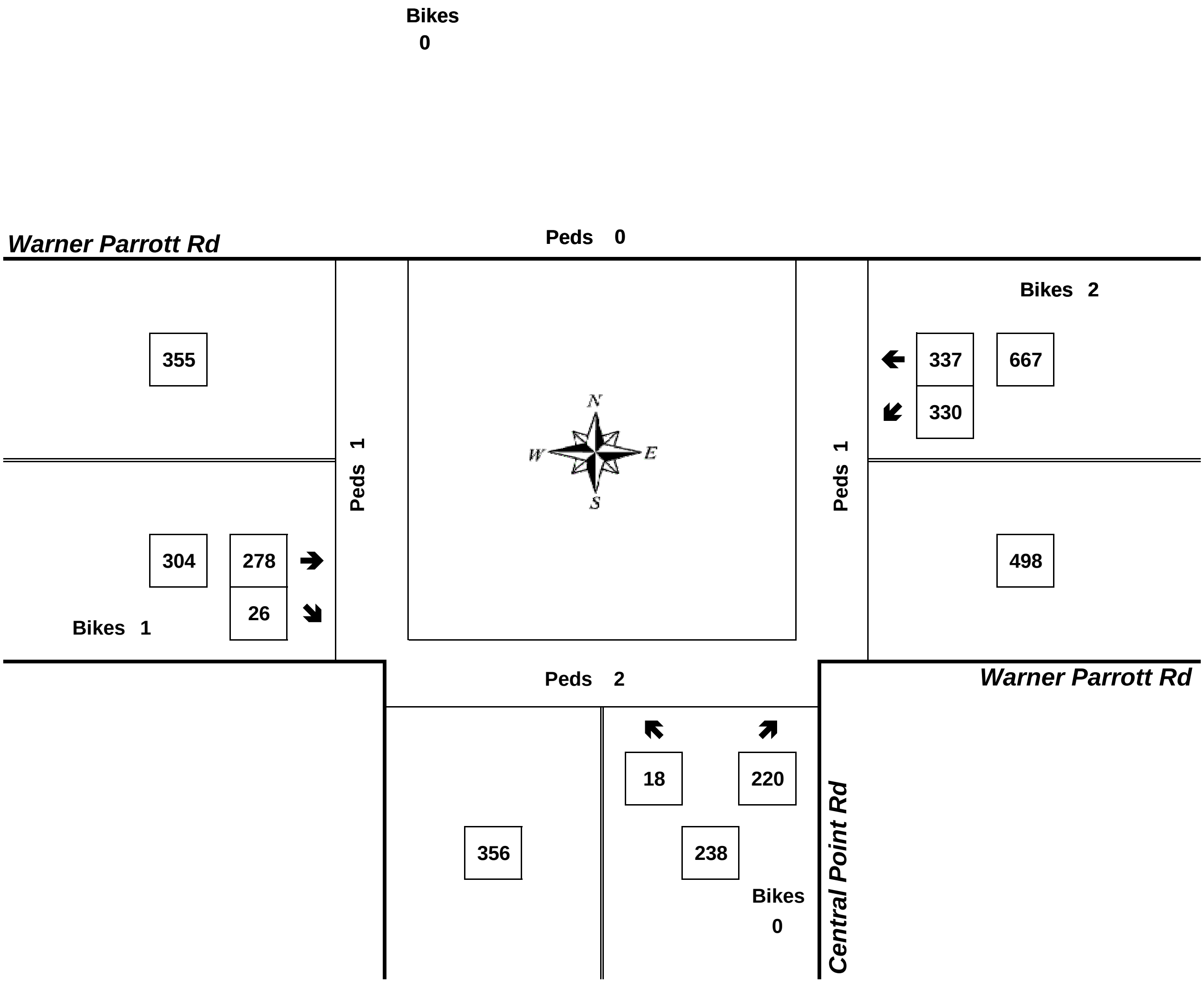
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Central Point Rd & Warner Parrott Rd

4:45 PM to 5:45 PM
Tuesday, December 02, 2014



Approach	PHF	HV%	Volume
EB	0.90	1.6%	304
WB	0.95	0.7%	667
NB	0.89	1.7%	238
SB	0.00	0.0%	0
Intersection	0.97	1.2%	1,209

Count Period: 4:00 PM to 6:00 PM

HCM Intersection Analysis (Synchro)

HCM Signalized Intersection Capacity Analysis
12: Central Point Road & Warner Parrott Road

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations	↰	↱	↰↰↱		↰	↱
Volume (vph)	400	475	340	125	65	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.97		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	0.85
Flt Protected	0.95	1.00	0.96		0.95	1.00
Satd. Flow (prot)	1805	1615	3296		1719	1599
Flt Permitted	0.95	1.00	0.96		0.95	1.00
Satd. Flow (perm)	1805	1615	3296		1719	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	412	490	351	129	67	361
RTOR Reduction (vph)	0	38	32	0	0	61
Lane Group Flow (vph)	412	452	448	0	67	300
Confl. Peds. (#/hr)	5			5		1
Heavy Vehicles (%)	0%	0%	2%	4%	5%	1%
Turn Type	Prot	custom	Prot		Prot	custom
Protected Phases	1 3 4	1 2 3 4	2		5	1 3 4 5
Permitted Phases						
Actuated Green, G (s)	70.4	104.4	29.5		7.0	81.4
Effective Green, g (s)	66.4	100.4	29.5		7.0	73.4
Actuated g/C Ratio	0.55	0.84	0.25		0.06	0.61
Clearance Time (s)			4.5		4.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)	999	1352	810		100	978
v/s Ratio Prot	c0.23	0.28	c0.14		c0.04	0.19
v/s Ratio Perm						
v/c Ratio	0.41	0.33	0.55		0.67	0.31
Uniform Delay, d1	15.5	2.2	39.4		55.3	11.1
Progression Factor	0.25	0.55	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	0.8		16.2	0.2
Delay (s)	3.9	1.3	40.3		71.5	11.3
Level of Service	A	A	D		E	B
Approach Delay (s)	2.5		40.3		20.7	
Approach LOS	A		D		C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	90	485	115	160	615	180	140	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1793		1770	3391		1770	1725		1767	1769	
Flt Permitted	0.95	1.00		0.95	1.00		0.16	1.00		0.25	1.00	
Satd. Flow (perm)	1770	1793		1770	3391		292	1725		464	1769	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	143	184	117	173	276	122
RTOR Reduction (vph)	0	7	0	0	23	0	0	19	0	0	13	0
Lane Group Flow (vph)	92	605	0	163	789	0	143	282	0	173	385	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	2 5	2 5		1	1		3	4		3	4	
Permitted Phases							4			4		
Actuated Green, G (s)	41.0	41.0		28.5	28.5		33.4	25.5		33.4	25.5	
Effective Green, g (s)	41.0	41.0		28.5	28.5		33.4	25.5		33.4	25.5	
Actuated g/C Ratio	0.34	0.34		0.24	0.24		0.28	0.21		0.28	0.21	
Clearance Time (s)				4.5	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	605	613		420	806		178	366		215	376	
v/s Ratio Prot	0.05	c0.34		0.09	c0.23		0.05	0.16		c0.05	c0.22	
v/s Ratio Perm							0.17			0.17		
v/c Ratio	0.15	0.99		0.39	0.98		0.80	0.77		0.80	1.02	
Uniform Delay, d1	27.4	39.2		38.4	45.4		51.8	44.4		48.1	47.2	
Progression Factor	0.70	0.72		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	31.0		0.6	26.3		22.4	9.6		19.2	52.4	
Delay (s)	19.2	59.1		39.0	71.7		74.2	54.1		67.3	99.6	
Level of Service	B	E		D	E		E	D		E	F	
Approach Delay (s)		53.9			66.2			60.6			89.8	
Approach LOS		D			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: Central Point Road & Warner Parrott Road

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations	↰	↱	↰↰↱		↰	↱
Volume (vph)	400	475	340	125	65	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.97		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	0.85
Flt Protected	0.95	1.00	0.96		0.95	1.00
Satd. Flow (prot)	1805	1615	3298		1719	1599
Flt Permitted	0.95	1.00	0.96		0.95	1.00
Satd. Flow (perm)	1805	1615	3298		1719	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	412	490	351	129	67	361
RTOR Reduction (vph)	0	150	32	0	0	165
Lane Group Flow (vph)	412	340	448	0	67	196
Confl. Peds. (#/hr)	5			5		1
Heavy Vehicles (%)	0%	0%	2%	4%	5%	1%
Turn Type	Prot	custom	Prot		Prot	custom
Protected Phases	1 3 4	1 2 3 4	2		5	1 3 4 5
Permitted Phases						
Actuated Green, G (s)	51.5	78.5	22.5		11.0	62.5
Effective Green, g (s)	47.5	74.5	22.5		11.0	58.5
Actuated g/C Ratio	0.44	0.69	0.21		0.10	0.54
Clearance Time (s)			4.5		4.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)	797	1119	690		175	870
v/s Ratio Prot	c0.23	0.21	c0.14		c0.04	0.12
v/s Ratio Perm						
v/c Ratio	0.52	0.30	0.65		0.38	0.23
Uniform Delay, d1	21.7	6.4	38.9		45.1	12.7
Progression Factor	0.31	2.04	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	2.1		1.4	0.1
Delay (s)	6.7	13.1	41.0		46.5	12.9
Level of Service	A	B	D		D	B
Approach Delay (s)	10.2		41.0		18.1	
Approach LOS	B		D		B	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	25.5
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	90	485	115	160	615	180	140	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1794		1770	3393		1770	1723		1766	1768	
Flt Permitted	0.95	1.00		0.95	1.00		0.32	1.00		0.32	1.00	
Satd. Flow (perm)	1770	1794		1770	3393		596	1723		595	1768	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	143	184	117	173	276	122
RTOR Reduction (vph)	0	6	0	0	22	0	0	19	0	0	13	0
Lane Group Flow (vph)	92	606	0	163	790	0	143	282	0	173	385	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	2 5	2 5		1	1		3	4		3	4	
Permitted Phases							4			4		
Actuated Green, G (s)	38.0	38.0		22.5	22.5		20.5	12.5		20.5	12.5	
Effective Green, g (s)	38.0	38.0		22.5	22.5		20.5	12.5		20.5	12.5	
Actuated g/C Ratio	0.35	0.35		0.21	0.21		0.19	0.12		0.19	0.12	
Clearance Time (s)				4.5	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	625	634		370	710		201	200		200	205	
v/s Ratio Prot	0.05	c0.34		0.09	c0.23		0.05	0.16		c0.06	c0.22	
v/s Ratio Perm							0.08			0.10		
v/c Ratio	0.15	0.96		0.44	1.11		0.71	1.41		0.86	1.88	
Uniform Delay, d1	23.7	33.9		37.0	42.5		45.1	47.5		45.8	47.5	
Progression Factor	0.53	0.61		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	22.9		0.8	69.0		11.3	212.4		30.0	412.5	
Delay (s)	12.6	43.7		37.9	111.5		56.4	259.9		75.8	460.0	
Level of Service	B	D		D	F		E	F		E	F	
Approach Delay (s)		39.6			99.2			194.4			343.6	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	151.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	25.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NEL	NER
Vol, veh/h	340	125	475	460	0	390
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	474	0	402

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1870	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1454	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	69	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	209	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	38	754
Mov Cap-2 Maneuver	-	-	-	-	38	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	114	-

Approach	EB	WB	NE
HCM Control Delay, s	0	5.6	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	754	-	-	1088	-
HCM Lane V/C Ratio	0.533	-	-	0.45	-
HCM Control Delay (s)	15.1	-	-	11	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	3.2	-	-	2.4	-

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	130	485	115	160	615	180	160	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	3395		1770	1729		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	3395		1770	1729		1770	1770	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	133	495	117	163	628	184	163	184	117	173	276	122
RTOR Reduction (vph)	0	10	0	0	30	0	0	26	0	0	18	0
Lane Group Flow (vph)	133	602	0	163	782	0	163	275	0	173	380	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	8.8	30.9		9.0	31.1		9.0	21.4		9.0	21.4	
Effective Green, g (s)	8.8	30.9		9.0	31.1		9.0	21.4		9.0	21.4	
Actuated g/C Ratio	0.10	0.35		0.10	0.36		0.10	0.25		0.10	0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	178	635		182	1209		182	423		182	433	
v/s Ratio Prot	0.08	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21	
v/s Ratio Perm												
v/c Ratio	0.75	0.95		0.90	0.65		0.90	0.65		0.95	0.88	
Uniform Delay, d1	38.2	27.4		38.7	23.5		38.7	29.6		38.9	31.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	23.5		38.4	1.2		38.4	3.6		52.2	17.8	
Delay (s)	53.8	50.9		77.1	24.7		77.1	33.2		91.2	49.5	
Level of Service	D	D		E	C		E	C		F	D	
Approach Delay (s)		51.4			33.5			48.6			62.1	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 TWSC
12: Central Point Road & Warner Parrott Road

Intersection	
Int Delay, s/veh	6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	340	125	475	460	0	395
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	474	0	407

Major/Minor	Major1			Major2	Minor1	
Conflicting Flow All	0	0	480	0	1870	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1454	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	69	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	209	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	38	754
Mov Cap-2 Maneuver	-	-	-	-	38	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	114	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	754	-	-	1088	-
HCM Lane V/C Ratio	0.54	-	-	0.45	-
HCM Control Delay (s)	15.2	-	-	11	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	3.3	-	-	2.4	-

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↶	↱		↰	↑↱		↰	↱		↰	↱
Volume (vph)	45	90	485	115	160	615	180	155	180	115	170	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5
Lane Util. Factor		1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1566	1796		1770	3395		1770	1729		1770	1770
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1566	1796		1770	3395		1770	1729		1770	1770
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	49	92	495	117	163	628	184	158	184	117	173	276
RTOR Reduction (vph)	0	0	9	0	0	27	0	0	26	0	0	18
Lane Group Flow (vph)	0	141	603	0	163	785	0	158	275	0	173	380
Confl. Peds. (#/hr)		5		8	8		5			6	6	
Confl. Bikes (#/hr)				1						4		
Turn Type	Prot	Prot	NA		Prot	NA		Prot	NA		Prot	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases												
Actuated Green, G (s)		13.1	31.5		9.1	27.5		7.1	21.2		7.1	21.2
Effective Green, g (s)		13.1	31.5		9.1	27.5		7.1	21.2		7.1	21.2
Actuated g/C Ratio		0.15	0.37		0.11	0.32		0.08	0.25		0.08	0.25
Clearance Time (s)		4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		238	658		187	1086		146	426		146	436
v/s Ratio Prot		0.09	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21
v/s Ratio Perm												
v/c Ratio		0.59	0.92		0.87	0.72		1.08	0.65		1.18	0.87
Uniform Delay, d1		33.9	25.9		37.8	25.8		39.4	29.0		39.4	31.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.9	17.4		33.0	2.4		98.2	3.4		132.7	17.1
Delay (s)		37.8	43.4		70.8	28.2		137.6	32.4		172.1	48.1
Level of Service		D	D		E	C		F	C		F	D
Approach Delay (s)			42.3			35.4			68.6			85.7
Approach LOS			D			D			E			F

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.9	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	120
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	122
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	2
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 2010 TWSC
1: Central Point Road & Warner Parrott Road

Intersection	
Int Delay, s/veh	19.2

Movement	EBT	EBR	WBL	WBT	NEL	NER
Vol, veh/h	340	125	475	410	55	350
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	423	57	361

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1818	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1402	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	75	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	222	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	~ 41	754
Mov Cap-2 Maneuver	-	-	-	-	~ 41	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	122	-

Approach	EB	WB	NE
HCM Control Delay, s	0	5.9	70.3
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	41	754	-	-	1088	-
HCM Lane V/C Ratio	1.383	0.479	-	-	0.45	-
HCM Control Delay (s)	$ 428.1	14.1	-	-	11	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	5.7	2.6	-	-	2.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
2: Leland Rd/Linn Ave & Warner Milne Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	90	485	115	160	615	180	150	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	3395		1770	1729		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	3395		1770	1729		1770	1770	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	153	184	117	173	276	122
RTOR Reduction (vph)	0	10	0	0	29	0	0	26	0	0	18	0
Lane Group Flow (vph)	92	602	0	163	783	0	153	275	0	173	380	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	6.8	31.7		9.0	33.9		8.0	20.6		9.0	21.6	
Effective Green, g (s)	6.8	31.7		9.0	33.9		8.0	20.6		9.0	21.6	
Actuated g/C Ratio	0.08	0.36		0.10	0.39		0.09	0.24		0.10	0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	652		182	1318		162	407		182	437	
v/s Ratio Prot	0.05	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21	
v/s Ratio Perm												
v/c Ratio	0.67	0.92		0.90	0.59		0.94	0.68		0.95	0.87	
Uniform Delay, d1	39.2	26.6		38.7	21.2		39.4	30.3		38.9	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	18.9		38.4	0.7		54.0	4.4		52.2	16.6	
Delay (s)	51.4	45.5		77.1	22.0		93.5	34.7		91.2	48.1	
Level of Service	D	D		E	C		F	C		F	D	
Approach Delay (s)		46.3			31.2			54.5			61.1	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	45.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Documentation: Effects of Increased U-Turns at Intersections of Divided Facilities and Median Divided Versus Five Lane Undivided Benefits. North Carolina State University. August 2004. Research conducted for the North Carolina Department of Transporation.

1.8% sat flow rate loss in the left turn lane for every 10% incrase in the U-Turn percentage
And an additional 1.5% loss for every 10% U-turns if the U-turning movement is opposed by protected right turn overlap from the cross street.

Warner Parrott

EBT	EBLT	EB U-turn
485	90	45

Sat flow adjustment

loss per 10% U-turns	BASE left turn sat flow
3.3%	1770

Use left turn saturation flow rate of
1566

Percent of u-turners		multiplier	% loss of sat flow	sat flow loss	final sat flow
33%		3	9.90%	175.23	1595
		4	13.20%	233.64	1536

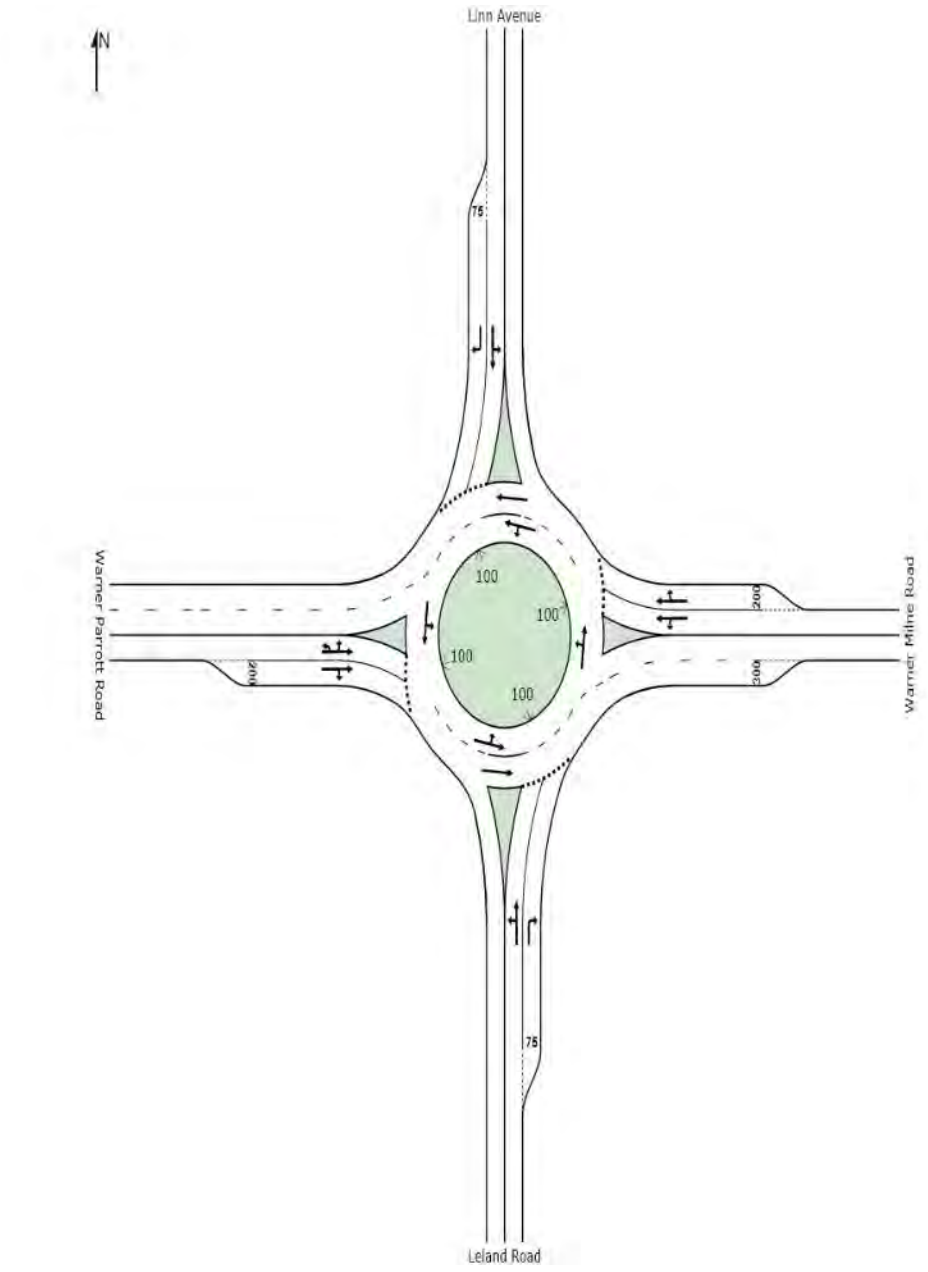
Average
1566

HCM Intersection Analysis (SIDRA)

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
2035 Planned System - PM Peak



MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3	L2	158	2.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
8	T1	189	1.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
18	R2	121	0.0	0.281	13.0	LOS B	1.3	32.5	0.73	1.46	25.5
Approach		468	1.1	0.537	14.1	LOS B	3.7	93.7	0.80	0.85	24.6
East: Warner Milne Road											
1	L2	168	0.0	0.582	13.3	LOS B	5.4	136.4	0.84	1.66	25.1
6	T1	647	2.0	0.582	12.7	LOS B	5.5	139.9	0.84	1.63	25.7
16	R2	189	0.0	0.582	12.2	LOS B	5.5	139.9	0.84	1.60	26.3
Approach		1005	1.3	0.582	12.7	LOS B	5.5	139.9	0.84	0.81	25.7
North: Linn Avenue											
7	L2	179	0.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
4	T1	284	1.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
14	R2	126	2.0	0.388	19.9	LOS B	1.8	45.2	0.77	1.62	22.6
Approach		589	0.9	0.766	25.2	LOS C	6.7	168.2	0.89	1.03	20.7
West: Warner Parrott Road											
5u	U	58	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
5	L2	95	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
2	T1	511	2.0	0.672	15.7	LOS B	7.7	195.1	0.93	1.96	24.2
12	R2	120	2.0	0.433	12.7	LOS B	3.1	78.2	0.83	1.67	26.0
Approach		783	2.0	0.672	15.5	LOS B	7.7	195.1	0.92	0.97	24.4
All Vehicles		2846	1.4	0.766	16.3	LOS B	7.7	195.1	0.86	0.91	23.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

INTERSECTION SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	29.4 mph	29.4 mph
Travel Distance (Total)	1805.7 veh-mi/h	2166.9 pers-mi/h
Travel Time (Total)	61.5 veh-h/h	73.8 pers-h/h
Demand Flows (Total)	2846 veh/h	3416 pers/h
Percent Heavy Vehicles (Demand)	1.4 %	
Degree of Saturation	0.766	
Practical Spare Capacity	10.9 %	
Effective Intersection Capacity	3714 veh/h	
Control Delay (Total)	12.89 veh-h/h	15.47 pers-h/h
Control Delay (Average)	16.3 sec	16.3 sec
Control Delay (Worst Lane)	26.6 sec	
Control Delay (Worst Movement)	26.6 sec	26.6 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	16.3 sec	
Idling Time (Average)	10.3 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	7.7 veh	
95% Back of Queue - Distance (Worst Lane)	195.1 ft	
Queue Storage Ratio (Worst Lane)	0.16	
Total Effective Stops	2581 veh/h	3097 pers/h
Effective Stop Rate	0.91 per veh	0.91 per pers
Proportion Queued	0.86	0.86
Performance Index	117.2	117.2
Cost (Total)	740.52 $/h	740.52 $/h
Fuel Consumption (Total)	75.2 gal/h	
Carbon Dioxide (Total)	671.0 kg/h	
Hydrocarbons (Total)	0.251 kg/h	
Carbon Monoxide (Total)	3.322 kg/h	
NOx (Total)	0.952 kg/h	

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

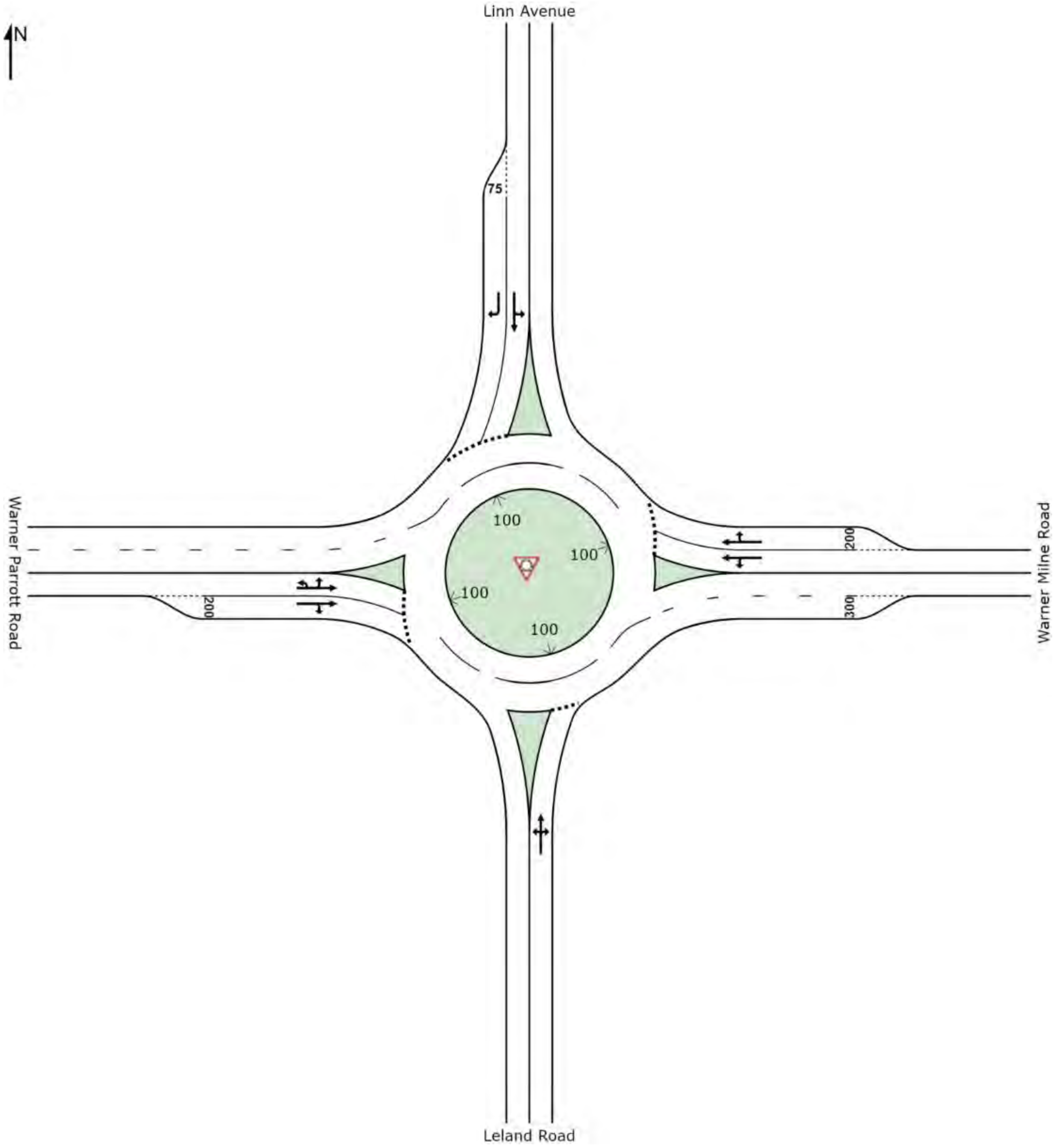
Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,366,231 veh/y	1,639,478 pers/y
Delay	6,187 veh-h/y	7,424 pers-h/y
Effective Stops	1,238,765 veh/y	1,486,518 pers/y
Travel Distance	866,744 veh-mi/y	1,040,093 pers-mi/y
Travel Time	29,512 veh-h/y	35,415 pers-h/y
Cost	355,449 $/y	355,449 $/y
Fuel Consumption	36,083 gal/y	
Carbon Dioxide	322,101 kg/y	
Hydrocarbons	121 kg/y	
Carbon Monoxide	1,594 kg/y	
NOx	457 kg/y	

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout



MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

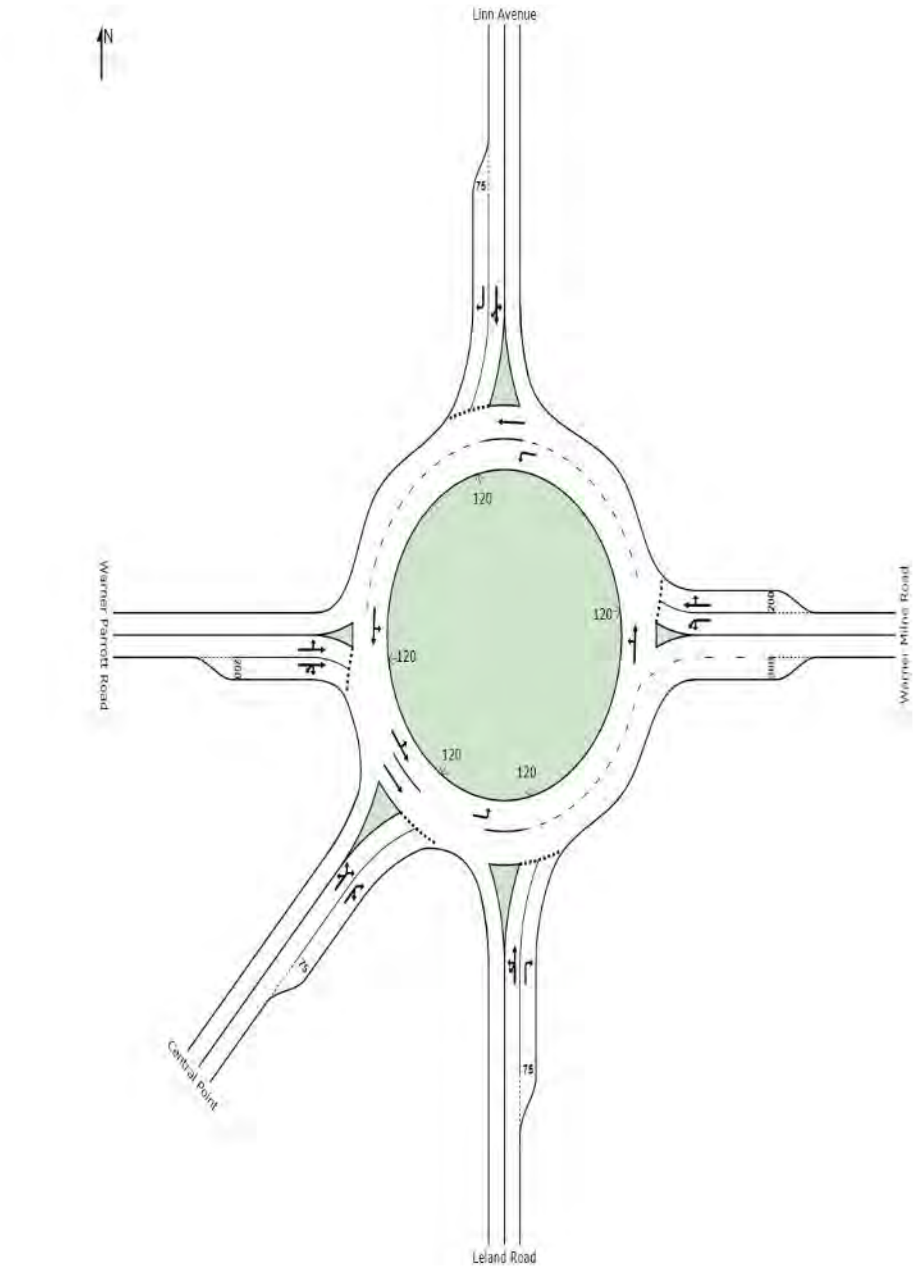
Mov	OD	Demand Flows		Deg.	Average	Level of	95% Back of Queue		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	ft		per veh	mph
South: Leland Road											
3	L2	158	2.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.6
8	T1	189	1.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.6
18	R2	121	0.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.3
Approach		468	1.1	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.5
East: Warner Milne Road											
1	L2	168	0.0	0.593	13.8	LOS B	5.7	143.2	0.86	0.86	30.4
6	T1	647	2.0	0.593	13.2	LOS B	5.8	147.3	0.86	0.84	30.9
16	R2	189	0.0	0.593	12.7	LOS B	5.8	147.3	0.86	0.82	30.5
Approach		1005	1.3	0.593	13.2	LOS B	5.8	147.3	0.86	0.84	30.7
North: Linn Avenue											
7	L2	179	0.0	0.771	27.2	LOS C	6.8	170.7	0.92	1.09	25.8
4	T1	284	1.0	0.771	27.2	LOS C	6.8	170.7	0.92	1.09	25.7
14	R2	126	2.0	0.391	20.1	LOS C	1.8	45.7	0.78	0.81	27.7
Approach		589	0.9	0.771	25.6	LOS C	6.8	170.7	0.89	1.03	26.1
West: Warner Parrott Road											
5u	U	58	2.0	0.672	16.9	LOS B	7.7	195.4	0.96	1.04	29.8
5	L2	95	2.0	0.672	16.9	LOS B	7.7	195.4	0.96	1.04	29.2
2	T1	511	2.0	0.672	15.8	LOS B	7.7	195.4	0.93	0.98	29.7
12	R2	120	2.0	0.433	12.7	LOS B	3.1	78.3	0.84	0.83	30.5
Approach		783	2.0	0.672	15.5	LOS B	7.7	195.4	0.92	0.97	29.8
All Vehicles		2846	1.4	0.914	22.4	LOS C	12.0	301.5	0.91	1.00	27.3

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
2035 Planned System - PM Peak



MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3b	L3	88	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
3	L2	75	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
8	T1	196	1.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
18	R2	125	0.0	0.258	11.3	LOS B	1.2	29.4	0.70	1.40	26.6
Approach		484	1.1	0.499	12.1	LOS B	3.4	84.8	0.76	0.81	25.7
East: Warner Milne Road											
1	L2	174	0.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
1a	L1	359	2.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
6	T1	300	2.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
16	R2	189	0.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
Approach		1022	1.3	0.587	12.2	LOS B	5.5	139.7	0.84	0.80	25.3
North: Linn Avenue											
7	L2	179	0.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
4	T1	293	1.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14a	R1	70	2.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14	R2	59	2.0	0.176	13.9	LOS B	0.7	17.0	0.71	1.43	25.3
Approach		601	0.9	0.833	29.5	LOS C	7.8	195.6	0.90	1.09	19.7
West: Warner Parrott Road											
5	L2	46	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
2	T1	251	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
12	R2	63	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
12b	R3	136	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
Approach		496	2.0	0.634	23.9	LOS C	7.3	185.6	1.00	1.20	21.4
SouthWest: Central Point											
5bx	L3	60	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
5ax	L1	50	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
12ax	R1	266	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	1.59	25.8
12bx	R3	64	2.0	0.290	12.0	LOS B	1.3	33.0	0.72	1.44	26.4
Approach		440	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	0.79	25.8
All Vehicles		3043	1.4	0.833	17.6	LOS B	7.8	195.6	0.85	0.92	23.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	23.4 mph	23.4 mph
Travel Distance (Total)	1191.1 veh-mi/h	1429.3 pers-mi/h
Travel Time (Total)	50.9 veh-h/h	61.0 pers-h/h
Demand Flows (Total)	3043 veh/h	3651 pers/h
Percent Heavy Vehicles (Demand)	1.4 %	
Degree of Saturation	0.833	
Practical Spare Capacity	2.1 %	
Effective Intersection Capacity	3653 veh/h	
Control Delay (Total)	14.83 veh-h/h	17.80 pers-h/h
Control Delay (Average)	17.6 sec	17.6 sec
Control Delay (Worst Lane)	31.1 sec	
Control Delay (Worst Movement)	31.1 sec	31.1 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	17.6 sec	
Idling Time (Average)	10.9 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	7.8 veh	
95% Back of Queue - Distance (Worst Lane)	195.6 ft	
Queue Storage Ratio (Worst Lane)	0.16	
Total Effective Stops	2809 veh/h	3370 pers/h
Effective Stop Rate	0.92 per veh	0.92 per pers
Proportion Queued	0.85	0.85
Performance Index	125.0	125.0
Cost (Total)	601.30 $/h	601.30 $/h
Fuel Consumption (Total)	26.5 gal/h	
Carbon Dioxide (Total)	236.3 kg/h	
Hydrocarbons (Total)	0.124 kg/h	
Carbon Monoxide (Total)	0.872 kg/h	
NOx (Total)	0.169 kg/h	

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

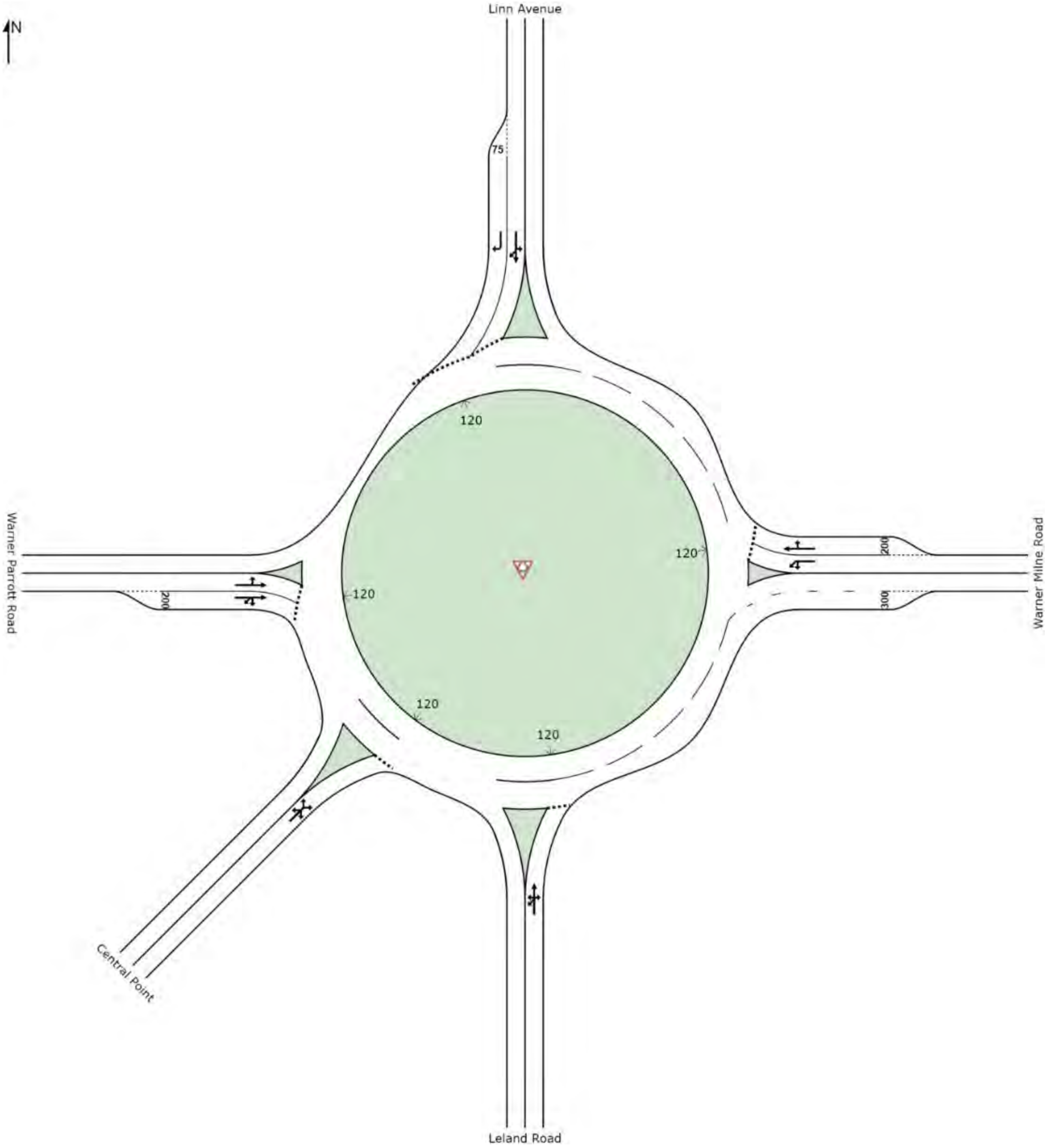
Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,460,491 veh/y	1,752,589 pers/y
Delay	7,121 veh-h/y	8,545 pers-h/y
Effective Stops	1,348,088 veh/y	1,617,706 pers/y
Travel Distance	571,736 veh-mi/y	686,083 pers-mi/y
Travel Time	24,413 veh-h/y	29,295 pers-h/y
Cost	288,624 $/y	288,624 $/y
Fuel Consumption	12,727 gal/y	
Carbon Dioxide	113,404 kg/y	
Hydrocarbons	59 kg/y	
Carbon Monoxide	419 kg/y	
NOx	81 kg/y	

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout



Created: Friday, December 19, 2014 11:49:00 AM

MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

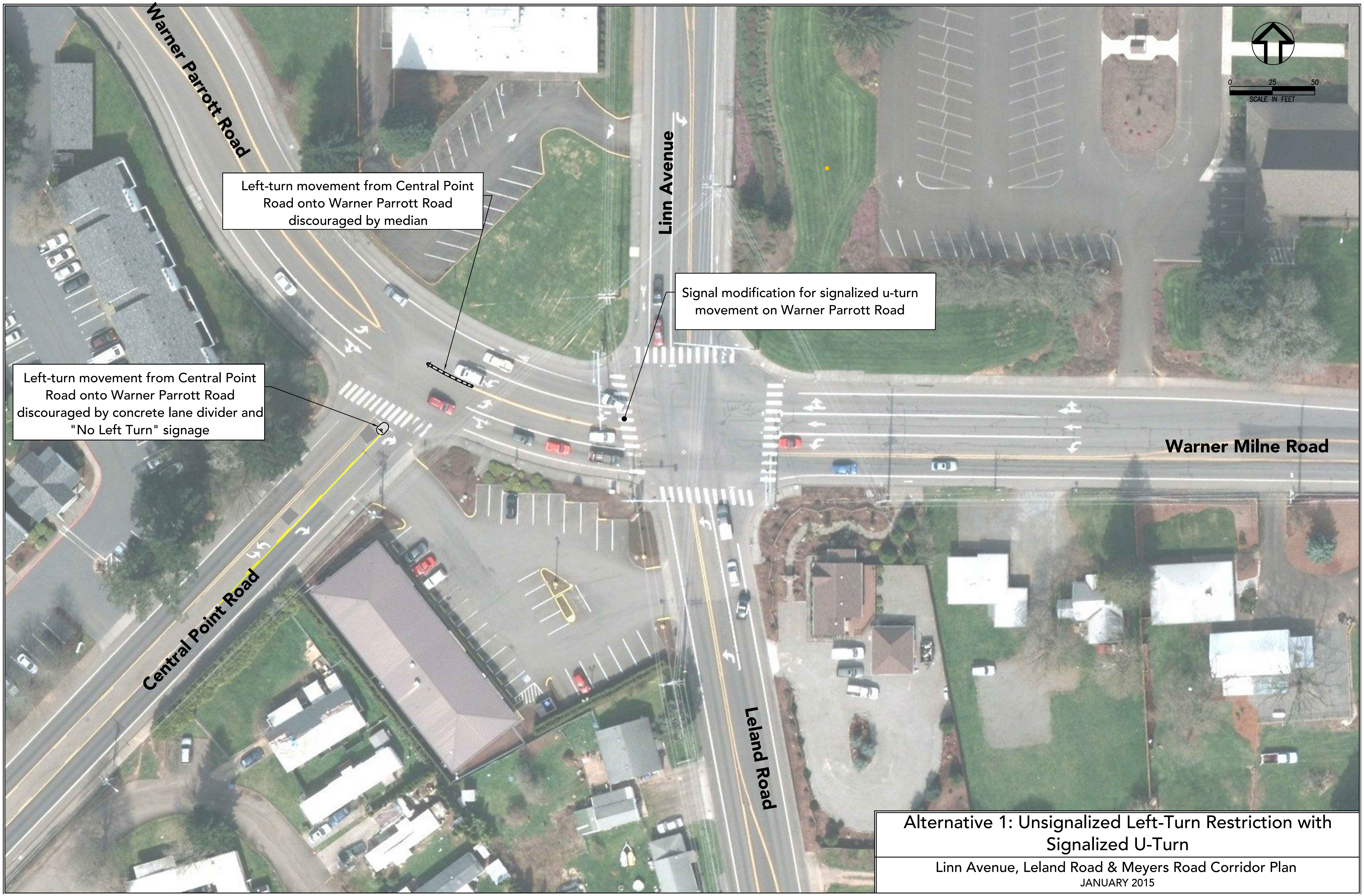
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3b	L3	88	2.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
3	L2	75	2.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
8	T1	196	1.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
18	R2	125	0.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
Approach		484	1.1	0.973	62.5	LOS E	19.3	487.4	1.00	1.66	13.4
East: Warner Milne Road											
1	L2	174	0.0	0.575	11.9	LOS B	5.5	140.1	0.85	1.61	24.5
1a	L1	359	2.0	0.575	11.9	LOS B	5.5	140.1	0.85	1.61	24.5
6	T1	300	2.0	0.602	13.9	LOS B	5.9	148.6	0.87	1.74	25.7
16	R2	189	0.0	0.602	13.9	LOS B	5.9	148.6	0.87	1.74	25.7
Approach		1022	1.3	0.602	12.8	LOS B	5.9	148.6	0.86	0.84	25.1
North: Linn Avenue											
7	L2	179	0.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
4	T1	293	1.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
14a	R1	70	2.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
14	R2	59	2.0	0.177	14.0	LOS B	0.7	17.2	0.72	1.43	25.3
Approach		601	0.9	0.840	30.4	LOS C	8.0	200.4	0.91	1.10	19.4
West: Warner Parrott Road											
5	L2	46	2.0	0.636	23.4	LOS C	7.3	186.2	1.00	2.45	21.8
2	T1	251	2.0	0.636	23.4	LOS C	7.3	186.2	1.00	2.45	21.8
12	R2	63	2.0	0.558	24.9	LOS C	5.0	126.8	1.00	2.31	20.8
12b	R3	136	2.0	0.558	24.9	LOS C	5.0	126.8	1.00	2.31	20.8
Approach		496	2.0	0.636	24.0	LOS C	7.3	186.2	1.00	1.20	21.4
SouthWest: Central Point											
5bx	L3	60	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
5ax	L1	50	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
12ax	R1	266	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
12bx	R3	64	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
Approach		440	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	1.28	16.1
All Vehicles		3043	1.4	0.973	30.7	LOS C	19.3	487.4	0.93	1.14	19.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ODOT Collision Data

Crash ID	Serial #	Crash Date	Hour	1st Street	2nd Street	Dist.	Dir.	Lat	Long	Road Character	Crash Type	Col. Type	Veh Count	Veh Occu	Tot Per	Crash Sev	Weather	Road Surface	Light	Vehicle Movement	From - To	Vehicle Action	Vehicle Moveme	From - To	Vehicle Action
1323506	1439	4/16/2009	16	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	TURN-R	SW to SE	GO A/STOP	STRGHT	NW to SE	NONE
1356752	198	1/19/2010	6	LELAND RD	WARNER-MILNE RD	0	CN	45.336417	-122.604946	INTER	S-1STOP	REAR	2	8	8	INJ C	CLEAR	DRY	DARK-NO ST LIGHTS	STRGHT	W to E	NONE	STOP	W to E	STOPPED
1359936	639	2/23/2010	11	LINN AVE	WARNER-PARROTT RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	3	3	INJ C	RAIN	WET	DAYLIGHT	STRGHT	N to S	NONE	STRGHT	E to W	NONE
1356414	83	1/9/2010	18	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	O-1TURN	TURN	2	3	3	INJ C	CLEAR	DRY	DARK-NO ST LIGHTS	STRGHT	NW to SE	NONE	TURN-L	SE to SW	NONE
1368969	1214	4/12/2010	9	CENTRAL POINT RD	WARNER-MILNE RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	TURN-L	SW to NW	GO A/STOP	STRGHT	NW to SE	NONE
1376031	2537	7/21/2010	15	LINN AVE	WARNER-MILNE RD	20	N	45.336480	-122.604947	STRGHT	S-1STOP	REAR	2	2	2	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	N to S	NONE	STOP	N to S	STOPPED
1387492	3511	9/28/2010	13	LELAND RD	WARNER-MILNE RD	1000	SE	45.333720	-122.604165	STRGHT	S-1TURN	TURN	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	U-TURN	NW to NW	ENT OFFRD
1375822	2437	7/14/2010	14	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	TURN-L	SW to NW	GO A/STOP
1399462	4763	12/13/2010	7	WARNER-PARROTT RD	CENTRAL POINT RD	218	NW	45.336911	-122.606136	CURVE	FIX OBJ	FIX	1	1	1	PDO	RAIN	WET	DAYLIGHT	STRGHT	SE to NW	NONE			
1409679	711	2/27/2011	12	LINN AVE	WARNER-MILNE RD	0	E	45.336411	-122.604946	INTER	S-1STOP	SS-O	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	E to W	AVOIDING	STOP	E to W	STOPPED
1439776	3858	10/14/2011	11	LINN AVE	WARNER-MILNE RD	0	CN	45.336417	-122.604939	INTER	O-1TURN	TURN	2	2	2	INJ C	CLOUDY	DRY	DAYLIGHT	STRGHT	E to W	NONE	TURN-L	W to N	NONE
1445677	4694	12/5/2011	7	LINN AVE	WARNER-MILNE RD	0	N	45.336417	-122.604939	INTER	ANGL-STP	TURN	2	2	2	PDO	FOG	ICE	DAWN	TURN-R	E to N	NONE	STOP	N to S	STOPPED
1469715	1720	5/10/2012	7	LELAND RD	WARNER-MILNE RD	137	S	45.336043	-122.604867	STRGHT	S-1STOP	REAR	2	3	3	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1471585	1973	5/30/2012	15	LINN AVE	WARNER-MILNE RD	95	N	45.336686	-122.604952	STRGHT	S-1STOP	REAR	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	N to S	NONE	STOP	N to S	STOPPED
1480291	2866	8/4/2012	12	LINN AVE	WARNER-MILNE RD	100	N	45.336686	-122.604952	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1486129	3422	9/14/2012	11	WARNER-MILNE RD	LELAND RD	100	E	45.336420	-122.604545	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	W to E	NONE	STOP	W to E	STOPPED
1488339	3639	10/1/2012	15	CENTRAL POINT RD	WARNER-PARROTT RD	0	SW	45.336497	-122.605533	INTER	BIKE	TURN	1	1	2	INJ B	CLEAR	DRY	DAYLIGHT	TURN-L	SE to SW	NONE	STRGHT	SW to NE	NONE
1490401	3835	10/15/2012	17	LELAND RD	WARNER-MILNE RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	4	4	INJ C	RAIN	WET	DUSK	STRGHT	E to W	NONE	STRGHT	S to N	NONE
1499513	4405	11/17/2012	20	LELAND RD	WARNER-PARROTT RD	31	S	45.336226	-122.604923	STRGHT	FIX OBJ	FIX	1	1	1	INJ B	RAIN	WET	DARK-NO ST LIGHTS	STRGHT	N to S	NONE	PRKD-P	NE to SW	PAR PARK
1499760	4652	12/1/2012	13	WARNER-PARROTT RD	CENTRAL POINT RD	473	NW	45.337400	-122.606825	CURVE	FIX OBJ	FIX	1	1	1	INJ C	CLOUDY	DRY	DAYLIGHT	STRGHT	W to E	NONE			
1506878	720	3/2/2013	20	LELAND RD	WARNER-PARROTT RD	0	SW	45.336417	-122.604946	INTER	PED	PED	1	1	2	INJ B	RAIN	WET	DUSK	TURN-R	W to S	NONE	STOP	SE to NW	STOPPED
1512521	1308	4/17/2013	14	WARNER-PARROTT RD	CENTRAL POINT RD	100	E	45.337289	-122.622501	STRGHT	S-1STOP	SS-O	4	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	W to E	AVOIDING	STOP	W to E	STOPPED
1519476	2048	6/5/2013	15	WARNER-PARROTT RD	CENTRAL POINT RD	500	NW	45.337401	-122.606909	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	STOP	NW to SE	STOPPED
1519762	2086	6/12/2013	7	LELAND RD	WARNER-MILNE RD	0	S	45.336417	-122.604946	INTER	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1533493	3616	9/25/2013	16	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336540	-122.605573	INTER	ANGL-OTH	TURN	2	2	2	PDO	CLOUDY	DRY	DAYLIGHT	TURN-L	SW to NW	GO A/STOP	STRGHT	NW to SE	NONE
1537350	4120	10/26/2013	17	LELAND RD	WARNER-PARROTT RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	5	5	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STRGHT	E to W	NONE
1544482	4879	12/17/2013	4	WARNER-PARROTT RD	CENTRAL POINT RD	96	NW	45.336680	-122.605795	STRGHT	FIX OBJ	FIX	1	2	2	PDO	CLOUDY	WET	DARK-ST LIGHTS	STRGHT	SE to NW	NONE	STOP	W to E	STOPPED

Alternative Conceptual Drawings



Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by median

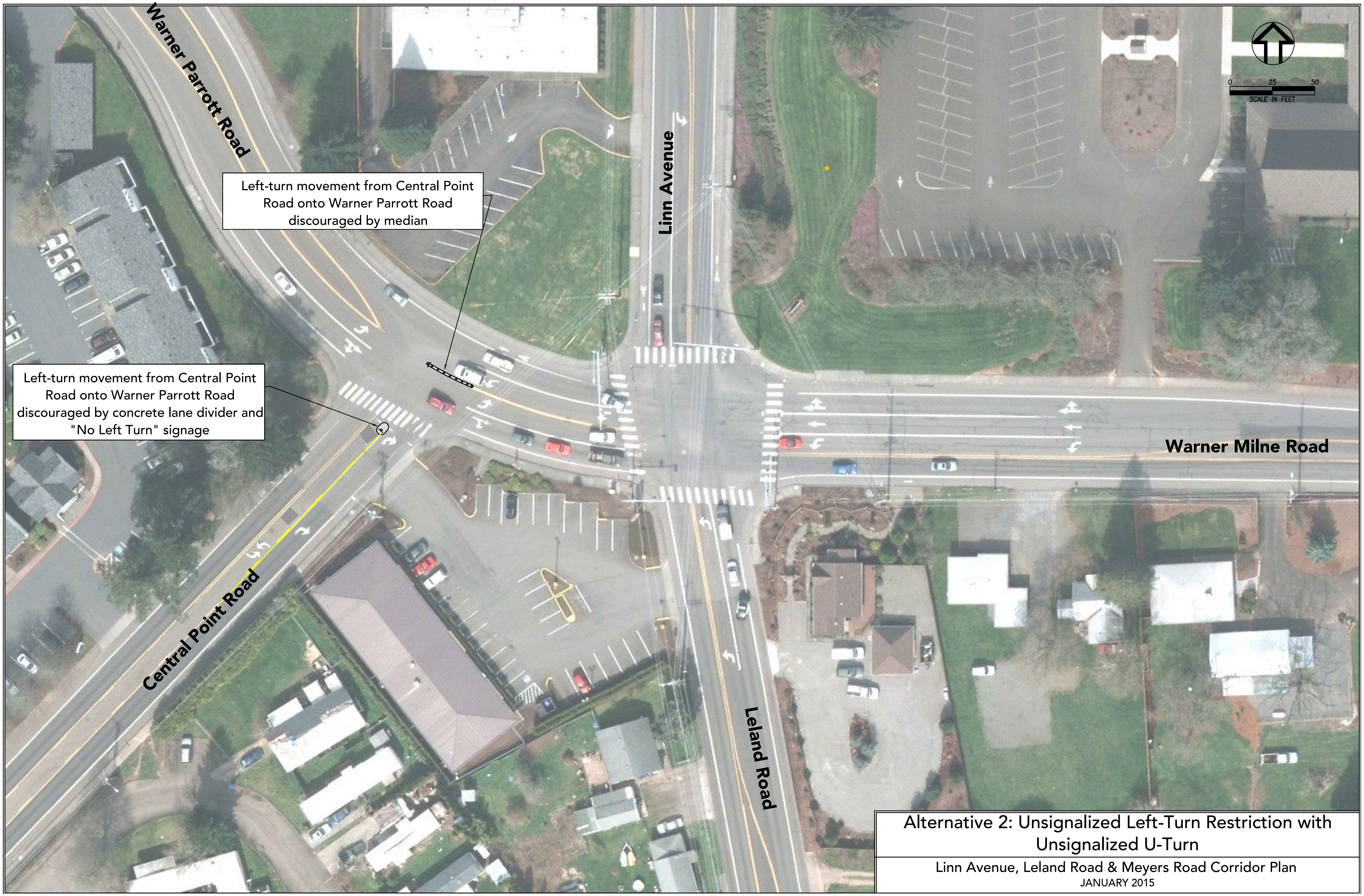
Signal modification for signalized u-turn movement on Warner Parrott Road

Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by concrete lane divider and "No Left Turn" signage

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

Linn Avenue, Leland Road & Meyers Road Corridor Plan

JANUARY 2015



Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by median

Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by concrete lane divider and "No Left Turn" signage

Alternative 2: Unsignalized Left-Turn Restriction with Unsignalized U-Turn

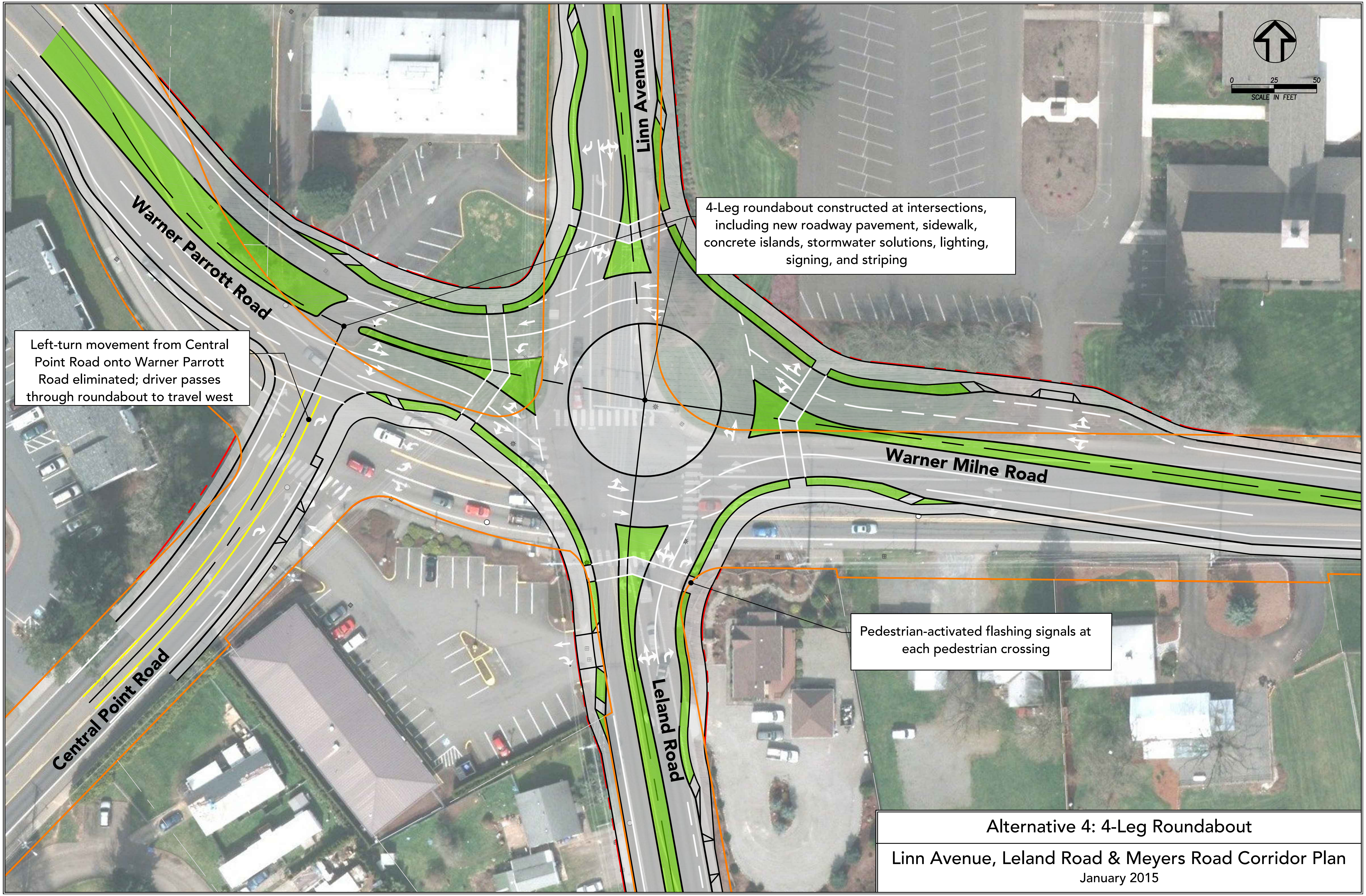
Linn Avenue, Leland Road & Meyers Road Corridor Plan
JANUARY 2015

New signal for Central Point Road and Warner Parrott Road with associated pedestrian improvements at intersection

Signal modification to sync with intersection of Central Point Road and Warner Parrott Road

Alternative 3: Both Intersections Signalized

Linn Avenue, Leland Road & Meyers Road Corridor Plan
JANUARY 2015



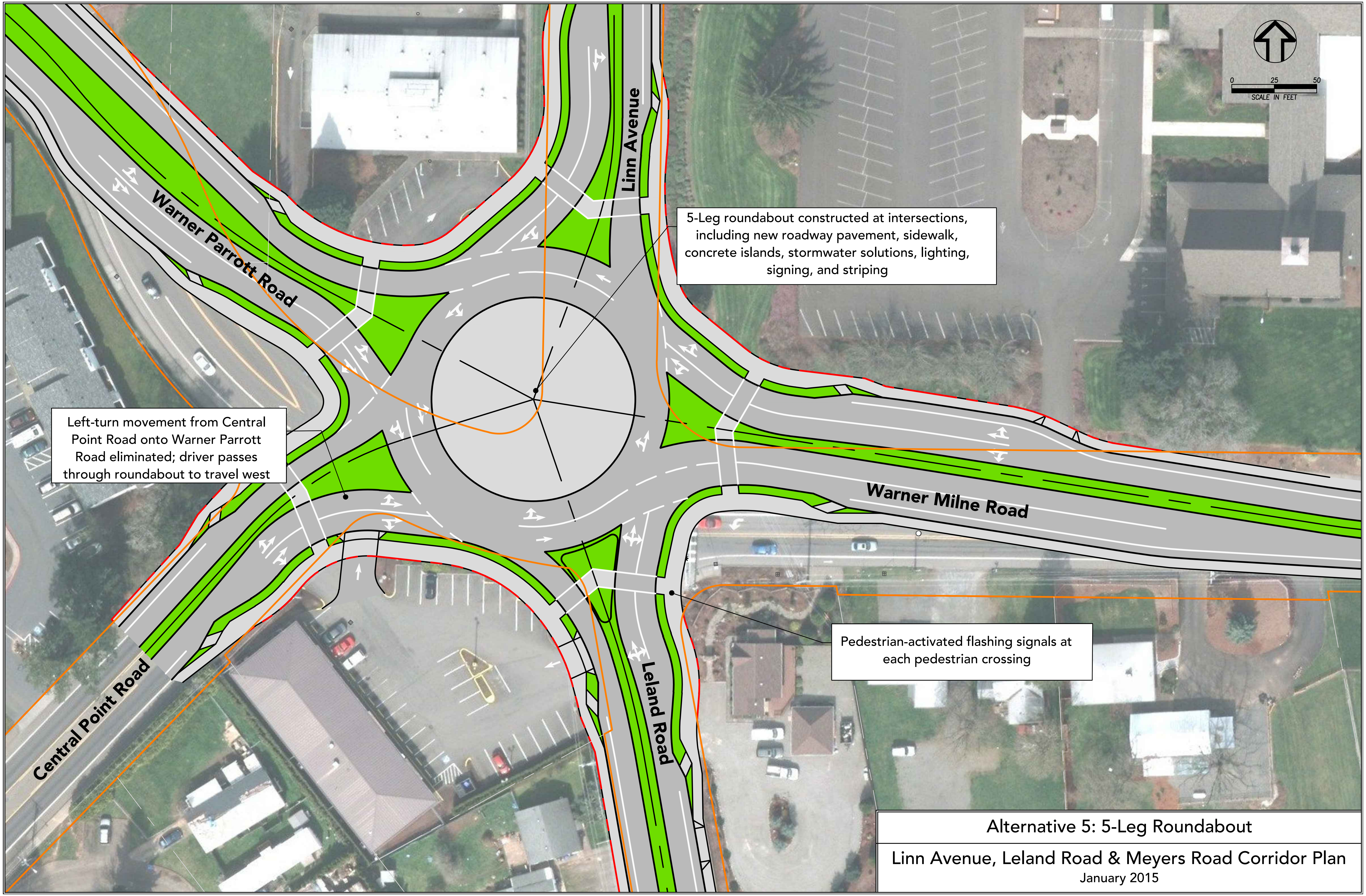
4-Leg roundabout constructed at intersections, including new roadway pavement, sidewalk, concrete islands, stormwater solutions, lighting, signing, and striping

Left-turn movement from Central Point Road onto Warner Parrott Road eliminated; driver passes through roundabout to travel west

Pedestrian-activated flashing signals at each pedestrian crossing

Alternative 4: 4-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan
January 2015



5-Leg roundabout constructed at intersections, including new roadway pavement, sidewalk, concrete islands, stormwater solutions, lighting, signing, and striping

Left-turn movement from Central Point Road onto Warner Parrott Road eliminated; driver passes through roundabout to travel west

Pedestrian-activated flashing signals at each pedestrian crossing

Alternative 5: 5-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan

January 2015

Cost Estimates

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$3,600
Traffic Control	1	L.S.	$3,200
Erosion Control	1	L.S.	$700
Channelizing Island & Median	1	L.S.	$9,000
Signing and Striping	1	L.S.	$2,300
Signal Improvements	1	L.S.	$40,000
Construction Subtotal			*$58,800*
Construction and Project Contingency at 30%			*$17,640*
Construction Total			***$76,440***
Right of Way			
Right of Way			$0
Right of Way Contingency at 50%			$0
Right of Way Total			***$0***
Engineering and Permitting			
Design Engineering and Administration			$20,000
Construction Engineering Services			$10,000
Environmental Permitting			$5,000
Engineering and Permitting Total			***$35,000***
PROJECT GRAND TOTAL			**$111,440**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. New signal pole on SE corner of Linn/Leland/Warner Milne/Warner Parrott (cost would be significantly less if existing pole is structurally adequate for new equipment)
6. Environmental Permitting is lump sum.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$800
Traffic Control	1	L.S.	$700
Erosion Control	1	L.S.	$170
Channelizing Island & Median	1	L.S.	$9,000
Signing and Striping	1	L.S.	$2,300
Construction Subtotal			*$12,970*
Construction and Project Contingency at 30%			*$3,891*
Construction Total			***$16,861***
Right of Way			
Right of Way			$0
Right of Way Contingency at 50%			$0
Right of Way Total			***$0***
Engineering and Permitting			
Design Engineering and Administration			$15,000
Construction Engineering Services			$5,000
Environmental Permitting			$5,000
Engineering and Permitting Total			***$25,000***
PROJECT GRAND TOTAL			**$41,861**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Environmental Permitting is lump sum.

Alternative 3: Signalized Intersections
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/10/15
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$ 24,500
Traffic Control	1	L.S.	$ 21,000
Erosion Control	1	L.S.	$ 5,200
Channelizing Island & Median	1	L.S.	$ 5,700
Sidewalk and Curb Ramps	1	L.S.	$ 10,100
Signing and Striping	1	L.S.	$ 3,980
Signal Improvements	1	L.S.	$ 275,000
Lighting	1	L.S.	$ 50,000
Construction Subtotal			*$ 395,480*
Construction and Project Contingency at 30%			*$ 118,644*
Construction Total			***$ 514,124***
Right of Way			
Right of Way			$ 0
Right of Way Contingency at 50%			$ 0
Right of Way Total			***$ 0***
Engineering and Permitting			
Design Engineering and Administration at 13%			$ 66,836
Construction Engineering Services at 12%			$ 61,695
Environmental Permitting			$ 50,000
Engineering and Permitting Total			***$ 178,531***
PROJECT GRAND TOTAL			**$ 692,655**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 6% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. New signal at Central Point Rd/Warner Parrott Rd.
6. Signal at Linn Ave/Leland Rd/Warner Parrott Rd/Warner Milne Rd is modified to work as one signalized intersection with new signal at Central Point Rd/Warner Parrott Rd.
7. Environmental Permitting is lump sum.

Alternative 4: Four-Leg Roundabout
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$111,700
Traffic Control	1	L.S.	$111,700
Erosion Control	1	L.S.	$24,000
Roundabout	1	L.S.	$1,024,600
Signing and Striping	1	L.S.	$60,000
Stormwater	1	L.S.	$74,700
Landscaping	1	L.S.	$41,740
Pedestrian-Activated Signals	1	L.S.	$120,000
Lighting	1	L.S.	$250,000
Construction Subtotal			*$1,818,440*
Construction and Project Contingency at 30%			*$545,532*
Construction Total			***$2,363,972***
Right of Way			
Right of Way			$143,820
Right of Way Contingency at 50%			$71,910
Right of Way Total			***$215,730***
Engineering and Permitting			
Design Engineering and Administration at 13%			$307,316
Construction Engineering Services at 12%			$283,677
Environmental Permitting			$50,000
Engineering and Permitting Total			***$640,993***
PROJECT GRAND TOTAL			**$3,220,695**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Landscaping includes excavation, soil, and light landscaping.
6. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
7. Signing and striping assumed to include all striping within roundabout limits, all signing within roundabout limits and directional signing leading up to roundabout.
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Alternative 5: 5-leg Roundabout
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$114,600
Traffic Control	1	L.S.	$114,600
Erosion Control	1	L.S.	$24,200
Roundabout	1	L.S.	$1,023,000
Signing and Striping	1	L.S.	$60,000
Stormwater	1	L.S.	$74,700
Landscaping	1	L.S.	$54,000
Pedestrian-Activated Signals	1	L.S.	$150,000
Lighting	1	L.S.	$250,000
Construction Subtotal			*$1,865,100*
Construction and Project Contingency at 30%			*$559,530*
Construction Total			***$2,424,630***
Right of Way			
Right of Way			$179,750
Right of Way Contingency at 50%			$89,875
Right of Way Total			***$269,625***
Engineering and Permitting			
Design Engineering and Administration at 13%			$315,202
Construction Engineering Services at 12%			$290,956
Environmental Permitting			$50,000
Engineering and Permitting Total			***$656,158***
PROJECT GRAND TOTAL			**$3,350,413**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Landscaping includes excavation, soil, and light landscaping.
6. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
7. Signing and striping assumed to include all striping within roundabout limits, all signing within roundabout limits and directional signing leading up to roundabout.
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Present Worth Analysis

Present Worth Analysis

4/1/2015

Option #	**Annual Weekday PM Peak Hour Delay Cost**	**Construction Cost**	**Annual Crash Savings**	**Annual Maintenance Cost**	**Present Worth**	**Is option viable from an operations perspective?**
no-build	$316,593	$0	$0	$2,000	($4,329,783)	no
Signalized Option 1	$279,270	$115,000	$14,320	$2,000	($3,738,515)	yes
Closure of Central Point Left Turn	$254,475	$45,000	$14,320	$2,000	($3,334,235)	yes
Signalized Option 2	$751,158	$700,000	$0	$3,000	($10,922,330)	no
4 Leg Roundabout	$98,658	$3,220,000	$79,020	$1,500	($3,383,426)	yes
5 Leg Roundabout	$91,872	$3,350,000	$131,240	$1,500	($2,706,515)	yes

Notes

1. Assumed interest rate is 4%.
2. Assumed 20-year design life for improvements.
3. Maintenance costs do not include maintenance of pavement or utilities within the intersection.
4. Maintenance costs for the intersection signal are recent costs for the existing signal.
5. Maintenance costs for the roundabout are assumed to be equal to the landscaping costs for a similar roundabout at Washington/Clackamas River Drive.

625 Center Street
Oregon City, OR 97045
503-657-0891

Staff Report

File Number: 15-205

Agenda Date: 4/7/2015

Status: Agenda Ready

To: City Commission

Agenda #: 3a.

From: Public Works Director John Lewis

File Type: Presentation

SUBJECT:
Linn Avenue / Leland Road / Meyers Road Corridor Plan Presentation (Planning File LE 14-04)

BACKGROUND:
The Linn Avenue / Leland Road / Meyers Road Corridor Plan (Plan) is being developed to address deficiencies in the pedestrian and bicycle facilities along the corridor. The area of the Plan is from 5th Street at Jackson Street to Meyers Road at Moccasin Way. Along this route there are very few existing sidewalks and designated bicycle lanes. The Plan will identify preferred street sections to address these deficiencies when future development occurs. The Plan will also look at connecting important features along the corridor (i.e. parks and schools) by means of pathways, sidewalks and bicycle lanes. In addition, the Plan will address the needs of the Linn Avenue, Warner Milne Road, Leland Road, Warner Parrott Road and Central Point Road intersection by proposing an intersection improvement plan.

On August 25, 2014, the Planning Commission voted unanimously to recommend approval of the Linn Avenue / Leland Road / Meyers Road Corridor Plan with the following recommendations:

- Consider the use of rumble strips or other visual methods to adequately separate bicycle lanes from vehicle travel lanes, particularly on inside curves;
- Minimize impacts to the Plaid Pantry commercial properties;
- Maximize the use of green techniques and landscaping to make the roundabout and intersection as visually attractive as possible;
- Recommend moving the center of the 5-legged roundabout north and west in order to minimize impacts to the Plaid Pantry (Savage) property;
- Look at options to improve the intersection with Electric Avenue with respect to stormwater management improvements;
- Utilize efficient street lighting to maximize safety along the right-of-way.

On September 17, 2014, legislative review of the Linn Avenue / Leland Road / Meyers Road Corridor Plan was requested. More public testimony was introduced and discussed, specifically related to concerns about the 5-leg roundabout proposed in the Plan for the Linn Avenue, Leland Road, Warner Milne Road, Warner Parrott Road and Central Point Road intersection(s). With the additional testimony, staff recommended that the topic be continued until November 19 so further determinations could be made.

On November 19, 2014, the corridor plan adoption was continued a second time until April 15, 2015, to allow the project team time to complete a detailed intersection control analysis. The agreement for professional services with Wallis Engineering was amended to include the supplemental scope to further ascertain the long term needs of the intersection, but more specifically, to complete a detailed analysis of 5 intersection scenarios. This additional work was anticipated to require 15 weeks to complete.

Wallis Engineering and DKS Associates have provided the City with an Intersection Control Analysis Draft Report which on February 18th was presented to the Transportation Advisory Committee. Project stakeholders and interested public were also provided access to the plan and opportunity to comment. The draft intersection control analysis considers 6 alternatives including a do nothing alternative. These alternatives are generally described as follows:
- Alternative 0 - Do nothing
- Alternative 1 - Turn restrictions at Central Point Rd / Warner Parrott Rd with U-turn options at Warner Parrott Rd / Warner Milne Rd / Linn Ave / Leland Rd intersection
- Alternative 2 - Turn restrictions at Central Point Rd / Warner Parrott Rd without U-turn options at Warner Parrott Rd / Warner Milne Rd / Linn Ave / Leland Rd intersection
- Alternative 3 - Two signalized intersections
- Alternative 4 - Turn restrictions at Central Point Rd / Warner Parrott Rd and a four-legged roundabout
- Alternative 5 - One five-legged roundabout

Considerations including traffic operations, construction and maintenance costs, safety, system context, and right of way / access impacts were all studied. The report also describes other costs that are more difficult to quantify such as construction delay costs, opportunity costs, impacts to private businesses and right-of-way impacts.

Overall, alternatives 4 and 5 show the greatest benefit for operations and safety, but also have the largest construction costs including right-of-way acquisition. Alternatives 1 and 2 have much more modest construction costs yet the operational benefits and safety benefits are not nearly what can be achieved with the roundabout options. Alternative 3 does not meet operational standards.

Based on future traffic operations and potential savings related to safety, Alternative 5 is recommended as the long-term preferred alternative for these study intersections. If a short term solution is desired, Alternatives 1 or 2 could be implemented at a significantly lower cost.

DKS

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DRAFT MEMORANDUM

DATE: February 5th, 2015

TO: John Lewis, City of Oregon City
John Burrell, City of Oregon City
Dave Brokaw, Wallis Engineering

FROM: Nate Schroeder, P.E., PTOE
Jordin Ketelsen

SUBJECT: **Linn Ave Concept Plan – Intersection Control Analysis DRAFT** P#13220-000

The purpose of this memorandum is to provide a summary of the intersection control analysis that was completed for the intersections of Linn Ave/Warner Milne Rd/Leland Rd/Warner Parrott Rd and Central Point Rd/Warner Parrott Rd. The work completed as part of this analysis builds off of the previous work completed at these intersections in the Linn Avenue Concept Plan.[1] The project study area shown in Figure 1.

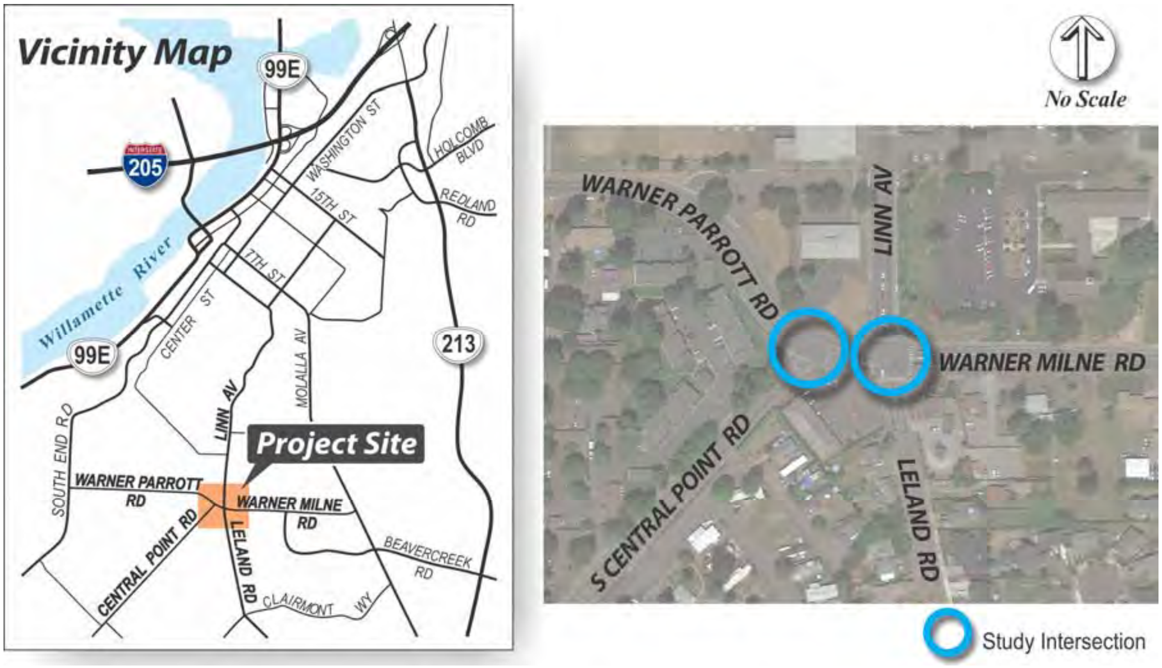

Figure 1: Project Study Area

The following sections discuss a summary of prior studies, system context, traffic volumes, a description of future alternatives, intersection operations analysis for each alternative, and a comparison summary.

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[1] Oregon City, *Linn Avenue Concept Plan*, 2013-current.

SUMMARY OF PRIOR STUDIES

While these intersections have been the topic of discussion for quite some time, and even included as part of previous work, a comprehensive evaluation of intersection control alternatives was not conducted until this time. A summary of the past work involving these two study intersections is provided in the sections below.

Oregon City Transportation System Plan

Oregon City recently completed an update to their Transportation System Plan (TSP)[2] in an effort to prepare for and accommodate future transportation growth in the most efficient manner possible. As part of the update, it was determined that the intersection of Central Point Rd/Warner Parrott Rd would not meet the mobility targets identified in the adopted TSP. Based on input from key stakeholders, the selected improvement for addressing the deficiency at Central Point Rd/Warner Parrott Rd was a roundabout at the Warner Parrot Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, which is identified as project D34 in the adopted TSP. No detailed alternatives analysis was completed during the update, due to the high level nature of TSP analysis, support for the roundabout, and it's inclusion in the previous version of the TSP.

Oregon City Roundabout Alternatives & Linn Ave Concept Plan

The Oregon City Roundabout Alternatives project[3] provided preliminary hand drawn sketches of different roundabout configurations that could be constructed at the intersection of Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd. The sketches were intended to be illustrative in nature, and no detailed operational analysis or evaluation was completed as part of this work. The concepts developed as part of this work provided a starting point for future analysis, and were later refined as part of the Linn Avenue Concept Plan project.[4] No alternatives evaluation was included as part of this work, as it was assumed that a roundabout was the preferred intersection control type based on its inclusion in the TSP.

SYSTEM CONTEXT

Identifying the system in which an intersection operates is important to determine the factors that contribute to its overall function. The existing and future contexts of the study intersections are discussed in the sections below, which include the roadway network, nearby intersections, pedestrian and bicycle facilities, transit facilities, intersection collision analysis, and a general discussion on alternative system context impacts.

Roadway Network

The transportation characteristics of the key roadways near the study area are shown in Table 1 and include jurisdiction, functional classification, posted speed, number of travel lanes, presence of sidewalks and/or bike lanes, as well as transit facilities.

---

[2] Oregon City, *Transportation System Plan*, June 2013.

[3] *Oregon City Roundabout Alternatives*, DKS Associates, 2008.

[4] However, the work completed for the Linn Avenue Concept Plan was intended to verify the needed geometry for a roundabout at this location.

The functional classification is a key roadway characteristic because it specifies the purpose of the facility[5] and is a determining factor of applicable cross-section, access spacing, and intersection performance standards.

Table 1: Key Roadway Characteristics in Project Vicinity

Roadway	Jurisdiction	Functional Classification	Posted Speed	Number of Lanes	Sidewalks	Bike Lanes	Transit
Warner Parrott Road	Oregon City	Minor Arterial	30 mph	3-4[a]	Yes	Yes	No
Warner Milne Road	Oregon City	Minor Arterial	30 mph	2	Some	Yes	Route 33
Central Point Road	Oregon City	Collector	35 mph	2	Yes	Yes	No
Linn Avenue	Oregon City	Minor Arterial	35 mph	2	Yes	Yes	Route 33
Leland Road	Oregon City	Minor Arterial	35 mph	2	Some	Yes	No

[a] Warner Parrott Road is a four-lane cross section in between the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd and Central Point Rd/Warner Parrott Rd study intersections.

As shown, all of the key roadways are under the jurisdiction of Oregon City and the majority of the roadways are classified as minor arterials, with the exception of Central Point Rd that is classified as a collector. Most roadways are two-lane facilities, with the exception of Warner Parrott Rd that has two travel lanes and a center turn lane west of the Central Point Rd/Warner Parrott Rd intersection and one travel lane and one left-turn lane in each direction between the two study intersections.

Warner Milne Rd and Leland Rd have gaps in the sidewalk facilities near the study intersections, but all roadways have bike lanes. TriMet's Route 33 serves the study area along Warner Milne Rd and Linn Ave.

Nearby Intersections

Most of the intersections adjacent to the two study intersections are unsignalized including Linn Ave/AV Davis Rd/Ethel St to the north, Warner Parrott Rd/Canemah Rd to the west, Central Point Rd/Shenandoah Dr to the southwest, and Leland Rd/Pease Rd to the south. The Warner Milne Rd/Beavercreek Rd intersection to the east of the project study area is the only signalized intersection.

Pedestrian and Bicycle Facilities

Sidewalks are present near both study intersections except for some gaps on the southeast corner of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. Pedestrian push-buttons and crosswalks are present along all four legs of the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection and only a single striped crosswalk is present on the southern leg of the Central Point Rd/Warner Parrott Rd intersection.

All roadways have bike lanes near the study intersections. Additionally, there are bicycle push-button detectors at all four corners of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

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[5] The primary purpose of an arterial is to provide mobility, whereas at the opposite end of the spectrum, a local road is primarily concerned with site access. Collector roadways provide a transition between arterials and local roads.

Further understanding of the existing pedestrian and bicycle volumes at the study intersections was provided by intersection turn movement counts were taken on Tuesday, December 2nd, 2014. Table 2 displays the existing pedestrian and bicycle volumes at study intersections during the PM peak hour.

Table 2: PM Peak Hour Pedestrian and Bicycle Volumes at Study Intersections

Study Intersection	**PM Peak Hour Volume**	
	Pedestrian	*Bicycle*
Central Point Rd/Warner Parrott Rd	4	3
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	10	2
Total	**14**	**5**

As shown, more pedestrians frequent the study are than bicyclists and the majority of pedestrians crossed at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

Transit Facilities

Route 33-McLoughlin travels bi-directionally along Linn Ave and Warner Milne Rd, turning at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. This route has 15 minute headways on weekdays in the morning and afternoon and serves four bus stops in the project vicinity; two on Warner Milne Rd (TriMet Stop IDs 6121 and 6120) and two stops on Linn Ave (TriMet Stop IDs 3418 and 9559).

The First Presbyterian Church Park and Ride is located just north of the project vicinity on the southeast corner of the Linn Ave/Williams St intersection.

Intersection Collision Analysis

Collision analysis was performed for the study intersections to identify intersection-related trends. This analysis considered data from the past five years (2009-2013), which was obtained from the ODOT Crash and Analysis Reporting Unit and is located in the appendix.[6]

Table 3 shows a detailed crash rate compared to the published 90th percentile rates[7] in ODOT's Analysis Procedure Manual Table 4-1.[8] Intersections with crash rates close to or over the 90th percentiles rates should be flagged for further analysis. As shown, the intersection crash rate for the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is below the 90th percentile crash rates for other statewide urban, four-legged, signalized intersections. However, the Central Point Rd/Warner Parrott Rd intersection has a crash rate slightly higher than the statewide 90th percentile crash rate for urban, three-legged, unsignalized intersections.

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[6] Oregon Department of Transportation, Crash Analysis and Reporting Unit.

[7] The 90th percentile values represent 90th percentile crash rates from a study of 500 intersections in Oregon. The crash rates are grouped by rural/urban, signalized/unsignalized, and 3-leg/4-leg intersections.

[8] Analysis Procedures Manual, Version 2, February 2014, Chapter 4, Table 4-1.

Table 3: Study Intersection Collision Analysis (2009-2013)

Intersection	Collisions (by Severity)			Collisions per Year	Intersection Crash Rate	90th Percentile Rate
	Injury	*PDO*[a]	***Total***			
Central Point Rd/Warner Parrott Rd	5	6	11	2.2	**0.50**	0.47
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	9	7	16	3.2	0.46	0.86

[a] PDO = Property damage only.
Bolded intersection crash rates indicate a value higher than the 90th percentile rates.

Further investigation was performed for the Central Point Rd/Warner Parrott Rd intersection to assess whether there are any clear trends in the collision data. Table 4 shows the collision data from 2009 through 2013 broken down by the type of collision. As shown, the most prevalent collision types were turning movement collisions as they make up 55 percent of the total collisions occurring at this intersection during the past five years. Furthermore, half of the turning collisions at this intersection involve the northbound left-turning movement. These turning collisions could be caused by the close proximity of the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, limited sight distance with the presence of queued vehicles, the intersection geometry itself (e.g. the curvature and skew of the roadways), or the requirement to cross three lanes of traffic to complete the left-turning movement.

Table 4: Collision Breakdown by Collision Type (2009 through 2013)

Intersection	Turn	Fixed Obj.	Bike[a]	Side-Swipe	Rear-End	Total
Central Point Rd/Warner Parrott Rd	6	3	1	1	1	11

[a] The collision involving a cyclist was a "Turn"-type collision and therefore is not included in the total.

Alternative System Context Impacts

All future alternatives include either unsignalized, signalized, or roundabout intersections. None of these intersection types are expected to significantly disrupt the system context of the surrounding area. Since this alternative evaluation category is not likely to aid in the alternatives comparison, a general system context discussion for the various alternatives are included in the sections below.

Alternatives Involving Signalized Intersection(s)

Although the majority of surrounding intersections are unsignalized, there are many other signalized intersections in Oregon City and drivers are expected to understand traffic laws regarding signalized intersections and to be familiar handling the intersection process. It is also anticipated that push-button detectors and marked cross-walks at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection will accommodate pedestrians at the intersection. Bike lanes that connect into the existing bicycle network in the area are easily accommodated with signalized intersections. Transit will be able to maneuver the intersection with relative ease due to prior experience with signalized and stop-controlled intersections and it is unlikely for alternatives involving signalized intersections to necessitate the modification of any existing transit facilities.

Alternatives Involving a Roundabout Intersection

The nearest existing roundabout in Oregon City is at the intersection of Washington St and Clackamas River Dr, but there are several other intersections identified in the Oregon City TSP that are planned to be roundabout controlled in the future. A roundabout in the study area is not anticipated to severely disrupt the current system context, but this option may not be as familiar to users as a signalized intersection. An effort to accommodate pedestrians and cyclists through clear signing and striping may be required for alternatives including roundabout intersections due to unfamiliarity with the multimodal aspects of roundabouts. Existing transit facilities may need modification due to the pull-up and pull-out space transit vehicles need to operate safely at a bus stop along a roadway, but transit should be able to maneuver the intersection.

TRAFFIC VOLUME DEVELOPMENT

For the Oregon City TSP update process, PM peak hour traffic counts were collected at both study intersections, but during different days. Those counts were collected in 2011 and 2012.[9] The 2035 future volumes were then developed based on those counts.

For this study, we wanted to both verify that the future counts developed for the Oregon City TSP update still apply, as well as collect data at both study intersections during the PM peak hour period (4 p.m.- 6 p.m.) to ensure consistency between the two intersections. On Tuesday, December 2nd 2014, PM peak hour turn movement counts were collected at both study intersections. These new counts were consistent with the 2011 and 2012 counts, which helped validate the development of the future 2035 traffic volumes. Collecting the counts during the same peak hour also verified that the volume distribution between the two intersections as developed for the 2035 future year volumes resembled existing conditions.

Based on the new PM peak hour counts collected in 2014, we concluded that the 2035 volumes developed for the Oregon City TSP update accurately capture projected future volumes and are the future volumes used in this study. All intersection volume data is located in the appendix.

Volume adjustments for each alternative were based on a qualitative assessment of the surrounding roadway network and an assumed origin and destination for the affected vehicles. The resolution of the regional travel demand model was too large to adequately reflect volume adjustments based on the relatively minor geometric change being proposed for each alternative.

FUTURE ALTERNATIVES

Five alternatives for addressing future transportation needs at the study intersections were considered as part of this analysis. These improvement alternatives were developed based on input received from key stakeholders, City staff, and the previously completed TSP. A description of the No-Build scenario and each alternative are included in the sections below. Conceptual drawings for each alternative developed by Wallis Engineering are provided in the appendix..

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[9] At the Warner Parrot Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection counts were collected on Wednesday, October 3, 2012. At the Central Point/Warner Parrott Rd intersection counts were collected on Thursday, April 21, 2011.

No-Build

The No-Build scenario assumes that no changes to the study intersections will occur before the year 2035. Currently, the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is a four-leg, signalized intersection that allows all movements and the Central Point Rd/Warner Parrott Rd intersection is a three-leg, unsignalized intersection that allows all movements. The future 2035 volumes for the No-Build scenario are displayed in Figure 2.

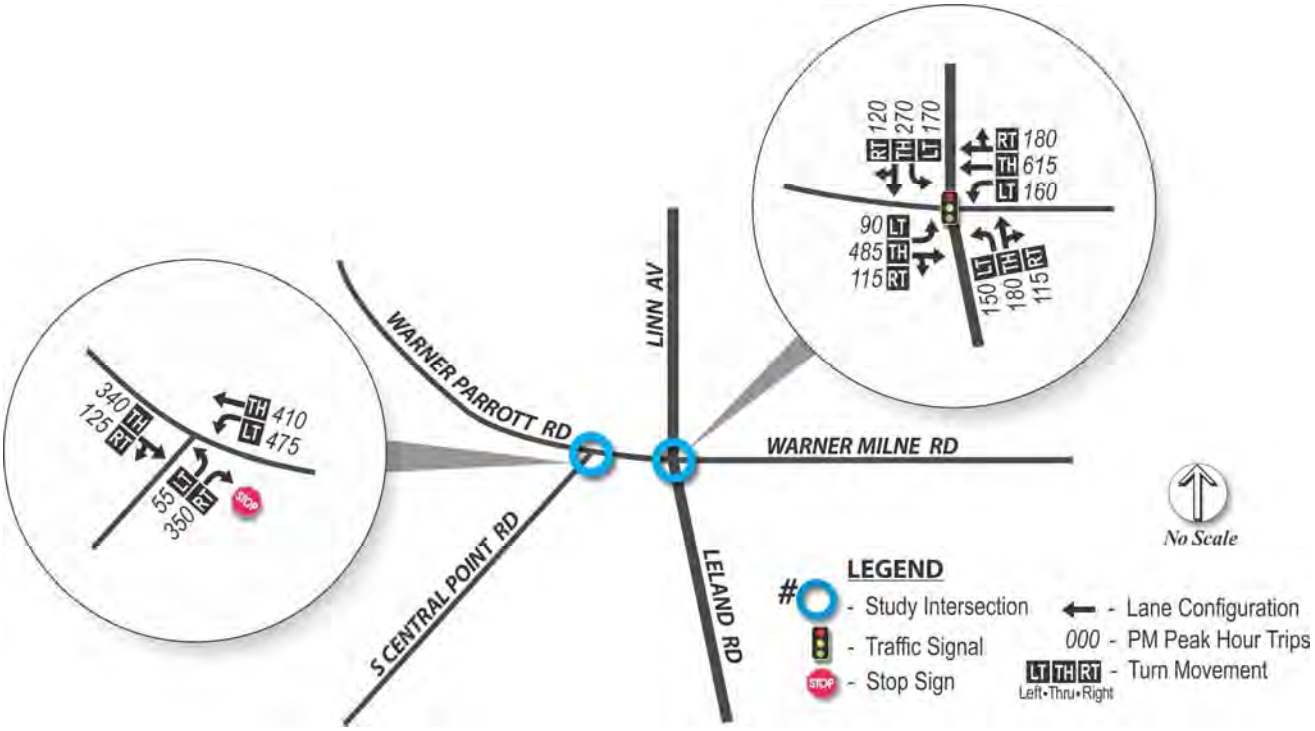

Figure 2: 2035 No-Build Intersection Volumes

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

This alternative includes the restriction of left-turns from Central Point Rd by the installation of a median along Warner Parrott Rd or a channelizing island at Central Point Rd. Left-turns onto Central Point Rd would still be allowed. The displaced left-turns would be accommodated by allowing an eastbound U-turn at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. However, this movement would be restricted to passenger cars only since intersection widening required to accommodate larger vehicles would necessitate significant reconstruction and would have impacts to pedestrian crossing movements and vehicular operations.[10]

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[10] An SU-30 design vehicle performing the eastbound U-turn movement at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection was simulated in Autoturn by Wallis Engineering and was found to require significant intersection widening.

As shown in Figure 2, 55 northbound left-turns are projected to occur at the Central Point Rd/Warner Parrott Rd intersection during the PM peak hour. Since this alternative restricts the northbound left-turn, volume adjustments were made to re-allocate these vehicles through the study area as shown in Figure 3.

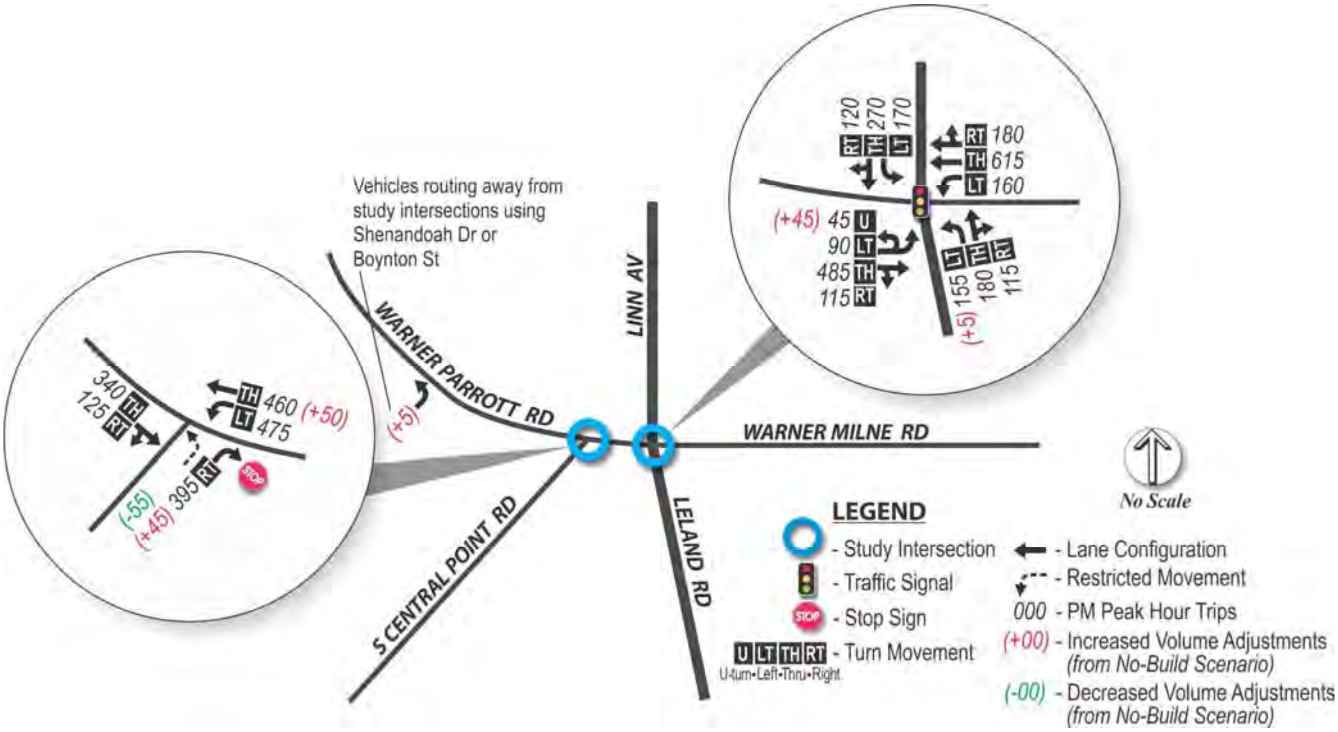

Figure 3: 2035 Intersection Volumes for Alt 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

In this alternative, it was assumed that the majority of these displaced vehicles (45 during the PM peak) would simply utilize the U-turn at the adjacent signal (i.e. northbound vehicles turn right at the Central Point Rd/Warner Parrott Rd intersection then make a U-turn at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection), because of this movement is the most similar to the existing northbound left-turn movement. Five of the vehicles were assumed to avoid the Central Point Rd/Warner Parrott Rd intersection and instead use an alternate route, such as Pease Rd, to access Leland Rd to turn left at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

The remaining five vehicles were anticipated to avoid both study intersections and find an alternate route such as Shenandoah Dr or Boynton St to access Warner Parrott Rd west of the project study area. Since a relatively small number of vehicles are anticipated to re-route away from both study intersections, the traffic operations at surrounding intersections are not likely to be severely impacted, but these drivers may experience extended travel time.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

This alternative also includes the closure of the northbound left-turn at the Central Point Rd/Warner Parrott Rd intersection by the installation of a median along Warner Parrott Rd or a channelizing island at Central Point Rd. However, unlike Alternative 1, no U-turn would be available at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. Since this alternative also includes the closure of the northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection, the volumes currently making this turn during the PM peak hour were re-distributed accordingly.

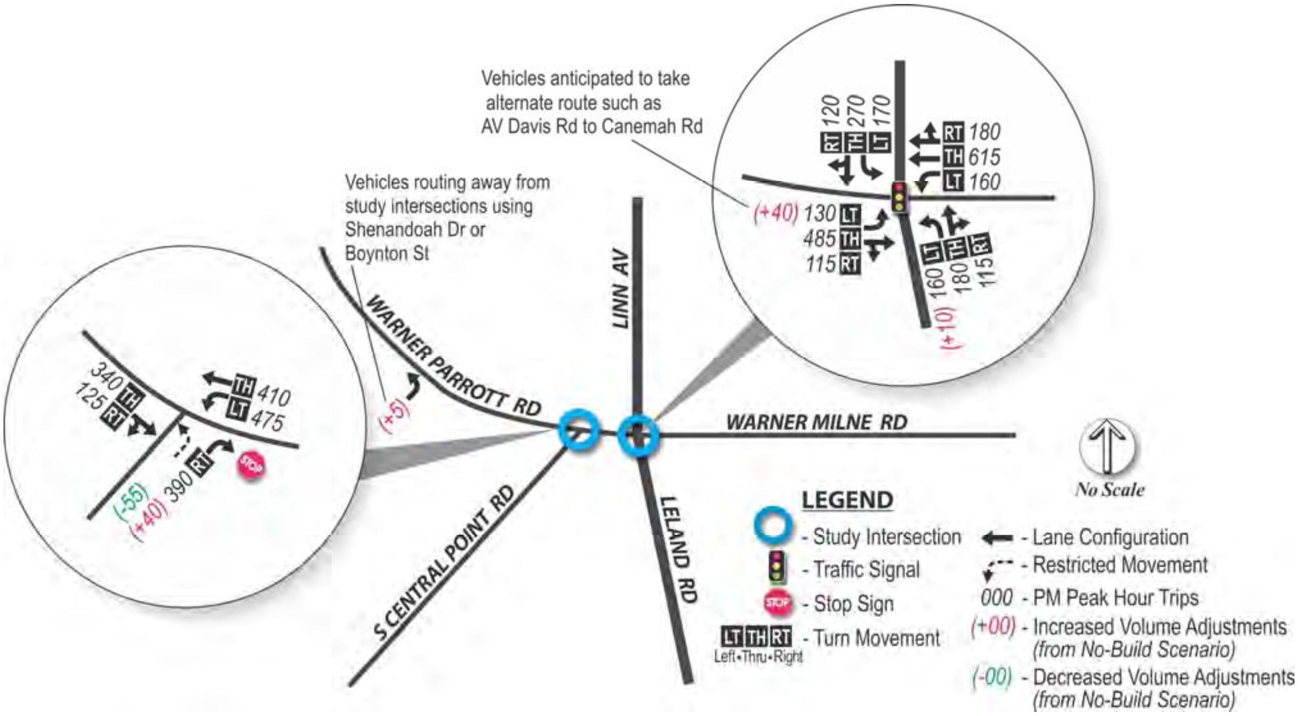

Figure 4: 2035 Intersection Volumes for Alt 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

Forty of these northbound vehicles were assumed to turn right at the Central Point Rd/Warner Parrott Rd intersection, then turn left at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, then take a parallel route (most likely AV Davis Rd onto Canemah Rd) to access Warner Parrott Rd west of the study area. Ten of the vehicles were assumed to forgo the Central Point Rd/Warner Parrott Rd intersection and instead use an alternate route, such as Pease Rd, to access Leland Rd and turn left at the adjacent Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.

The remaining five vehicles are anticipated to avoid both study intersections and find an alternate route, such as Shenandoah Dr or Boynton St, to access Warner Parrott Rd west of the project study area. Since a relatively small amount of vehicles are anticipated to re-route away from both study intersections, the surrounding intersections are not likely to be severely impacted although these drivers may experience extended travel time.

Alternative 3: Both Intersections Signalized

In this alternative both study intersections are fully signalized, which allows for all movements to be accommodated. However, due to the close proximity of the study intersections, the two signals would need to operate as one intersection.

Due to the increased convenience of having a signalized northbound left-turn at the Central Point Rd/Warner Parrott Rd intersection, ten northbound vehicles turning left were assumed to migrate from the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to the Central Point Rd/Warner Parrott Rd intersection as shown below in Figure 5.

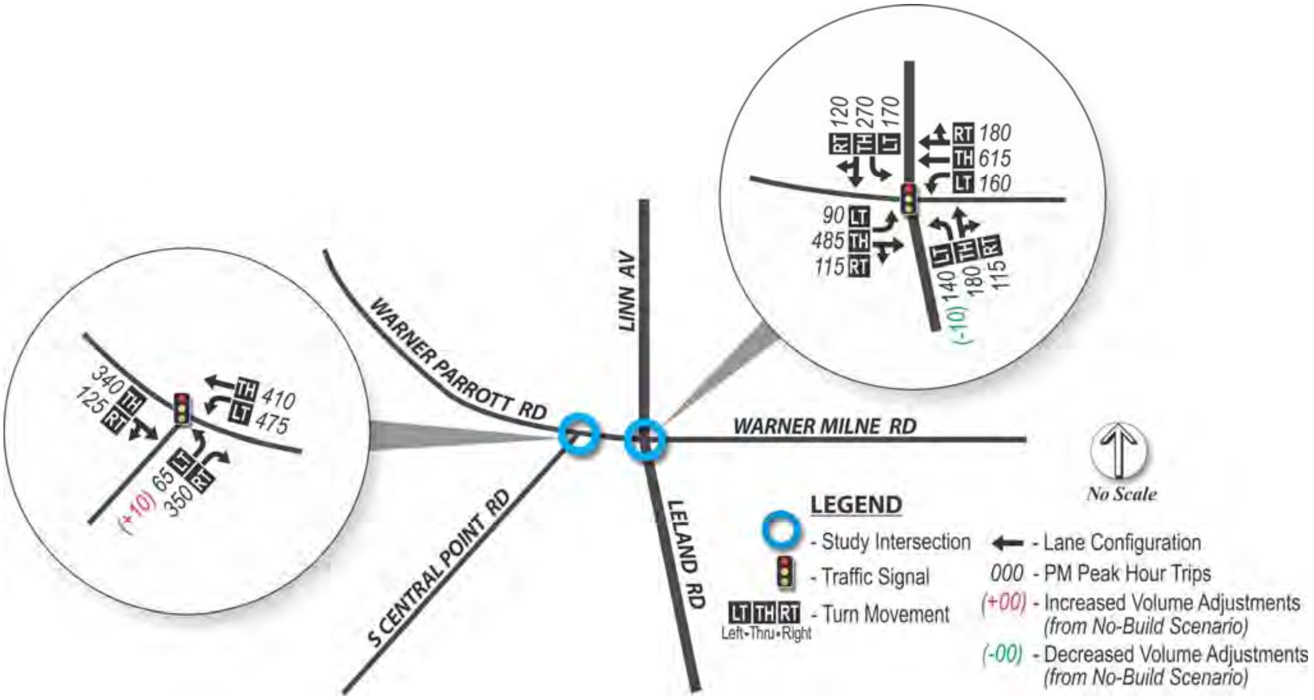

Figure 5: 2035 Intersection Volumes for Alt 3: Both Intersections Signalized

Alternative 4: Four-Leg Roundabout

In this alternative, northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection would be restricted by the installation of a median along Warner Parrott Rd. Left-turns onto Central Point Rd would still be allowed. The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection would be converted into a four-legged roundabout, which would accommodate the displaced northbound left-turning vehicles from Central Point Rd/Warner Parrott Rd via the eastbound U-turn movement.

The roundabout considered in this alternative includes two lane approaches for each of the legs. However, the removal of one approach lane on the south leg (Leland Ave) was also evaluated and is discussed further in the Intersection Operations section for Alternative 4.

Since this alternative also includes the closure of the northbound left-turns at the Central Point Rd/Warner Parrott Rd intersection, the volumes currently making this turn during the PM peak hour were re-distributed in a way that is identical to Alternative 1. The intersection volumes used for Alternative 4 are shown in Figure 6.

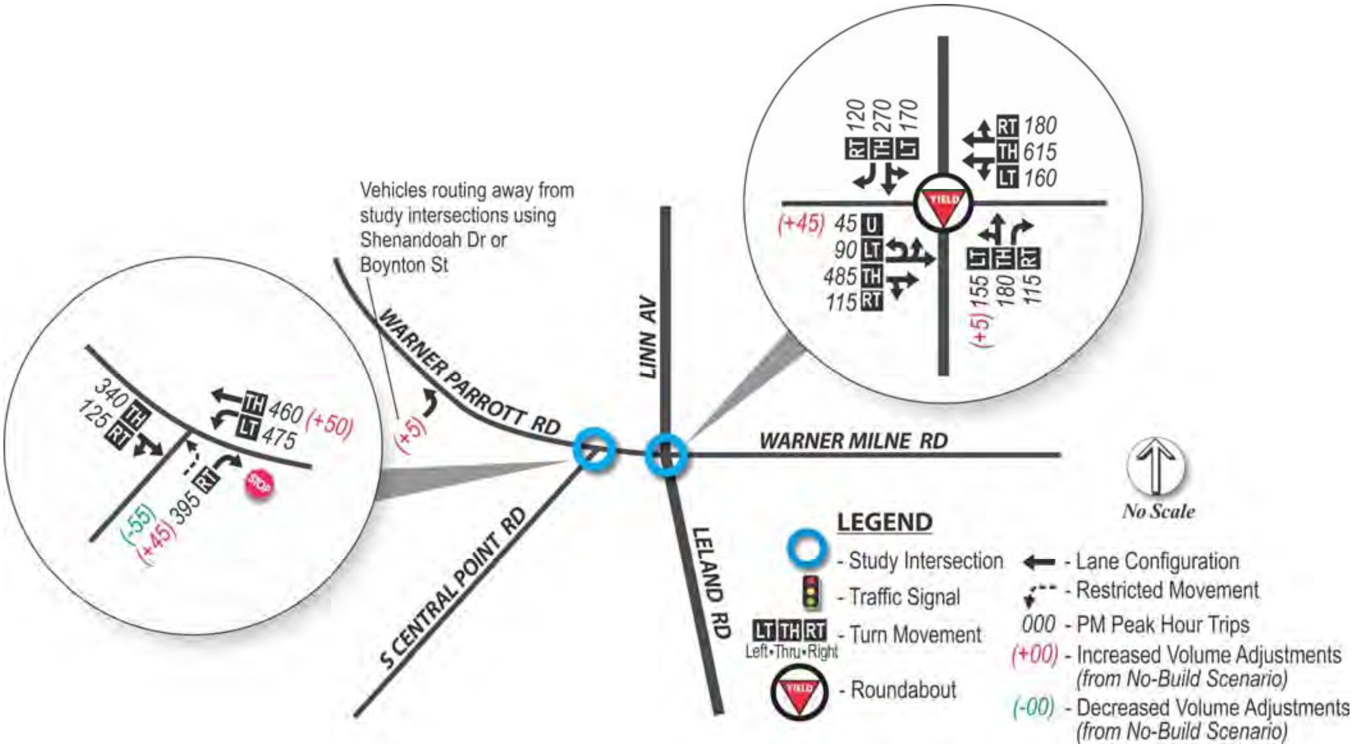

Figure 6: 2035 Intersection Volumes for Alt. 4: Four-Leg Roundabout

Alternative 5: Five-Leg Roundabout

In this alternative, a five-legged roundabout was considered that combined both study intersections into one. The five-legged roundabout results in a larger roundabout, but no turn movements are restricted. The approaches to the roundabout were all two-lane.

Since both intersections are merged into a single intersection in this alternative, the distribution of the 2035 PM peak hour volumes were determined by general destination and origin assumptions using the turn-movement counts collected as part of this analysis and are described in Figure 7.

Based on the distribution of westbound traffic at the Central Point Rd/Warner Parrott Rd intersection, 46 percent of traffic on that approach is destined for Warner Parrott Rd and the remaining 56 percent is destined for Central Point Rd. These percentages were then applied to the southbound right, westbound through, and northbound left movements at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to estimate how these movements might re-distribute with the single intersection.

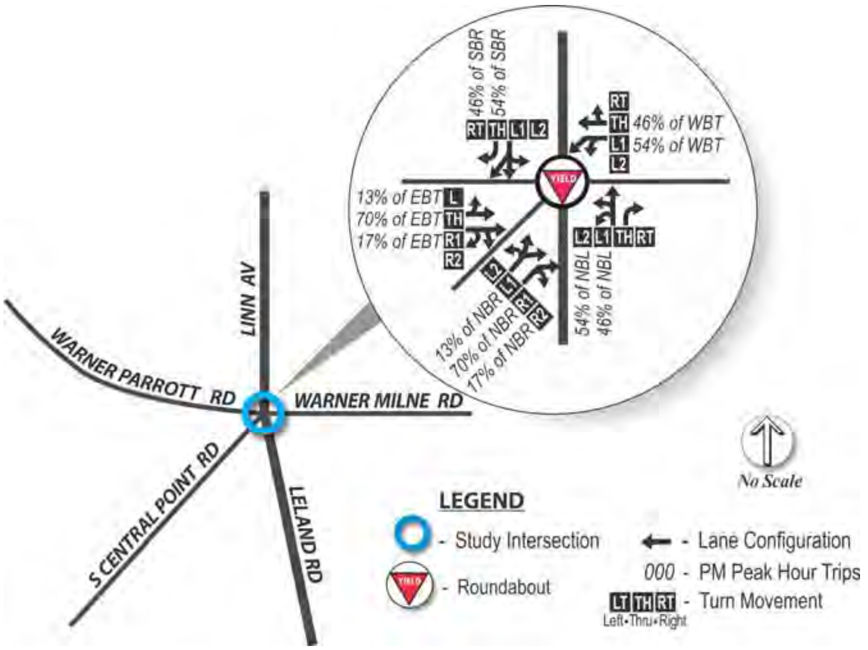

Figure 7: Intersection Volume Adjustments for Alt. 5: Five-Leg Roundabout

In the eastbound direction at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, 70 percent of the traffic was determined to be destined for Warner Milne Rd, 17 percent destined for Linn Ave, and 13 percent destined for Leland Rd. These percentages were applied to the eastbound volume and northbound left-turn volume at Central Point Rd/Warner Parrott Rd to estimate how these movements might re-distribute with the single intersection. Figure 7 shows the combined intersection volumes that were used for Alternative 5.

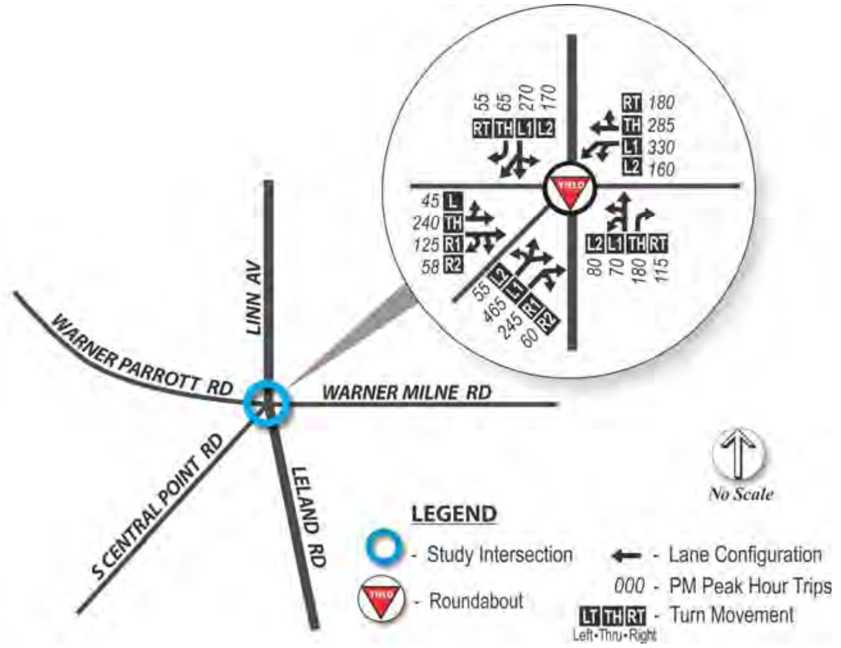

Figure 8: 2035 Intersection Volumes for Alt 5: Five-Leg Roundabout

FUTURE ALTERNATIVES EVALUATION

Each of the alternatives was evaluated based on several criteria to provide a comparison of the alternatives to each other, and to the No-Build scenario. These criteria included intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety. The following sections discuss the mobility standards for Oregon City, as well as a summary of the present worth analysis completed for each of the transportation alternatives.

Mobility Standards

Agency mobility standards often require intersections to meet level of service (LOS) or volume-to-capacity (v/c) intersection operation thresholds.

- The **intersection LOS** is similar to a “report card” rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- The **volume-to-capacity (v/c) ratio** represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the v/c ratio approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, as seen by the formation of excessive queues.

Two adopted documents contain language regarding the mobility standards for both signalized and unsignalized intersections in Oregon City. The first is Oregon City’s TSP and the second is the Oregon City Municipal Code.[11] The language from both documents agrees that the mobility standard for signalized intersections as a whole requires a v/c ratio less than 0.99. However, the mobility standard language in both documents differs in regards to unsignalized intersections. According to the TSP, unsignalized mobility standards are given as v/c ratios that may not exceed 0.99 for the worst intersection movement, which is typically the side street. On the other hand, Oregon City’s Municipal code refers to mobility standards for unsignalized intersections as a v/c ratio that may not exceed 0.99 for the main street movement and specifically states that there is no mobility standard for the side street movement.

In this document, mobility standards will be reported in accordance with Oregon City’s TSP language. However, a discussion of the Oregon City Municipal Code mobility standards will be discussed as applicable. The mobility standards for signalized and unsignalized intersections from both the City’s TSP and Municipal Code are summarized in Table 5.

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[11] Oregon City, Oregon - Code of Ordinances, August 25, 2014.

Table 5: Applicable Study Intersection Mobility Standards

Document	Traffic Control	Mobility Standard	Applicable Intersection Movement
		v/c Ratio	
Oregon City's TSP	Signalized	0.99	Intersection as a whole
	Unsignalized	0.99	Worst intersection movement (Critical movement)
Oregon City Municipal Code	Signalized	0.99	Intersection as a whole
	Unsignalized	0.99	Worst major-street movement

No-Build

Table 6 provides the results of the intersection operations analysis completed for the future No-Build scenario. As shown, the critical movement of the Central Point Rd/Warner Parrott Rd intersection does not meet Oregon City's TSP v/c standard for unsignalized intersections although the major street v/c is below 0.99 and therefore does meet the Oregon City Municipal Code's mobility standards for unsignalized intersections. In light of differing mobility standards, it is important to note that motor vehicle queuing and overall intersection performance drastically decreases as the critical movement (northbound left) approaches a v/c above 0.99. The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection does meet mobility standards in year 2035.[12]

Table 6: 2035 No-Build Intersection Operations

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/F	> 100s	1.38
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	45.4	0.91

Signalized intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
v/c= Intersection Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c= Critical Movement Volume-to-Capacity Ratio

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn.

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 3. Due to the added eastbound U-turn at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, a saturation flow adjustment was made to the

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[12] Detailed reports for the HCM intersection analysis for the No-Build scenario as well as all five alternatives are provided in the appendix.

eastbound left turns as per research completed by the North Carolina State University for the North Carolina Department of Transportation.[13] The saturation flow adjustments are provided in the appendix. Table 7 provides the results of the intersection operation analysis.

Table 7: 2035 Intersection Operations for Alt. 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	52.8	0.92

Signalized intersection:	Unsignalized intersection:
Delay = Average Intersection Delay (sec.)	Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service	LOS = Major Street LOS/Minor Street LOS
v/c= Intersection Volume-to-Capacity Ratio	v/c= Critical Movement Volume-to-Capacity Ratio

As shown, both intersections meet the mobility standards under future year conditions during the PM peak hour. Compared to the No-Build scenario, an increase of over 30 seconds of delay from the No-Build scenario at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is expected under this alternative.

Under this alternative, the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario which is due to the restriction of the northbound left-turn movement on the Central Point Rd intersection leg (critical movement).

Right-of-way/Access Impacts

Limited impacts to accesses are anticipated under this alternative. All existing access to adjacent businesses will remain open, but the Central Point Rd northbound left-turn will be restricted. However, the added U-turn movement at the adjacent intersection should help minimize the impact of removing that turn movement. No right-of-way acquisition is expected for this alternative. The two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City’s intersection minimum access spacing requirements for minor arterials.[14]

Construction/Maintenance Costs

Construction costs for this alternative would likely be relatively minor. Costs would include the construction of the center median along Warner Parrott Rd, and signal modifications to accommodate for the added eastbound U-turn movement. There would also be ongoing maintenance costs affiliated with the signalized intersection, which is expected to be similar to the existing maintenance costs for this intersection and typically include equipment replacement, signal timing updates, power, etc.

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[13] *Effects of Increased U-Turns at Intersections of Divided Facilities and Median Divided Versus Five Lane Undivided Benefits*, North Carolina State University, August 2004. (Research conducted for the North Carolina Department of Transportation).

[14] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

A construction cost estimate for this alternative was developed by Wallis Engineering, and found to be approximately $115,000.[15]

Safety

The poor traffic operations expected at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection and the anticipated queuing on the northbound approach of the Central Point Rd/Warner Parrott Rd intersection and eastbound approach between the intersections may cause an increase in collisions within the study intersections. When an intersection is over capacity (has a v/c ratio greater than 1.0) and experiences a significant amount of delay, the potential for drivers to become impatient and act more recklessly (e.g. running-red lights) increases.

Since the U-turn movement isn't especially common in the State of Oregon, drivers may be unfamiliar with the practice and the added conflict point. For instance, drivers making a southbound right from Linn Ave during a red-light are used to yielding for either the westbound through movement or northbound left-turn movement. In this alternative, drivers wanting to make a southbound right must also yield to the eastbound U-turn movement, which may require additional signage or operational changes (e.g. no turn on red) to help drivers understand how to navigate each intersection turning movement safely.

Although the current crash rate at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection isn't expected to change drastically under this alternative, the Central Point Rd/Warner Parrott Rd intersection could expect a decrease in accidents arising from northbound vehicles making left-turns due to the movement restriction.

Typically, a wide variety of collision types occur at signalized intersections, the most severe of which are head-on, turning, and "T-bone" collisions. These collision types often have a higher frequency of injuries and fatalities than other types of collisions such as side-swipe or rear-end collisions. However, signalized intersections would provide a protected crossing for pedestrians using the intersection.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn.

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 4. Table 8 provides the results of the intersection operations analysis.

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[15] Planning level construction costs estimates for all five alternatives are provided in the appendix.

Table 8: 2035 Intersection Operations for Alt 2: Unsignalized Left-Turn Restriction without Signalized U-Turn

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.1	0.53
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	46.8	0.92

Signalized intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
v/c= Intersection Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c= Critical Movement Volume-to-Capacity Ratio

As shown, both study intersections meet mobility standards under 2035 PM peak hour conditions. It is important to note that this alternative causes minor rerouting through other intersections (see the *Volumes Adjustment Summary* section in this memorandum). Those impacts are not assessed in this study, but are expected to be minor.

Under this alternative, the intersection delay at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is projected to stay similar to that of the No-Build scenario and the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario which is due to the restriction of the northbound left-turn movement on the Central Point Rd intersection leg (critical movement).

Right-of-way/Access Impacts

Limited, if any, accesses are anticipated to be adversely affected for this alternative. All existing access to adjacent businesses will remain open, however, the Central Point Rd northbound left-turn will be restricted. Right-of-way acquisition is not expected for this alternative. Additionally, the two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City's intersection minimum access spacing requirements for minor arterials.[16]

Construction/Maintenance Costs

Construction costs for this alternative are expected to be minimal, and would be limited to the construction of the center median along Warner Parrott Rd. No modifications to the existing traffic signal are anticipated as part of this alternative. The ongoing maintenance costs affiliated with signalized intersections are expected to be similar to existing maintenance costs for this intersection and typically include equipment replacement, signal timing updates, power, etc.

A construction cost estimate for this alternative was developed by Wallis Engineering, and was found to be approximately $45,000.

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[16] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

Safety

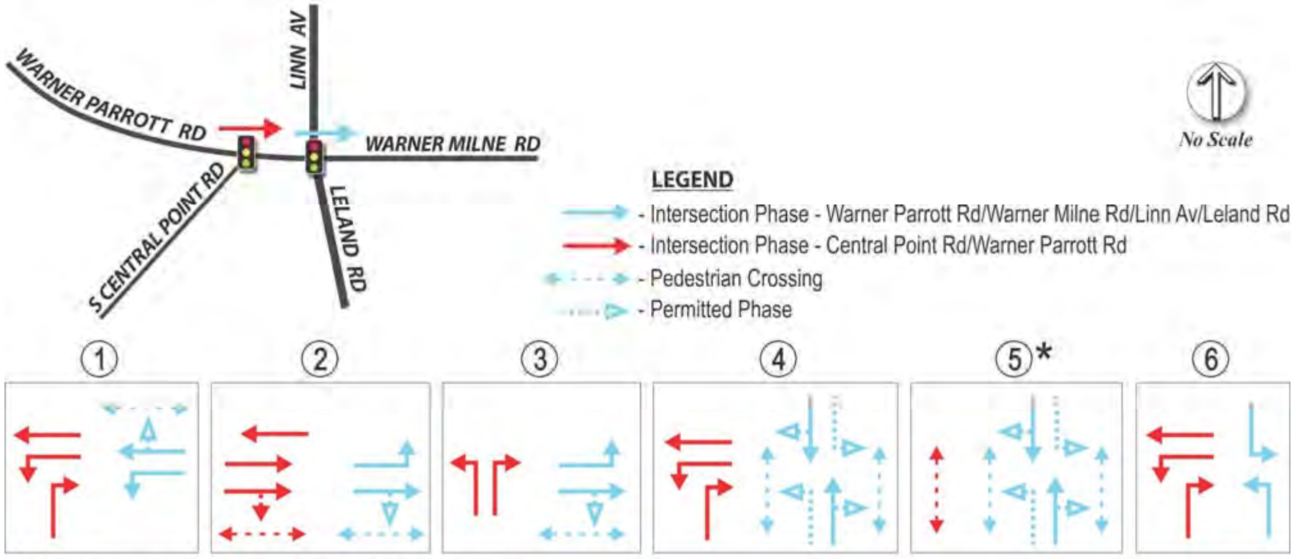
This alternative is not expected to change the safety of the study intersections significantly from existing conditions. However, it is important to note that the main types of collisions occurring at signalized intersections have a greater incidence of injury than other types of collisions. Although the current crash rate at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection isn't expected to change drastically under this alternative, the Central Point Rd/Warner Parrott Rd intersection could expect a decrease in accidents arising from northbound vehicles making left-turns due to the movement restriction.

Alternative 3: Both Intersections Signalized

A discussion of the coordinated signal phasing used for this alternative as well as the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 3: Both Intersections Signalized.

Coordinated Signal Phasing

Signalizing two intersections in such close proximity to each other create challenges in providing adequate through movement and not trapping vehicles between the two intersections. To help address these challenges, the two intersections will need to operate as one intersection, with signal phases carefully coordinated to allow for through movement and to prevent conflicts. To maintain a clear area between the two intersections, the eastbound and westbound phases need to operate using split phase timing. Split phase timing allows all the movements from one approach to flow through the intersection, instead of allowing through movements in two directions. This type of signal timing is typically less efficient than other types, but necessary in this case to provide adequate time for the through movement. The analysis maintained all four pedestrian crossings at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection, and includes two pedestrian crossings at the Central Point Rd/Warner Parrott Rd intersection. The proposed signal phasing is shown below in Figure 9.



* *Phase necessary if a pedestrian crossing is desired for the east and west legs of the Central Point/Warner Parrott Rd. intersection.*

Figure 9: Proposed Signal Phasing for Alternative 3 (Both Intersections Signalized)

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 5. Table 9 provides the results of the intersection operations analysis.

Table 9: 2035 Intersection Operations for Alt. 3: Both Intersections Signalized

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Maintaining all Pedestrian Crossings				
Central Point Rd/Warner Parrott Rd	0.99	C	20.2	0.53
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	F	151.1	1.12
Without Pedestrian Crossings on the East and West Legs of Central Point Rd/Warner Parrott Rd				
Central Point Rd/Warner Parrott Rd	0.99	B	16.8	0.49
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	E	67.1	1.02

Signalized intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
v/c = Intersection Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, the Warner Parrott Rd/Warner Milne Rd/Linn Av/Leland Rd intersection does not meet mobility standards under this alternative. Furthermore, an increase of over 20 seconds of delay from the No-Build scenario at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is expected under this alternative. This alternative was also analyzed without the pedestrian crossing on the east leg of Central Point Rd/Warner Parrott Rd. By eliminating this pedestrian crossing, more green time can be allocated to other movements and operations improve, but still do not meet mobility standards.

The split phase timing works well keeping the westbound area between the two intersections clear because the westbound through movement at Central Point Rd is served during four of the five phases shown in the proposed signal phasing. However, in the eastbound direction the block between the two intersections can become fully queued. Due to the northbound and southbound traffic demands at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, as well as the split phase eastbound-westbound signal timing, there is limited green time for the eastbound movement. The northbound right from Central Point Rd continuously fills that block, yet cannot proceed through the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection. This scenario creates a significant northbound vehicle queue on Central Point Rd although the delay of the critical movement approach is projected to significantly increase from the No-Build scenario at this location.

Since the intersection operations for this alternative fails to meet Oregon City's mobility standards, it is excluded from any further evaluation.

Alternative 4: Four-Leg Roundabout

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 4: Four-Leg Roundabout.

Intersection Operations

Intersection operations analysis was performed for both study intersections during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 6. Table 10 provides the results of the intersection operations analysis.

Table 10: 2035 Intersection Operations for Alt. 4: Four-Leg Roundabout

Intersection	Operating Standard	PM Peak Hour		
	v/c	*LOS*	*Delay*	*v/c*
Two-Lane Approach for all Four Roundabout Legs				
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	C	26.6	0.77
Two-Lane Approach for all but the South Leg (Leland Ave)				
Central Point Rd/Warner Parrott Rd	0.99	B/C	15.2	0.54
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd	0.99	D	49.3	0.91

Roundabout intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service
v/c = Critical Movement Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, the two study intersections operate with v/c ratios well below the mobility standard for Oregon City, in both four-legged options. However, at the conceptual stage, it is recommended that the scenario including a two-lane approach for all legs be carried forward for the evaluation. Taking this approach is likely to result in a conservative estimate of the potential impacts associated with this alternative. The possibility of phased construction could be considered as part of the final design process if needed.

The critical movement delays at both study intersections are expected to decrease at both study intersections under this alternative when compared with the No-Build scenario.

Right-of-way/Access Impacts

The Central Point Rd northbound left-turn will be restricted in this alternative and all existing accesses to adjacent businesses will remain open. However, the east and west driveways accessing the strip mall have the potential to be restricted to right-in, right-out only depending on the final configuration and design of the roundabout. These decisions would be made as part of the final design phase of the project, which is not expected to occur until funding is secured for the project. Even with these potential access restrictions, all movements from both intersections would be able to enter/exit the strip mall without going beyond the two study intersections.

This alternative would require right-of-way acquisitions to construct the proposed roundabout and realigned roadways. Based on the current concept for this alternative, approximately 5,000 square feet of right-of-way would need to be acquired. Additionally, the two study intersections are spaced less than 150 feet in this alternative, thus, it does not meet the City's intersection minimum access spacing requirements for minor arterials.[17]

Construction/Maintenance Costs

The cost of construction for this alternative is expected to be significantly higher than the construction costs other alternatives with signalized intersections. The major reason for this is the significant amount of new road construction and changes to roadway alignment that are needed to initially construct the roundabout. The cost associated with acquiring right-of-way is also a factor in the higher cost for this alternative as compared to the traffic signal alternatives.

Ongoing maintenance cost of a roundabout controlled intersection is highly dependent on the landscaping treatment. Options can range from high maintenance costs that include irrigation, regular pruning, and cleaning statues or other art work, to low maintenance cost options that may include a simple concrete island or pavers. Other ongoing costs could include lighting, maintaining signs related to the roundabout, and pedestrian crossing treatments.

A construction cost estimate for this alternative was developed by Wallis Engineering, and was found to be approximately $3,220,000.

Safety

Vehicles at roundabouts generally travel at slower speeds, which results in less severe collisions. Furthermore, the main collision types that occur at roundabout intersections (side-swipe or rear-end) typically have a lesser incidence of injury than other collision types. Studies show that roundabouts can reduce injury crashes by 72% to 80%[18,19].

Current guidance is to provide pedestrian crossing treatments for multi-lane approaches to roundabouts, as it can be difficult for visually impaired pedestrians to cross multiple lanes of an unsignalized facility. Therefore, pedestrian-activated flashers were assumed to be necessary at each crossing. The type of crossing treatment will need further review during the final design phase. Cyclists have the option to travel on the sidewalk or to circulate with traffic at an intersection with a roundabout configuration. For cyclists that choose to circulate with traffic, the relative speed between the cyclist and the adjacent motor vehicles is likely to be similar thus reducing the risk of high-impact collisions.

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[17] Oregon City Transportation System Plan, Volume I, Page 36, Table 1, June 2013.

[18] Insurance Institute for Highway Safety. Website Accessed 1/12/2015 : http://www.iihs.org/iihs/topics/t/roundabouts/qanda

[19] Eisenman, S.; Josselyn, J.; List, G.; Persaud, B.; Lyon, C.; Robinson, B.; Blogg, M.; Waltman, E.; and Troutbeck, R. 2004. Operational and safety performance of modern roundabouts and other intersection types. Final Report, SPR Project C-01-47. Albany, NY: New York State Department of Transportation.

Another safety consideration for this alternative is the vehicle queue created by the westbound left turn movement at Warner Parrott Rd/Central Point Rd. Existing observations revealed that vehicles making this movement queue through the adjacent signalized intersection occasionally during the PM peak hour. With volumes increasing by 2035, the queuing would likely grow more frequent. This vehicle queueing would likely be similar in Alternatives 1 and 2. However, with a roundabout there is some added complexity to the vehicle queue. With a signalized intersection at Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd, drivers can see the vehicle queue as they approach and choose not to enter the intersection. In the case of a roundabout, a driver might not be aware of the vehicle queue until they are in the roundabout, causing them to stop in the circulating roadway, which would then impact other movements through the roundabout as well.

Alternative 5: Five-Leg Roundabout

A discussion of the five areas of comparison; intersection operations, system context, right-of-way/access impacts, construction/maintenance costs, and safety are outlined in the sections below for Alternative 5: Five-Leg Roundabout.

Intersection Operations

Intersection operations analysis was performed for the combined study intersection during the PM peak hour using the adjusted future 2035 traffic volumes shown in Figure 8. Table 11 provides the results of the intersection operations analysis.

Table 11: 2035 Intersection Operations for Alt. 5: Five-Leg Roundabout

Intersection	**Operating Standard**	**PM Peak Hour**		
	v/c	*LOS*	*Delay*	*v/c*
Two-Lane Approach for all Five Roundabout Legs				
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd/Central Point Rd	0.99	C	31.1	0.83
Two-Lane Approach for all but the South Leg (Leland Ave) and the South-East Leg (Central Point Rd)				
Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd/Central Point Rd	0.99	E	62.5	0.97

Roundabout intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Level of Service
v/c = Critical Movement Volume-to-Capacity Ratio

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
v/c = Critical Movement Volume-to-Capacity Ratio

As shown, both roundabout scenarios have v/c ratios under the maximum standard for Oregon City. Similar to what was stated for Alternative 4, at the conceptual stage it is recommended that the scenario including a two-lane approach for all legs be carried forward for the evaluation. Furthermore, taking this approach is likely to result in a conservative estimate of the potential impacts associated with this alternative. The possibility of phased construction could be considered as part of the final design process if needed.

Under this alternative, the intersection delay at the Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection is projected to increase slightly when compared to the No-Build scenario and the delay of the critical movement approach for the Central Point Rd/Warner Parrott Rd intersection significantly decreases from the No-Build scenario.

Right-of-way/Access Impacts

No motor vehicle movements will be restricted in this alternative and all existing accesses to adjacent businesses will remain open, however, the east and west driveways for the strip mall has the potential to be restricted to right-in, right-out only and would require further analysis in the design phase. Even though this access restriction is not definite, all movements from both intersections would be able to enter and exit the site without going beyond the adjacent roundabout.

This alternative would require a significant amount of right-of-way acquisitions to construct the proposed roundabout and realigned roadways. Based on the current concept for this alternative, approximately 7,000 square feet of right-of-way would need to be acquired.

Construction/Maintenance Costs

The cost of construction for this alternative is expected to be significantly higher than the construction costs other alternatives with signalized intersections. The major reason for this is the significant amount of road construction and changes to roadway alignment that are needed to initially construct the roundabout. It is also anticipated that this alternative would be slightly more expensive than the four-legged roundabout in Alternative 4, due to the increased size of the roundabout required to accommodate the fifth leg. There is also more roadway alignment modifications required for this alternative compared to Alternative 4. The cost associated with acquiring right-of-way is also a factor in the higher cost for this alternative as compared to the traffic signal alternatives.

Similar to Alternative 4, the ongoing maintenance cost of a roundabout controlled intersection is highly dependent on the landscaping treatment. Options can range from high maintenance costs that include irrigation, regular pruning, and cleaning statues or other art work, to low maintenance cost options that may include a simple concrete island or pavers. Other ongoing costs could include lighting, maintaining signs related to the roundabout, and pedestrian crossing treatments.

A construction cost estimate for this alternative was developed by Wallis Engineering, and found to be approximately $3,350,000.

Safety

Similar to Alternative 4, a roundabout is expected to decrease the number of injury crashes by about 70%. Since this alternative includes a five-leg roundabout with complex lane geometry, driver confusion may occur and more conflict points for potential collisions exist for this alternative compared to others.

However, conflict points are not the only important factor in analyzing intersection safety. It is also important to discuss the general collision-types associated with roundabout intersections. The main collision types that occur at roundabouts (side-swipe, rear-end) typically have a lesser incidence of injury than other collision types. Furthermore, vehicles at roundabouts generally travel at slower speeds which results in less severe collisions.

Current guidance is to provide pedestrian crossing treatments for multi-lane approaches to roundabouts, as it can be difficult for visually impaired pedestrians to cross multiple lanes of an unsignalized facility. Therefore, pedestrian-activated flashers were assumed to be necessary at each crossing. The type of crossing treatment will need further review during the final design phase. Cyclists have the option to travel on the sidewalk or to circulate with traffic at an intersection with a roundabout configuration. For cyclists that choose to circulate with traffic, the relative speed between the cyclist and the adjacent motor vehicles is likely to be similar thus reducing the risk of high-impact collisions.

Present Worth Analysis

A present worth analysis was completed in order to determine the relative, present-day cost of each of the five alternatives. This analysis is included in the appendix. While the present worth analysis includes only those costs which are quantifiable, unquantifiable costs should also be considered.

Quantifiable Costs

Costs associated with construction delay, crashes, construction, and maintenance were estimated for each alternative. A short discussion of each of these quantifiable costs is included below.

Delay Costs

Traffic operations are based on the 2035 PM peak year analysis completed for each alternative. The cost associated with PM peak hour delay incorporates the average hourly cost of a passenger vehicle ($26.68) and for a heavy truck ($31.80)[20]. Using the hourly costs, along with existing traffic data (to establish the percent of passenger vehicles and heavy trucks), the average cost of PM peak hour delay for each alternative can be computed using the following equation:

$$Annual\ PM\ Peak\ Hour\ Delay\ Cost = \\ Total\ Peak\ Hour\ Delay\ (hrs) \times Adjusted\ Hourly\ Value\ Based\ on\ Percentages\ of\ Vehicle\ Types\ \times \\ 261\ (Total\ Weekdays\ in\ a\ Year)$$

These hourly costs can then be converted to an annual cost by multiplying them by the number of weekdays in a year. Using this methodology represents a conservative annual cost, because it excludes any delay that might occur outside of the weekday PM peak hour (i.e. weekends, AM peak hour).

Safety Costs

Annual safety benefits were calculated based on which crashes, over a five year period, could be prevented with the geometric changes of each alternative. The cost of a crash is associated with the level of severity. For the purposes of this evaluation, the following AASHTO[21] established costs for the various severity levels were used:

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[20] The Value of Time-Travel: Estimates of the Hourly Value of Time for Vehicles in Oregon 2011. Oregon Department of Transportation Programs and Economic Analysis Unit. November 2012.

[21] American Association of State Highway and Transportation Officials (AASHTO). Highway Safety Manual. 1st Edition. 2010. Table 7-1.

- Property damage only = $7,400
- Injury crash = $79,000
- Fatal crash = $4,008,900

Five years of crash data was analyzed, so the savings is divided by five to obtain annual crash savings. The general equation used to compute the crash savings for each alternative is displayed below:

$$\begin{aligned}
Annual\ Crash\ Savings &= \frac{[\#of\ Fatal\ Crashes\ Reduced\ \times \$4{,}008{,}900]}{5} \\
&+ \frac{[\#of\ Injury\ Crashes\ Reduced\ \times \$79{,}000]}{5} + \frac{[\#\ of\ PDO\ Crashes\ Reduced\ \times \$7{,}400]}{5}
\end{aligned}$$

For each alternative, the northbound left turn from Central Point Road to Warner Parrot Road is eliminated, which prevents one injury and two PDO crashes (over five years). For alternatives 1 and 2, these are the only crashes prevented.

Roundabouts typically result in less severe crashes than a typical traffic signal, with studies documenting a 72% to 80% reduction in injury crashes. This present worth analysis applied a conservative estimate, reducing 70% of injury crashes to PDO crashes at the roundabout intersections. For alternative 4, converting 70% of the injury crashes at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection to PDO crashes, equated to five crashes. For alternative 5, a 70% reduction in injury crashes was applied to both intersections (after accounting for the crashes prevented by eliminating the northbound left turn movement from Central Point Road to prevent double counting). For the five lane roundabout the 70% reduction equated to eight injury crashes being reduced to PDO crashes.

Construction Costs

A preliminary cost estimate was completed for all alternatives except the No-Build Alternative, with a planning-level approach to costs. The estimates include costs associated with design, construction, permitting, and Right-of-Way acquisition. Each cost estimate is included in the appendix.

Maintenance Costs

Maintenance costs for each alternative were also estimated. For Alternatives 1, 2, and 3, these are from signal maintenance. For Alternatives 4 and 5, costs are associated with landscaping maintenance. Maintenance of pavement or utilities within the intersection was not included, because these would be relatively the same for all alternatives.

Unquantifiable Costs

There are a number of significant costs which are not addressed in the present worth analysis. However difficult to quantify, these costs should be considered when determining the most optimal design solution.

Opportunity

There are significant costs for each project resulting from lost opportunities. Construction of each alternative would require funds. These funds, applied elsewhere, represent opportunities for improvements elsewhere. The greater the cost of the alternative, the larger the loss of opportunity to construct other improvements. For example, the construction of Alternative 5 (the 5-leg roundabout) would require a large amount of funds that could alternatively be used to construct other, perhaps greater-needed improvements.

Construction Delay

The traffic delays associated with construction are difficult to quantify, but represent significant costs to users – and to destination businesses within the project area. The more extensive the scope of work for each alternative, the greater the construction delay impacts - and their associated costs.

Impacts to Private Businesses

The construction impacts to private businesses and roadway users would vary substantially between the various alternatives. The significant reconfiguration of the intersection as required by Alternatives 4 and 5 would necessitate the reconfiguration of private properties within the intersection, such as driveways and roadway frontages. These costs to private property owners are not quantifiable at this level of planning.

Public Right-of-Way

The construction of Alternatives 4 or 5 would require a portion of Right-of-Way at the northwest corner of the intersection. Though this property is owned by the City, its use for a roundabout would have an associated cost to the City due to the inability to use it for another purpose.

COMPARISON SUMMARY

A summary table comparing each of the five alternatives plus the No-Build scenario is displayed in Table 12. The table is color coded, with light green shading indicating a more favorable factor (such as lower cost, or better traffic operations), yellow shading indicating a less favorable factor, and orange indicating the least favorable outcome (such as higher cost, lower safety improvements, etc).

Overall, the roundabout alternatives (alternatives 4 and 5) show the greatest benefit for operations and safety, but also have the largest construction cost, which includes right-of-way acquisition. Alternatives 1 and 2 have a much more modest construction cost, yet the operational benefits and safety benefits are not nearly what can be achieved with the roundabout options. Alternative 3, where both intersections are signalized, does not meet operational standards. Based on future traffic operations and potential savings related to safety, Alternative 5 is recommended as the long-term preferred alternative for these study intersections. If a short-term solution is desired, Alternative 1 or 2 could be implemented at a significantly lower cost.

Table 12: Future Alternatives Evaluation Summary Table

Alternative	Alternative Description	TRAFFIC OPERATIONS				CONSTRUCTION COSTS		SAFETY		System Context	Right-of-way/Access Impacts
		v/c ratio at Central Point	v/c ratio at Linn Ave	Annual Weekday PM Peak Hour Delay Cost	Queuing Between Intersections	Construction Assumptions	Estimated Construction Cost	Safety Elements	Annual Savings due to crash reduction		
No Build	Maintain existing lane configuration	1.38	0.91	$316,610	There is currently queuing between the study intersections due to the close proximity	None	$0	No changes	$0	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	Does not meet Oregon City's intersection access spacing standards.
1	Unsignalized northbound left-turn restriction at the Central Point Rd/Warner Parrott Rd intersection with an eastbound U-turn option for passenger vehicles at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.	0.54	0.92	$279,361	Queuing between the two study intersections due to their close proximity could have a similar impact to existing conditions	Key costs for this alternative include: • modifications to signal due to added U-Turn • channelizing island	$115,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash CONS • U-turn movement adds conflict points, and is only allowed for passenger vehicles • Traffic signals generally result in more severe crashes	$18,760	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - none Accesses Closed - none Accesses Modified - 1 (restricts northbound left from Central Point Road) Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
2	Unsignalized northbound left-turn restriction at the Central Point Rd/Warner Parrott Rd intersection without an eastbound U-turn option at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.	0.53	0.92	$254,529	Queuing between the two study intersections due to their close proximity could have a similar impact to existing conditions	Key costs for this alternative include: • channelizing island	$45,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash CONS • Traffic signals generally result in more severe crashes • Requires an alternate route	$18,760	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - none Accesses Closed - none Accesses Modified - 1 (restricts northbound left from Central Point Road) Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
3	No movements are restricted and both study intersections are fully signalized. Due to the close proximity of the study intersections, the two signals would essentially need to operate as one intersection.	0.53	1.12	This alternative does not meet mobility standards and is not considered for further evaluation and comparison.							
4	The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection would be converted into a four-legged roundabout that allows U-turns for all vehicle types. Northbound left turns at the Central Point Rd/Warner Parrott Rd intersection would be restricted by the installation of a median along Warner Parrott Road.	0.54	0.77	$98,708	Queuing due to the close intersectionproximity could have a greater impact to existing conditions because of the roundabout configuration at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection	Key costs for this alternative include: • construction of roundabout • right-of-way acquisition • lighting	$3,220,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash • Roundabouts generally result in less severe crashes than a traffic signal. Studies show a 72-80% reduction in injury crashes. This evaluation assumes a 70% reduction in injury crashes at Linn Ave (After accounting for the injury crashes eliminated due to restricted movements, 5 more injury crashes are reduced to PDO crashes) CONS • Pedestrian crossings more challenging especially for impaired pedestrians • Complex roundabout • Queuing into roundabout is likely to occur	$90,360	A roundabout may be less familiar to Oregon City area drivers than a traffic signal. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - 4,590 square feet Accesses Closed - none Accesses Modified - 3 (restricts northbound left from Central Point Road and relocates driveways to businesses between Central Point Rd and Leland Rd. Both driveways would be right-in/right-out. Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
5	A single five-legged roundabout that includes the Central Point Road approach with no motor vehicle movement restrictions.	n/a	0.83	$91,879	No queuing between intersections will occur under this alternative (the two intersections will become one)	Key costs for this alternative include: • construction of roundabout • right-of-way acquisition (slightly more than Alternative 4) • lighting	$3,350,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash • Removal of the westbound left at Central Point eliminates 1 injury crash • Roundabouts generally result in less severe crashes than a traffic signal. Studies show a 72-80% reduction in injury crashes. This evaluation assumes a 70% reduction in injury crashes at Linn Ave and Central Point Rd (After accounting for the injury crashes that were eliminated due to restricted movements, 8 more INJ crashes are reduced to PDO crashes) CONS • Pedestrian crossings more challenging especially for impaired pedestrians • Complex two lane roundabout	$149,120	A roundabout may be less familiar to Oregon City area drivers than a traffic signal. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - 6,980 square feet Accesses Closed - none Accesses Modified - 2 (relocates driveways to businesses between Central Point Rd and Leland Rd. Both driveways would be right-in/right-out.) Out of Direction Travel - none Meets Oregon City's intersection access spacing standards.

KEY

🟩 Green =

🟨 Yellow =

🟧 Orange =

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Appendix

Peak Hour Turn Movement Counts

Total Vehicle Summary

All Traffic Data Services Inc.

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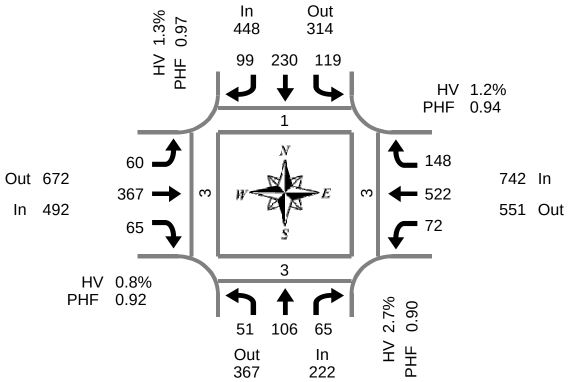

Peak Hour Summary
4:45 PM to 5:45 PM

Leland Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
4:00 PM	11	24	12	0	32	51	19	0	12	81	12	0	21	113	38	0	426
4:15 PM	9	29	15	0	27	56	19	0	16	85	16	0	18	125	32	0	447
4:30 PM	13	24	17	0	27	60	26	0	17	77	18	0	24	131	27	1	461
4:45 PM	9	21	20	0	33	52	23	0	13	94	18	0	20	125	34	1	462
5:00 PM	12	28	13	0	33	57	26	0	15	81	19	0	17	139	42	1	482
5:15 PM	14	28	15	0	27	60	23	0	19	101	13	0	17	119	36	0	472
5:30 PM	16	29	17	0	26	61	27	0	13	91	15	0	18	139	36	0	488
5:45 PM	13	25	11	0	23	53	22	0	15	87	16	0	20	114	32	0	431
Total Survey	97	208	120	0	228	450	185	0	120	697	127	0	155	1,005	277	3	3,669

Pedestrians Crosswalk			
North	South	East	West
2	0	0	0
1	0	0	1
0	2	0	0
0	0	2	1
0	0	1	0
1	1	0	2
0	2	0	0
1	1	0	0
5	6	3	4

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	222	367	589	0	448	314	762	0	492	672	1,164	0	742	551	1,293	2	1,904
%HV	2.7%				1.3%				0.8%				1.2%				1.3%
PHF	0.90				0.97				0.92				0.94				0.98

Pedestrians Crosswalk			
North	South	East	West
1	3	3	3

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	51	106	65	222	119	230	99	448	60	367	65	492	72	522	148	742	1,904
%HV	2.0%	2.8%	3.1%	2.7%	2.5%	0.9%	1.0%	1.3%	1.7%	0.5%	1.5%	0.8%	2.8%	1.0%	1.4%	1.2%	1.3%
PHF	0.80	0.91	0.81	0.90	0.90	0.94	0.92	0.97	0.79	0.91	0.86	0.92	0.90	0.94	0.88	0.94	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
4:00 PM	42	98	64	0	119	219	87	0	58	337	64	0	83	494	131	2	1,796
4:15 PM	43	102	65	0	120	225	94	0	61	337	71	0	79	520	135	3	1,852
4:30 PM	48	101	65	0	120	229	98	0	64	353	68	0	78	514	139	3	1,877
4:45 PM	51	106	65	0	119	230	99	0	60	367	65	0	72	522	148	2	1,904
5:00 PM	55	110	56	0	109	231	98	0	62	360	63	0	72	511	146	1	1,873

Pedestrians Crosswalk			
North	South	East	West
3	2	2	2
1	2	3	2
1	3	3	3
1	3	3	3
2	4	1	2

Heavy Vehicle Summary

Clay Carney
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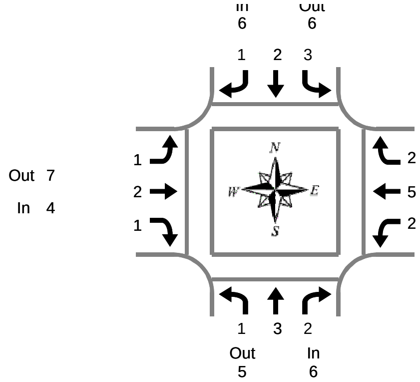

Leland Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	**Northbound** Leland Rd				**Southbound** Leland Rd				**Eastbound** Warner Parrott Rd				**Westbound** Warner Parrott Rd				**Interval Total**
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	0	1	2	2	0	0	2	0	2	0	2	1	2	0	3	9
4:15 PM	0	1	0	1	0	1	1	2	2	1	1	4	0	1	1	2	9
4:30 PM	2	1	0	3	1	0	2	3	1	2	0	3	2	0	0	2	11
4:45 PM	0	0	1	1	2	0	0	2	0	1	1	2	1	3	0	4	9
5:00 PM	0	2	0	2	0	0	1	1	0	0	0	0	0	1	1	2	5
5:15 PM	0	1	0	1	0	1	0	1	1	0	0	1	1	0	1	2	5
5:30 PM	1	0	1	2	1	1	0	2	0	1	0	1	0	1	0	1	6
5:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	2	1	3	4
Total Survey	4	6	3	13	6	3	4	13	4	7	2	13	5	10	4	19	58

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	**Northbound** Leland Rd			**Southbound** Leland Rd			**Eastbound** Warner Parrott Rd			**Westbound** Warner Parrott Rd			**Total**
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	5	11	6	6	12	4	7	11	9	7	16	25
PHF	0.25			0.21			0.11			0.28			0.22

By Movement	**Northbound** Leland Rd				**Southbound** Leland Rd				**Eastbound** Warner Parrott Rd				**Westbound** Warner Parrott Rd				**Total**
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	3	2	6	3	2	1	6	1	2	1	4	2	5	2	9	25
PHF	0.08	0.25	0.50	0.25	0.25	0.25	0.08	0.21	0.08	0.10	0.13	0.11	0.17	0.31	0.25	0.28	0.22

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	**Northbound** Leland Rd				**Southbound** Leland Rd				**Eastbound** Warner Parrott Rd				**Westbound** Warner Parrott Rd				**Interval Total**
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	3	2	2	7	5	1	3	9	3	6	2	11	4	6	1	11	38
4:15 PM	2	4	1	7	3	1	4	8	3	4	2	9	3	5	2	10	34
4:30 PM	2	4	1	7	3	1	3	7	2	3	1	6	4	4	2	10	30
4:45 PM	1	3	2	6	3	2	1	6	1	2	1	4	2	5	2	9	25
5:00 PM	1	4	1	6	1	2	1	4	1	1	0	2	1	4	3	8	20

Peak Hour Summary

All Traffic Data Services Inc.

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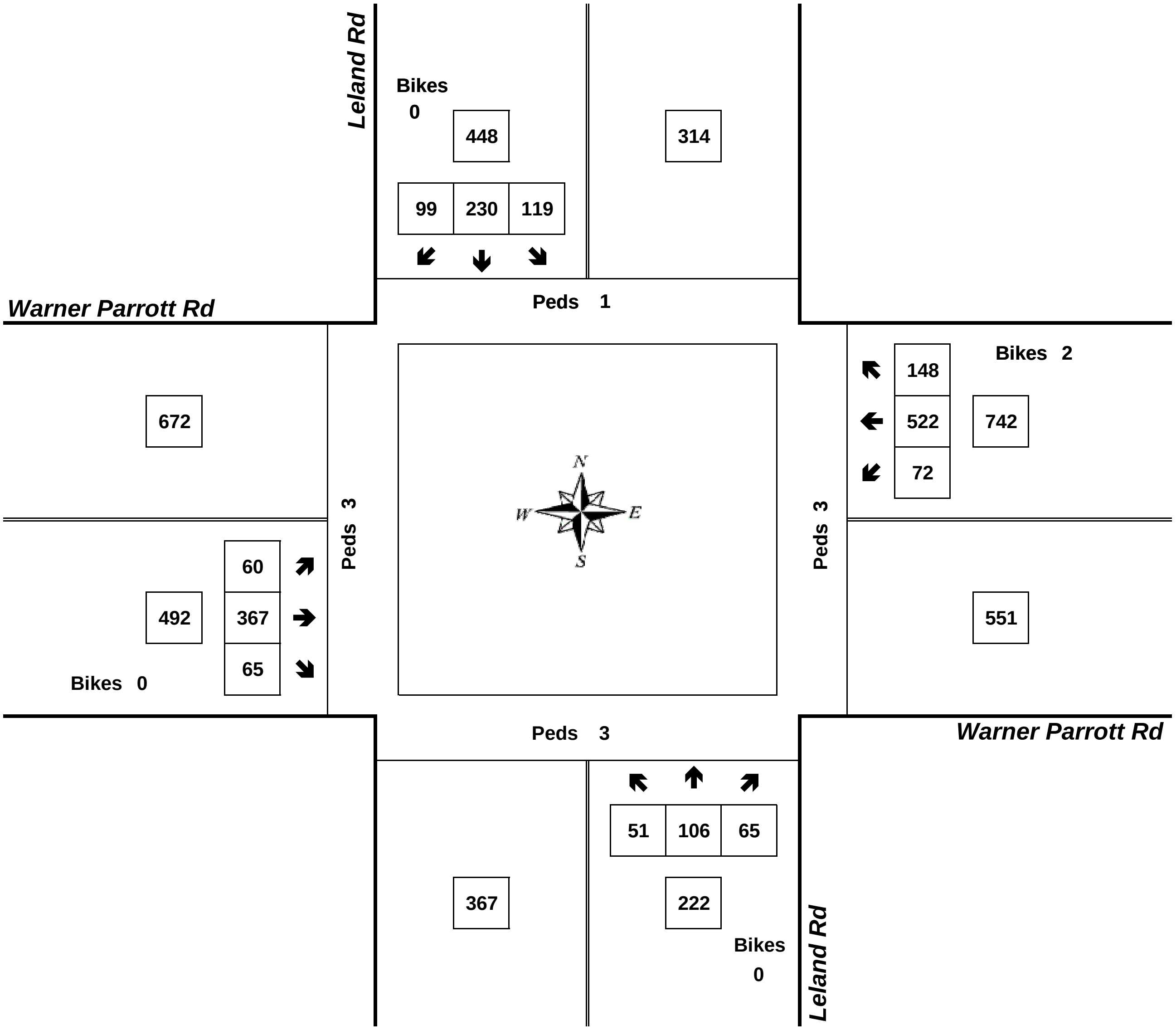
Leland Rd & Warner Parrott Rd

4:45 PM to 5:45 PM
Tuesday, December 02, 2014



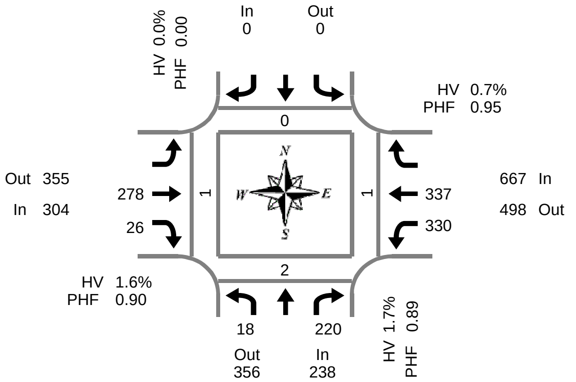
Approach	PHF	HV%	Volume
EB	0.92	0.8%	492
WB	0.94	1.2%	742
NB	0.90	2.7%	222
SB	0.97	1.3%	448
Intersection	0.98	1.3%	1,904

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Central Point Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	5		50	0				0		60	8	0	80	69		0	272	0	2	0	0
4:15 PM	5		55	0				0		62	5	0	68	81		0	276	0	1	0	0
4:30 PM	4		45	0				0		67	7	0	84	82		1	289	0	0	2	0
4:45 PM	2		52	0				0		75	9	0	80	79		0	297	0	0	0	0
5:00 PM	6		56	0				0		61	6	0	75	91		0	295	0	0	0	1
5:15 PM	6		61	0				0		72	7	0	85	82		0	313	0	2	1	0
5:30 PM	4		51	0				0		70	4	1	90	85		2	304	0	0	0	0
5:45 PM	6		42	0				0		71	6	0	74	77		0	276	0	0	0	0
Total Survey	38		412	0				0		538	52	1	636	646		3	2,322	0	5	3	1

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	238	356	594	0	0	0	0	0	304	355	659	1	667	498	1,165	2	1,209	0	2	1	1
%HV	1.7%				0.0%				1.6%				0.7%				1.2%				
PHF	0.89				0.00				0.90				0.95				0.97				

By Movement	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	18		220	238				0		278	26	304	330	337		667	1,209
%HV	11.1%	NA	0.9%	1.7%	NA	NA	NA	0.0%	NA	1.1%	7.7%	1.6%	0.6%	0.9%	NA	0.7%	1.2%
PHF	0.75		0.90	0.89				0.00		0.93	0.72	0.90	0.92	0.93		0.95	0.97

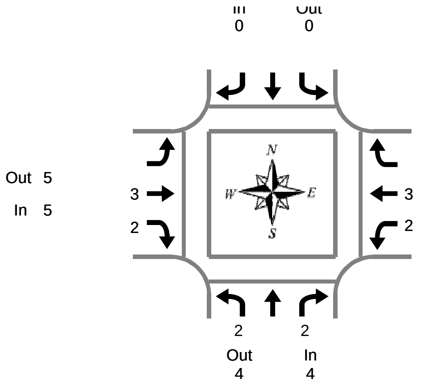
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Central Point Rd				Southbound Central Point Rd				Eastbound Warner Parrott Rd				Westbound Warner Parrott Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	16		202	0				0		264	29	0	312	311		1	1,134	0	3	2	0
4:15 PM	17		208	0				0		265	27	0	307	333		1	1,157	0	1	2	1
4:30 PM	18		214	0				0		275	29	0	324	334		1	1,194	0	2	3	1
4:45 PM	18		220	0				0		278	26	1	330	337		2	1,209	0	2	1	1
5:00 PM	22		210	0				0		274	23	1	324	335		2	1,188	0	2	1	1

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Central Point Rd & Warner Parrott Rd

Tuesday, December 02, 2014
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				Interval
Time	L		R	Total				Total		T	R	Total	L	T		Total	Total
4:00 PM	1		1	2				0		2	1	3	2	1		3	8
4:15 PM	2		0	2				0		1	0	1	1	2		3	6
4:30 PM	0		2	2				0		1	1	2	3	1		4	8
4:45 PM	0		1	1				0		2	0	2	1	2		3	6
5:00 PM	0		0	0				0		0	1	1	0	1		1	2
5:15 PM	1		1	2				0		0	1	1	1	0		1	4
5:30 PM	1		0	1				0		1	0	1	0	0		0	2
5:45 PM	0		0	0				0		0	0	0	1	1		2	2
Total Survey	5		5	10				0		7	4	11	9	8		17	38

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound			Southbound			Eastbound			Westbound			Total
	Central Point Rd			Central Point Rd			Warner Parrott Rd			Warner Parrott Rd			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	4	8	0	0	0	5	5	10	5	5	10	14
PHF	0.17			0.00			0.21			0.13			0.16

By Movement	Northbound				Southbound				Eastbound				Westbound				Total
	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	2		2	4				0		3	2	5	2	3		5	14
PHF	0.17		0.17	0.17				0.00		0.19	0.25	0.21	0.08	0.15		0.13	0.16

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	Central Point Rd				Central Point Rd				Warner Parrott Rd				Warner Parrott Rd				Interval
Time	L		R	Total				Total		T	R	Total	L	T		Total	Total
4:00 PM	3		4	7				0		6	2	8	7	6		13	28
4:15 PM	2		3	5				0		4	2	6	5	6		11	22
4:30 PM	1		4	5				0		3	3	6	5	4		9	20
4:45 PM	2		2	4				0		3	2	5	2	3		5	14
5:00 PM	2		1	3				0		1	2	3	2	2		4	10

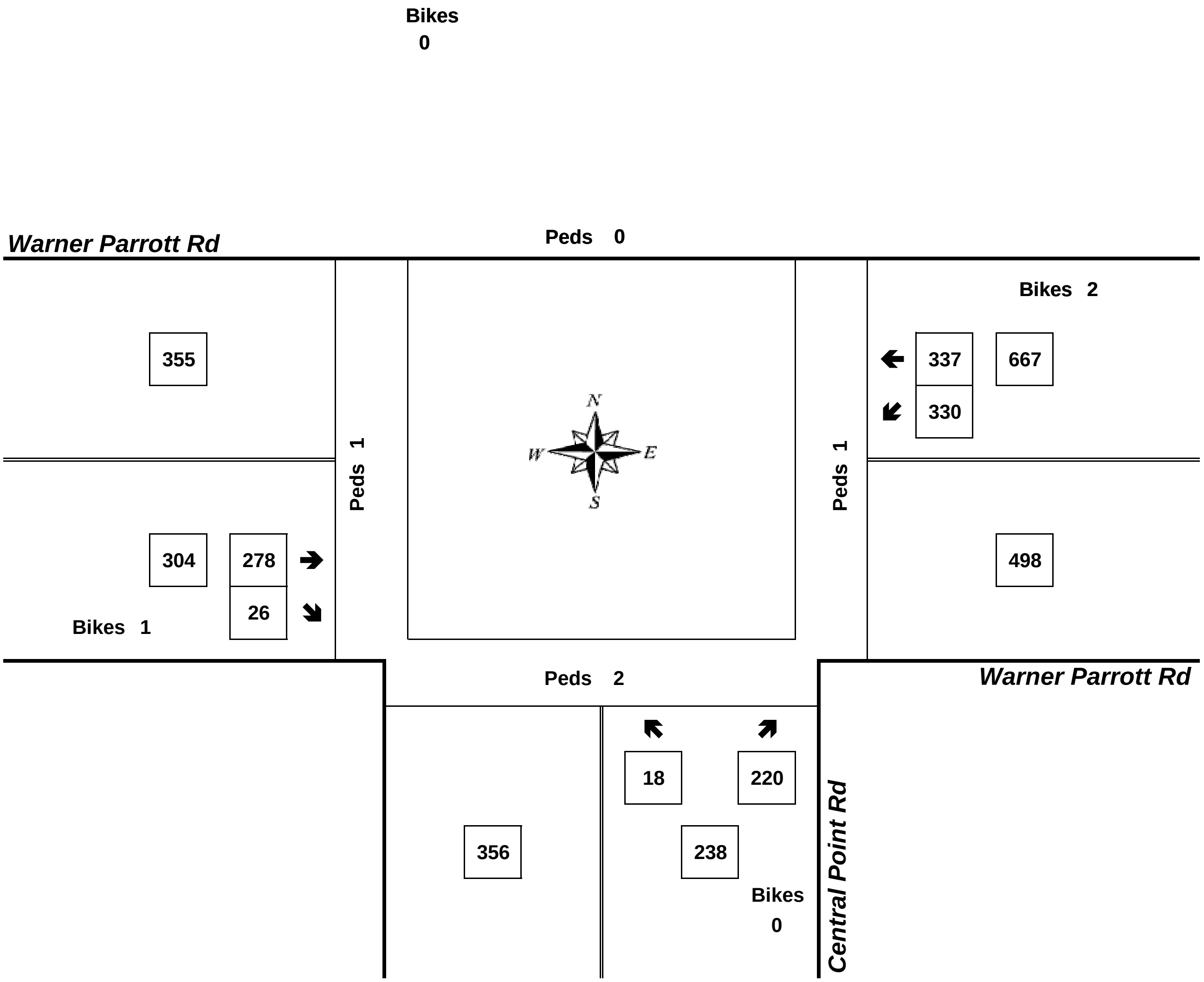
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Central Point Rd & Warner Parrott Rd

4:45 PM to 5:45 PM
Tuesday, December 02, 2014



Approach	PHF	HV%	Volume
EB	0.90	1.6%	304
WB	0.95	0.7%	667
NB	0.89	1.7%	238
SB	0.00	0.0%	0
Intersection	0.97	1.2%	1,209

Count Period: 4:00 PM to 6:00 PM

HCM Intersection Analysis (Synchro)

HCM Signalized Intersection Capacity Analysis
12: Central Point Road & Warner Parrott Road

2035_Both intersections SIGNALIZED_PM peak

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations	↰	↱	↰↱		↰	↱
Volume (vph)	400	475	340	125	65	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.97		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	0.85
Flt Protected	0.95	1.00	0.96		0.95	1.00
Satd. Flow (prot)	1805	1615	3296		1719	1599
Flt Permitted	0.95	1.00	0.96		0.95	1.00
Satd. Flow (perm)	1805	1615	3296		1719	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	412	490	351	129	67	361
RTOR Reduction (vph)	0	38	32	0	0	61
Lane Group Flow (vph)	412	452	448	0	67	300
Confl. Peds. (#/hr)	5			5		1
Heavy Vehicles (%)	0%	0%	2%	4%	5%	1%
Turn Type	Prot	custom	Prot		Prot	custom
Protected Phases	1 3 4	1 2 3 4	2		5	1 3 4 5
Permitted Phases						
Actuated Green, G (s)	70.4	104.4	29.5		7.0	81.4
Effective Green, g (s)	66.4	100.4	29.5		7.0	73.4
Actuated g/C Ratio	0.55	0.84	0.25		0.06	0.61
Clearance Time (s)			4.5		4.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)	999	1352	810		100	978
v/s Ratio Prot	c0.23	0.28	c0.14		c0.04	0.19
v/s Ratio Perm						
v/c Ratio	0.41	0.33	0.55		0.67	0.31
Uniform Delay, d1	15.5	2.2	39.4		55.3	11.1
Progression Factor	0.25	0.55	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	0.8		16.2	0.2
Delay (s)	3.9	1.3	40.3		71.5	11.3
Level of Service	A	A	D		E	B
Approach Delay (s)	2.5		40.3		20.7	
Approach LOS	A		D		C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

2035_Both intersections SIGNALIZED_PM peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	90	485	115	160	615	180	140	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1793		1770	3391		1770	1725		1767	1769	
Flt Permitted	0.95	1.00		0.95	1.00		0.16	1.00		0.25	1.00	
Satd. Flow (perm)	1770	1793		1770	3391		292	1725		464	1769	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	143	184	117	173	276	122
RTOR Reduction (vph)	0	7	0	0	23	0	0	19	0	0	13	0
Lane Group Flow (vph)	92	605	0	163	789	0	143	282	0	173	385	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	2 5	2 5		1	1		3	4		3	4	
Permitted Phases							4			4		
Actuated Green, G (s)	41.0	41.0		28.5	28.5		33.4	25.5		33.4	25.5	
Effective Green, g (s)	41.0	41.0		28.5	28.5		33.4	25.5		33.4	25.5	
Actuated g/C Ratio	0.34	0.34		0.24	0.24		0.28	0.21		0.28	0.21	
Clearance Time (s)				4.5	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	605	613		420	806		178	366		215	376	
v/s Ratio Prot	0.05	c0.34		0.09	c0.23		0.05	0.16		c0.05	c0.22	
v/s Ratio Perm							0.17			0.17		
v/c Ratio	0.15	0.99		0.39	0.98		0.80	0.77		0.80	1.02	
Uniform Delay, d1	27.4	39.2		38.4	45.4		51.8	44.4		48.1	47.2	
Progression Factor	0.70	0.72		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	31.0		0.6	26.3		22.4	9.6		19.2	52.4	
Delay (s)	19.2	59.1		39.0	71.7		74.2	54.1		67.3	99.6	
Level of Service	B	E		D	E		E	D		E	F	
Approach Delay (s)		53.9			66.2			60.6			89.8	
Approach LOS		D			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: Central Point Road & Warner Parrott Road

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations	↰	↱	↰↱		↰	↱
Volume (vph)	400	475	340	125	65	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.97		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	0.85
Flt Protected	0.95	1.00	0.96		0.95	1.00
Satd. Flow (prot)	1805	1615	3298		1719	1599
Flt Permitted	0.95	1.00	0.96		0.95	1.00
Satd. Flow (perm)	1805	1615	3298		1719	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	412	490	351	129	67	361
RTOR Reduction (vph)	0	150	32	0	0	165
Lane Group Flow (vph)	412	340	448	0	67	196
Confl. Peds. (#/hr)	5			5		1
Heavy Vehicles (%)	0%	0%	2%	4%	5%	1%
Turn Type	Prot	custom	Prot		Prot	custom
Protected Phases	1 3 4	1 2 3 4	2		5	1 3 4 5
Permitted Phases						
Actuated Green, G (s)	51.5	78.5	22.5		11.0	62.5
Effective Green, g (s)	47.5	74.5	22.5		11.0	58.5
Actuated g/C Ratio	0.44	0.69	0.21		0.10	0.54
Clearance Time (s)			4.5		4.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)	797	1119	690		175	870
v/s Ratio Prot	c0.23	0.21	c0.14		c0.04	0.12
v/s Ratio Perm						
v/c Ratio	0.52	0.30	0.65		0.38	0.23
Uniform Delay, d1	21.7	6.4	38.9		45.1	12.7
Progression Factor	0.31	2.04	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	2.1		1.4	0.1
Delay (s)	6.7	13.1	41.0		46.5	12.9
Level of Service	A	B	D		D	B
Approach Delay (s)	10.2		41.0		18.1	
Approach LOS	B		D		B	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	25.5
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

2035_Both intersections SIGNALIZED_PM peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	90	485	115	160	615	180	140	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1794		1770	3393		1770	1723		1766	1768	
Flt Permitted	0.95	1.00		0.95	1.00		0.32	1.00		0.32	1.00	
Satd. Flow (perm)	1770	1794		1770	3393		596	1723		595	1768	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	143	184	117	173	276	122
RTOR Reduction (vph)	0	6	0	0	22	0	0	19	0	0	13	0
Lane Group Flow (vph)	92	606	0	163	790	0	143	282	0	173	385	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	2 5	2 5		1	1		3	4		3	4	
Permitted Phases							4			4		
Actuated Green, G (s)	38.0	38.0		22.5	22.5		20.5	12.5		20.5	12.5	
Effective Green, g (s)	38.0	38.0		22.5	22.5		20.5	12.5		20.5	12.5	
Actuated g/C Ratio	0.35	0.35		0.21	0.21		0.19	0.12		0.19	0.12	
Clearance Time (s)				4.5	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	625	634		370	710		201	200		200	205	
v/s Ratio Prot	0.05	c0.34		0.09	c0.23		0.05	0.16		c0.06	c0.22	
v/s Ratio Perm							0.08			0.10		
v/c Ratio	0.15	0.96		0.44	1.11		0.71	1.41		0.86	1.88	
Uniform Delay, d1	23.7	33.9		37.0	42.5		45.1	47.5		45.8	47.5	
Progression Factor	0.53	0.61		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	22.9		0.8	69.0		11.3	212.4		30.0	412.5	
Delay (s)	12.6	43.7		37.9	111.5		56.4	259.9		75.8	460.0	
Level of Service	B	D		D	F		E	F		E	F	
Approach Delay (s)		39.6			99.2			194.4			343.6	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	151.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	25.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NEL	NER
Vol, veh/h	340	125	475	460	0	390
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	474	0	402

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1870	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1454	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	69	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	209	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	38	754
Mov Cap-2 Maneuver	-	-	-	-	38	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	114	-

Approach	EB	WB	NE
HCM Control Delay, s	0	5.6	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	754	-	-	1088	-
HCM Lane V/C Ratio	0.533	-	-	0.45	-
HCM Control Delay (s)	15.1	-	-	11	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	3.2	-	-	2.4	-

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	130	485	115	160	615	180	160	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	3395		1770	1729		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	3395		1770	1729		1770	1770	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	133	495	117	163	628	184	163	184	117	173	276	122
RTOR Reduction (vph)	0	10	0	0	30	0	0	26	0	0	18	0
Lane Group Flow (vph)	133	602	0	163	782	0	163	275	0	173	380	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	8.8	30.9		9.0	31.1		9.0	21.4		9.0	21.4	
Effective Green, g (s)	8.8	30.9		9.0	31.1		9.0	21.4		9.0	21.4	
Actuated g/C Ratio	0.10	0.35		0.10	0.36		0.10	0.25		0.10	0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	178	635		182	1209		182	423		182	433	
v/s Ratio Prot	0.08	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21	
v/s Ratio Perm												
v/c Ratio	0.75	0.95		0.90	0.65		0.90	0.65		0.95	0.88	
Uniform Delay, d1	38.2	27.4		38.7	23.5		38.7	29.6		38.9	31.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	23.5		38.4	1.2		38.4	3.6		52.2	17.8	
Delay (s)	53.8	50.9		77.1	24.7		77.1	33.2		91.2	49.5	
Level of Service	D	D		E	C		E	C		F	D	
Approach Delay (s)		51.4			33.5			48.6			62.1	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	340	125	475	460	0	395
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	474	0	407

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1870	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1454	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	69	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	209	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	38	754
Mov Cap-2 Maneuver	-	-	-	-	38	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	114	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	754	-	-	1088	-
HCM Lane V/C Ratio	0.54	-	-	0.45	-
HCM Control Delay (s)	15.2	-	-	11	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	3.3	-	-	2.4	-

HCM Signalized Intersection Capacity Analysis
98: Leland Rd/Linn Ave & Warner Milne Rd

	↶	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↰	↱		↰	↑↱		↰	↱		↰	↱
Volume (vph)	45	90	485	115	160	615	180	155	180	115	170	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5
Lane Util. Factor		1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1566	1796		1770	3395		1770	1729		1770	1770
Flt Permitted		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1566	1796		1770	3395		1770	1729		1770	1770
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	49	92	495	117	163	628	184	158	184	117	173	276
RTOR Reduction (vph)	0	0	9	0	0	27	0	0	26	0	0	18
Lane Group Flow (vph)	0	141	603	0	163	785	0	158	275	0	173	380
Confl. Peds. (#/hr)		5		8	8		5			6	6	
Confl. Bikes (#/hr)				1						4		
Turn Type	Prot	Prot	NA		Prot	NA		Prot	NA		Prot	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases												
Actuated Green, G (s)		13.1	31.5		9.1	27.5		7.1	21.2		7.1	21.2
Effective Green, g (s)		13.1	31.5		9.1	27.5		7.1	21.2		7.1	21.2
Actuated g/C Ratio		0.15	0.37		0.11	0.32		0.08	0.25		0.08	0.25
Clearance Time (s)		4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		238	658		187	1086		146	426		146	436
v/s Ratio Prot		0.09	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21
v/s Ratio Perm												
v/c Ratio		0.59	0.92		0.87	0.72		1.08	0.65		1.18	0.87
Uniform Delay, d1		33.9	25.9		37.8	25.8		39.4	29.0		39.4	31.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.9	17.4		33.0	2.4		98.2	3.4		132.7	17.1
Delay (s)		37.8	43.4		70.8	28.2		137.6	32.4		172.1	48.1
Level of Service		D	D		E	C		F	C		F	D
Approach Delay (s)			42.3			35.4			68.6			85.7
Approach LOS			D			D			E			F

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.9	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	120
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	122
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	2
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 2010 TWSC
1: Central Point Road & Warner Parrott Road

Intersection	
Int Delay, s/veh	19.2

Movement	EBT	EBR	WBL	WBT	NEL	NER
Vol, veh/h	340	125	475	410	55	350
Conflicting Peds, #/hr	0	5	5	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	4	0	0	5	1
Mvmt Flow	351	129	490	423	57	361

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1818	246
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	1402	-
Critical Hdwy	-	-	4.1	-	6.675	6.915
Critical Hdwy Stg 1	-	-	-	-	5.875	-
Critical Hdwy Stg 2	-	-	-	-	5.475	-
Follow-up Hdwy	-	-	2.2	-	3.5475	3.3095
Pot Cap-1 Maneuver	-	-	1093	-	75	758
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	222	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	~ 41	754
Mov Cap-2 Maneuver	-	-	-	-	~ 41	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	122	-

Approach	EB	WB	NE
HCM Control Delay, s	0	5.9	70.3
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	41	754	-	-	1088	-
HCM Lane V/C Ratio	1.383	0.479	-	-	0.45	-
HCM Control Delay (s)	$ 428.1	14.1	-	-	11	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	5.7	2.6	-	-	2.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
2: Leland Rd/Linn Ave & Warner Milne Rd

2035 No Build_PM peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	90	485	115	160	615	180	150	180	115	170	270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	3395		1770	1729		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	3395		1770	1729		1770	1770	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	495	117	163	628	184	153	184	117	173	276	122
RTOR Reduction (vph)	0	10	0	0	29	0	0	26	0	0	18	0
Lane Group Flow (vph)	92	602	0	163	783	0	153	275	0	173	380	0
Confl. Peds. (#/hr)	5		8	8		5			6	6		
Confl. Bikes (#/hr)			1						4			2
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	6.8	31.7		9.0	33.9		8.0	20.6		9.0	21.6	
Effective Green, g (s)	6.8	31.7		9.0	33.9		8.0	20.6		9.0	21.6	
Actuated g/C Ratio	0.08	0.36		0.10	0.39		0.09	0.24		0.10	0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	652		182	1318		162	407		182	437	
v/s Ratio Prot	0.05	c0.34		c0.09	0.23		0.09	0.16		c0.10	c0.21	
v/s Ratio Perm												
v/c Ratio	0.67	0.92		0.90	0.59		0.94	0.68		0.95	0.87	
Uniform Delay, d1	39.2	26.6		38.7	21.2		39.4	30.3		38.9	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	18.9		38.4	0.7		54.0	4.4		52.2	16.6	
Delay (s)	51.4	45.5		77.1	22.0		93.5	34.7		91.2	48.1	
Level of Service	D	D		E	C		F	C		F	D	
Approach Delay (s)		46.3			31.2			54.5			61.1	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	45.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Documentation: Effects of Increased U-Turns at Intersections of Divided Facilities and Median Divided Versus Five Lane Undivided Benefits. North Carolina State University. August 2004. Research conducted for the North Carolina Department of Transporation.

1.8% sat flow rate loss in the left turn lane for every 10% incrase in the U-Turn percentage
And an additional 1.5% loss for every 10% U-turns if the U-turning movement is opposed by protected right turn overlap from the cross street.

Warner Parrott

EBT	EBLT	EB U-turn
485	90	45

Sat flow adjustment

loss per 10% U-turns	BASE left turn sat flow
3.3%	1770

Use left turn saturation flow rate of
1566

Percent of u-turners		multiplier	% loss of sat flow	sat flow loss	final sat flow
33%		3	9.90%	175.23	1595
		4	13.20%	233.64	1536

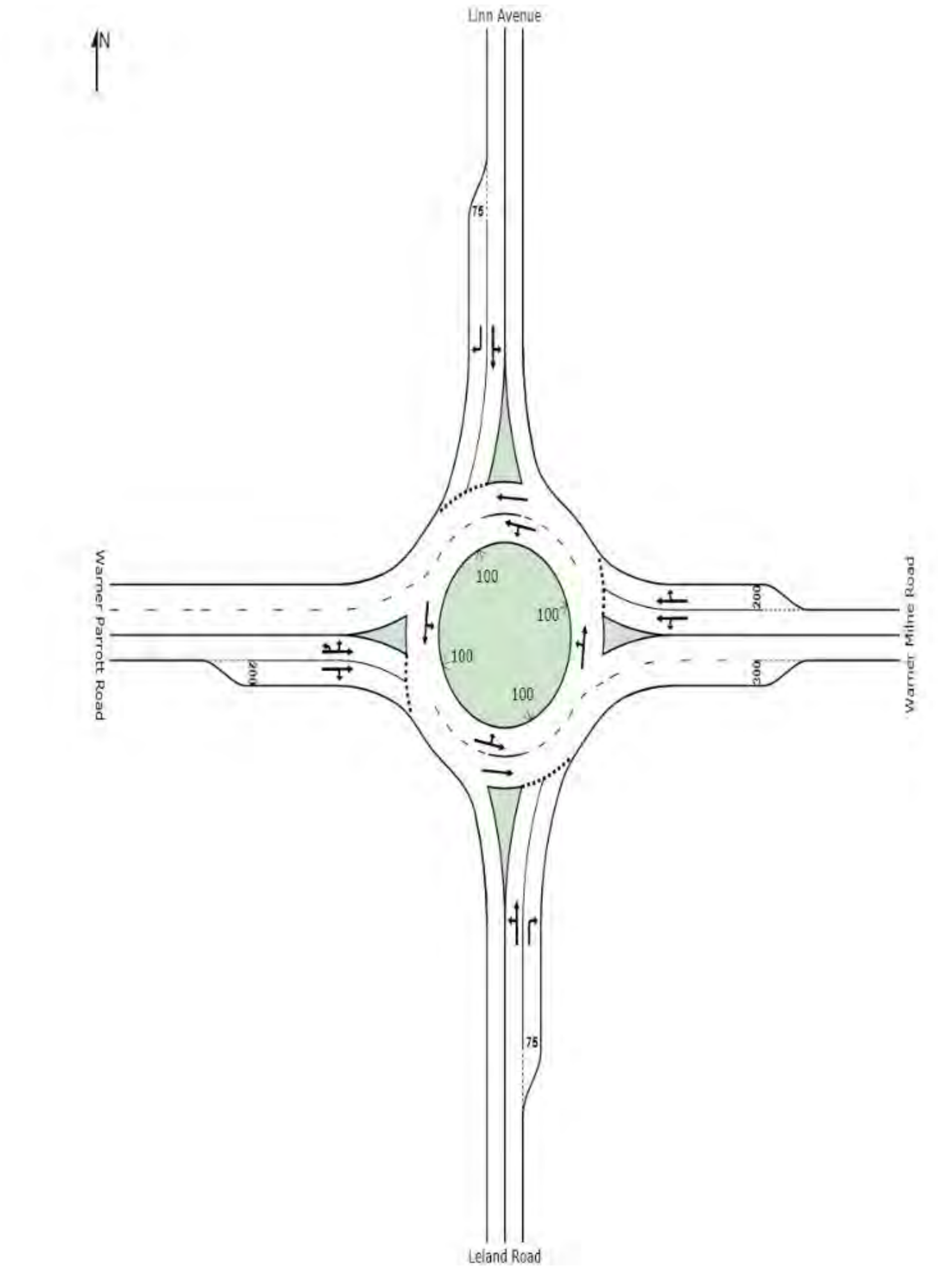
Average
1566

HCM Intersection Analysis (SIDRA)

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
2035 Planned System - PM Peak



MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3	L2	158	2.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
8	T1	189	1.0	0.537	14.5	LOS B	3.7	93.7	0.82	1.77	24.3
18	R2	121	0.0	0.281	13.0	LOS B	1.3	32.5	0.73	1.46	25.5
Approach		468	1.1	0.537	14.1	LOS B	3.7	93.7	0.80	0.85	24.6
East: Warner Milne Road											
1	L2	168	0.0	0.582	13.3	LOS B	5.4	136.4	0.84	1.66	25.1
6	T1	647	2.0	0.582	12.7	LOS B	5.5	139.9	0.84	1.63	25.7
16	R2	189	0.0	0.582	12.2	LOS B	5.5	139.9	0.84	1.60	26.3
Approach		1005	1.3	0.582	12.7	LOS B	5.5	139.9	0.84	0.81	25.7
North: Linn Avenue											
7	L2	179	0.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
4	T1	284	1.0	0.766	26.6	LOS C	6.7	168.2	0.92	2.17	20.2
14	R2	126	2.0	0.388	19.9	LOS B	1.8	45.2	0.77	1.62	22.6
Approach		589	0.9	0.766	25.2	LOS C	6.7	168.2	0.89	1.03	20.7
West: Warner Parrott Road											
5u	U	58	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
5	L2	95	2.0	0.672	16.9	LOS B	7.7	195.1	0.96	2.07	23.6
2	T1	511	2.0	0.672	15.7	LOS B	7.7	195.1	0.93	1.96	24.2
12	R2	120	2.0	0.433	12.7	LOS B	3.1	78.2	0.83	1.67	26.0
Approach		783	2.0	0.672	15.5	LOS B	7.7	195.1	0.92	0.97	24.4
All Vehicles		2846	1.4	0.766	16.3	LOS B	7.7	195.1	0.86	0.91	23.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	29.4 mph	29.4 mph
Travel Distance (Total)	1805.7 veh-mi/h	2166.9 pers-mi/h
Travel Time (Total)	61.5 veh-h/h	73.8 pers-h/h
Demand Flows (Total)	2846 veh/h	3416 pers/h
Percent Heavy Vehicles (Demand)	1.4 %	
Degree of Saturation	0.766	
Practical Spare Capacity	10.9 %	
Effective Intersection Capacity	3714 veh/h	
Control Delay (Total)	12.89 veh-h/h	15.47 pers-h/h
Control Delay (Average)	16.3 sec	16.3 sec
Control Delay (Worst Lane)	26.6 sec	
Control Delay (Worst Movement)	26.6 sec	26.6 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	16.3 sec	
Idling Time (Average)	10.3 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	7.7 veh	
95% Back of Queue - Distance (Worst Lane)	195.1 ft	
Queue Storage Ratio (Worst Lane)	0.16	
Total Effective Stops	2581 veh/h	3097 pers/h
Effective Stop Rate	0.91 per veh	0.91 per pers
Proportion Queued	0.86	0.86
Performance Index	117.2	117.2
Cost (Total)	740.52 $/h	740.52 $/h
Fuel Consumption (Total)	75.2 gal/h	
Carbon Dioxide (Total)	671.0 kg/h	
Hydrocarbons (Total)	0.251 kg/h	
Carbon Monoxide (Total)	3.322 kg/h	
NOx (Total)	0.952 kg/h	

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values

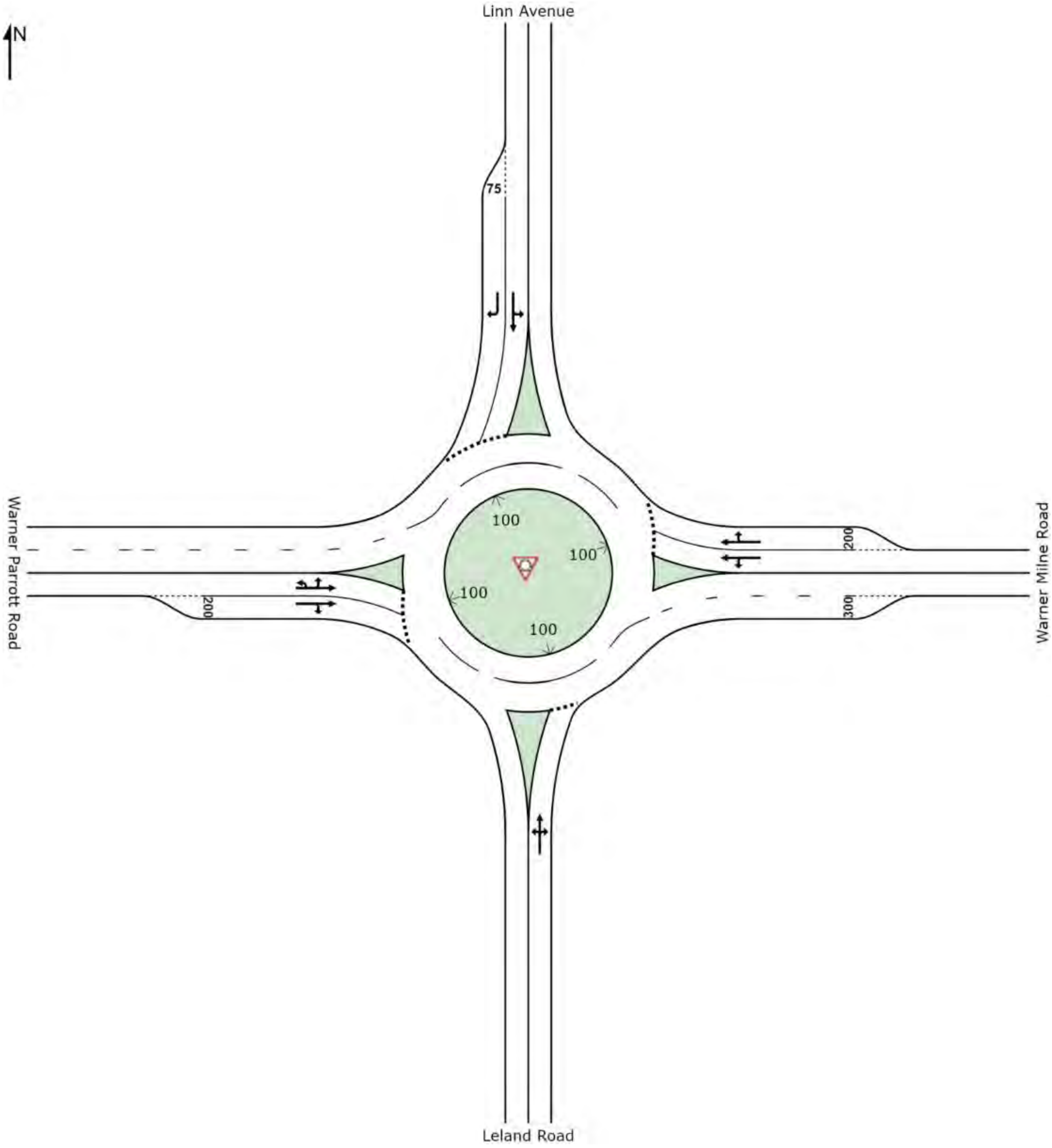
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,366,231 veh/y	1,639,478 pers/y
Delay	6,187 veh-h/y	7,424 pers-h/y
Effective Stops	1,238,765 veh/y	1,486,518 pers/y
Travel Distance	866,744 veh-mi/y	1,040,093 pers-mi/y
Travel Time	29,512 veh-h/y	35,415 pers-h/y
Cost	355,449 $/y	355,449 $/y
Fuel Consumption	36,083 gal/y	
Carbon Dioxide	322,101 kg/y	
Hydrocarbons	121 kg/y	
Carbon Monoxide	1,594 kg/y	
NOx	457 kg/y	

Processed: Tuesday, January 13, 2015 2:14:04 PM

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout



MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
4-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov	OD	Demand Flows		Deg.	Average	Level of	95% Back of Queue		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	ft		per veh	mph
South: Leland Road											
3	L2	158	2.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.6
8	T1	189	1.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.6
18	R2	121	0.0	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.3
Approach		468	1.1	0.914	49.3	LOS D	12.0	301.5	1.00	1.38	20.5
East: Warner Milne Road											
1	L2	168	0.0	0.593	13.8	LOS B	5.7	143.2	0.86	0.86	30.4
6	T1	647	2.0	0.593	13.2	LOS B	5.8	147.3	0.86	0.84	30.9
16	R2	189	0.0	0.593	12.7	LOS B	5.8	147.3	0.86	0.82	30.5
Approach		1005	1.3	0.593	13.2	LOS B	5.8	147.3	0.86	0.84	30.7
North: Linn Avenue											
7	L2	179	0.0	0.771	27.2	LOS C	6.8	170.7	0.92	1.09	25.8
4	T1	284	1.0	0.771	27.2	LOS C	6.8	170.7	0.92	1.09	25.7
14	R2	126	2.0	0.391	20.1	LOS C	1.8	45.7	0.78	0.81	27.7
Approach		589	0.9	0.771	25.6	LOS C	6.8	170.7	0.89	1.03	26.1
West: Warner Parrott Road											
5u	U	58	2.0	0.672	16.9	LOS B	7.7	195.4	0.96	1.04	29.8
5	L2	95	2.0	0.672	16.9	LOS B	7.7	195.4	0.96	1.04	29.2
2	T1	511	2.0	0.672	15.8	LOS B	7.7	195.4	0.93	0.98	29.7
12	R2	120	2.0	0.433	12.7	LOS B	3.1	78.3	0.84	0.83	30.5
Approach		783	2.0	0.672	15.5	LOS B	7.7	195.4	0.92	0.97	29.8
All Vehicles		2846	1.4	0.914	22.4	LOS C	12.0	301.5	0.91	1.00	27.3

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Friday, December 19, 2014 10:28:59 AM
SIDRA INTERSECTION 6.0.24.4877
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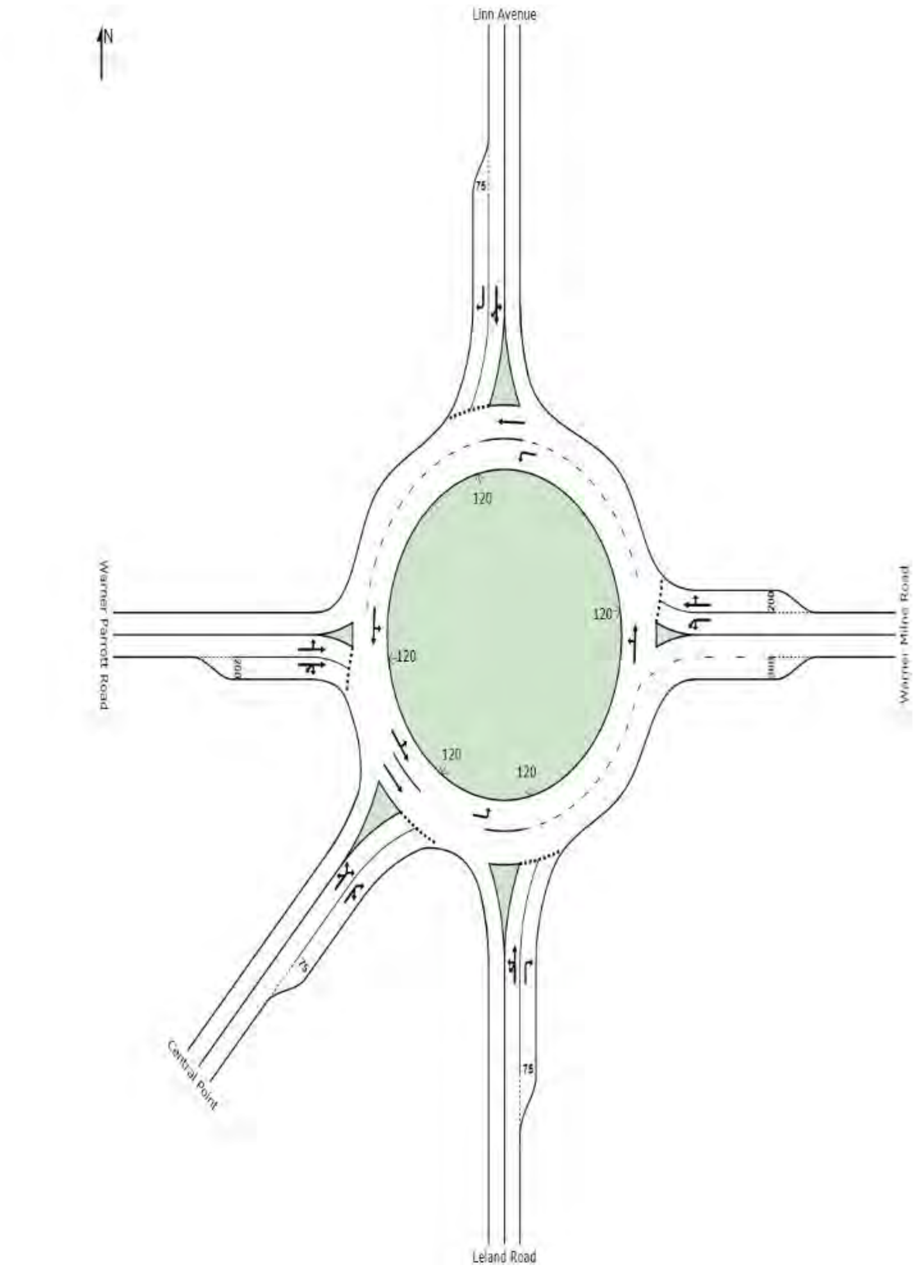
8000281, 6019144, DKS ASSOCIATES, PLUS / Floating

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
2035 Planned System - PM Peak



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MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov	OD	Demand Flows		Deg.	Average	Level of	95% Back of Queue		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	ft		per veh	mph
South: Leland Road											
3b	L3	88	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
3	L2	75	2.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
8	T1	196	1.0	0.499	12.4	LOS B	3.4	84.8	0.78	1.68	25.4
18	R2	125	0.0	0.258	11.3	LOS B	1.2	29.4	0.70	1.40	26.6
Approach		484	1.1	0.499	12.1	LOS B	3.4	84.8	0.76	0.81	25.7
East: Warner Milne Road											
1	L2	174	0.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
1a	L1	359	2.0	0.561	11.3	LOS B	5.2	131.1	0.83	1.54	24.7
6	T1	300	2.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
16	R2	189	0.0	0.587	13.2	LOS B	5.5	139.7	0.85	1.68	26.1
Approach		1022	1.3	0.587	12.2	LOS B	5.5	139.7	0.84	0.80	25.3
North: Linn Avenue											
7	L2	179	0.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
4	T1	293	1.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14a	R1	70	2.0	0.833	31.1	LOS C	7.8	195.6	0.92	2.26	19.2
14	R2	59	2.0	0.176	13.9	LOS B	0.7	17.0	0.71	1.43	25.3
Approach		601	0.9	0.833	29.5	LOS C	7.8	195.6	0.90	1.09	19.7
West: Warner Parrott Road											
5	L2	46	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
2	T1	251	2.0	0.634	23.3	LOS C	7.3	185.6	1.00	2.45	21.8
12	R2	63	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
12b	R3	136	2.0	0.557	24.9	LOS C	5.0	126.5	1.00	2.31	20.8
Approach		496	2.0	0.634	23.9	LOS C	7.3	185.6	1.00	1.20	21.4
SouthWest: Central Point											
5bx	L3	60	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
5ax	L1	50	2.0	0.467	12.7	LOS B	2.7	69.6	0.78	1.65	25.5
12ax	R1	266	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	1.59	25.8
12bx	R3	64	2.0	0.290	12.0	LOS B	1.3	33.0	0.72	1.44	26.4
Approach		440	2.0	0.467	12.5	LOS B	2.7	69.6	0.76	0.79	25.8
All Vehicles		3043	1.4	0.833	17.6	LOS B	7.8	195.6	0.85	0.92	23.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	23.4 mph	23.4 mph
Travel Distance (Total)	1191.1 veh-mi/h	1429.3 pers-mi/h
Travel Time (Total)	50.9 veh-h/h	61.0 pers-h/h
Demand Flows (Total)	3043 veh/h	3651 pers/h
Percent Heavy Vehicles (Demand)	1.4 %	
Degree of Saturation	0.833	
Practical Spare Capacity	2.1 %	
Effective Intersection Capacity	3653 veh/h	
Control Delay (Total)	14.83 veh-h/h	17.80 pers-h/h
Control Delay (Average)	17.6 sec	17.6 sec
Control Delay (Worst Lane)	31.1 sec	
Control Delay (Worst Movement)	31.1 sec	31.1 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	17.6 sec	
Idling Time (Average)	10.9 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	7.8 veh	
95% Back of Queue - Distance (Worst Lane)	195.6 ft	
Queue Storage Ratio (Worst Lane)	0.16	
Total Effective Stops	2809 veh/h	3370 pers/h
Effective Stop Rate	0.92 per veh	0.92 per pers
Proportion Queued	0.85	0.85
Performance Index	125.0	125.0
Cost (Total)	601.30 $/h	601.30 $/h
Fuel Consumption (Total)	26.5 gal/h	
Carbon Dioxide (Total)	236.3 kg/h	
Hydrocarbons (Total)	0.124 kg/h	
Carbon Monoxide (Total)	0.872 kg/h	
NOx (Total)	0.169 kg/h	

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

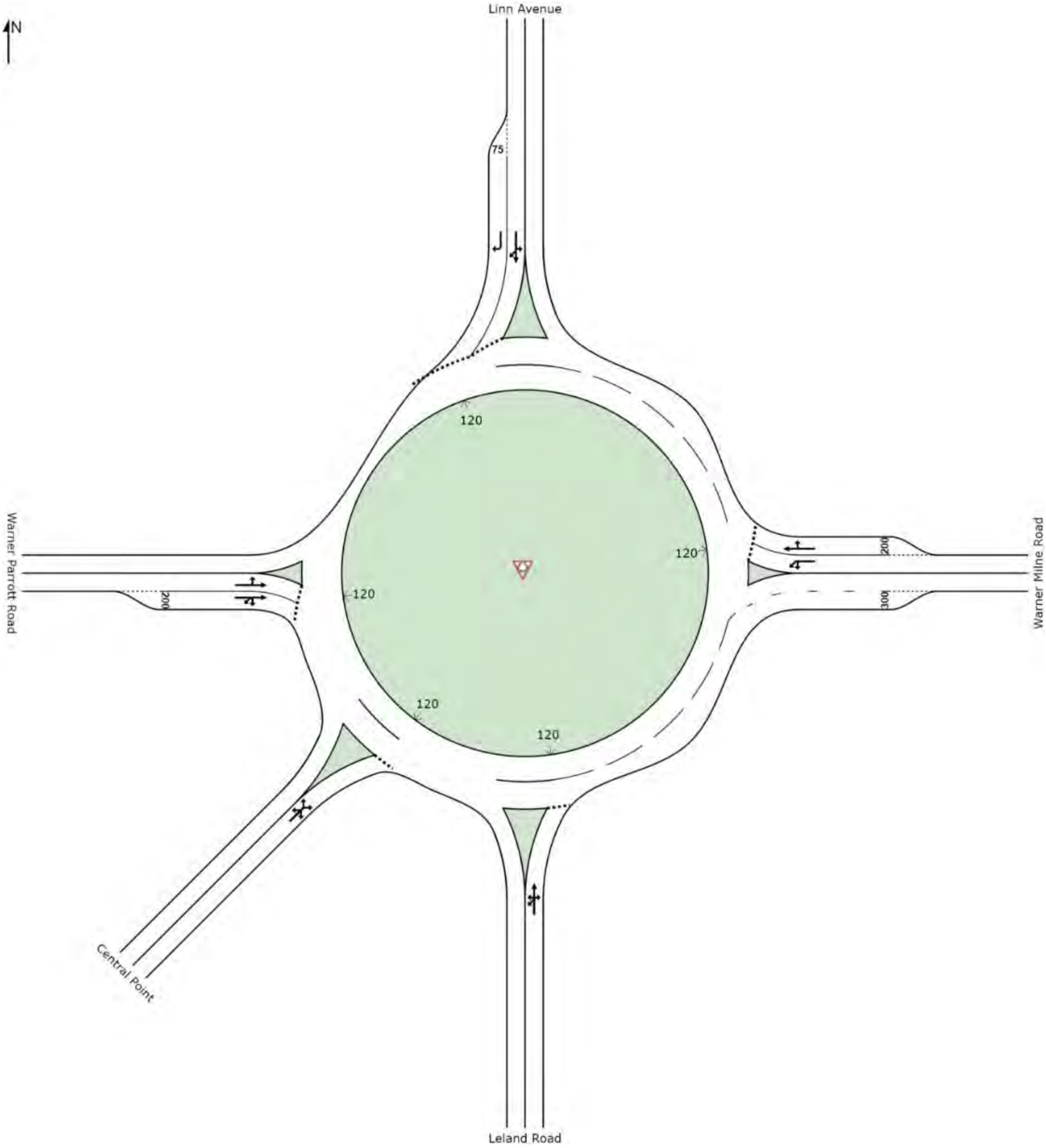
Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,460,491 veh/y	1,752,589 pers/y
Delay	7,121 veh-h/y	8,545 pers-h/y
Effective Stops	1,348,088 veh/y	1,617,706 pers/y
Travel Distance	571,736 veh-mi/y	686,083 pers-mi/y
Travel Time	24,413 veh-h/y	29,295 pers-h/y
Cost	288,624 $/y	288,624 $/y
Fuel Consumption	12,727 gal/y	
Carbon Dioxide	113,404 kg/y	
Hydrocarbons	59 kg/y	
Carbon Monoxide	419 kg/y	
NOx	81 kg/y	

SITE LAYOUT

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout



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MOVEMENT SUMMARY

Site: Warner Milne/Linn - Planned System

Warner Milne Road/Linn Avenue
5-Legged RAB Option
2035 Planned System - PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leland Road											
3b	L3	88	2.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
3	L2	75	2.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
8	T1	196	1.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
18	R2	125	0.0	0.973	62.5	LOS E	19.3	487.4	1.00	3.31	13.4
Approach		484	1.1	0.973	62.5	LOS E	19.3	487.4	1.00	1.66	13.4
East: Warner Milne Road											
1	L2	174	0.0	0.575	11.9	LOS B	5.5	140.1	0.85	1.61	24.5
1a	L1	359	2.0	0.575	11.9	LOS B	5.5	140.1	0.85	1.61	24.5
6	T1	300	2.0	0.602	13.9	LOS B	5.9	148.6	0.87	1.74	25.7
16	R2	189	0.0	0.602	13.9	LOS B	5.9	148.6	0.87	1.74	25.7
Approach		1022	1.3	0.602	12.8	LOS B	5.9	148.6	0.86	0.84	25.1
North: Linn Avenue											
7	L2	179	0.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
4	T1	293	1.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
14a	R1	70	2.0	0.840	32.2	LOS C	8.0	200.4	0.93	2.29	19.0
14	R2	59	2.0	0.177	14.0	LOS B	0.7	17.2	0.72	1.43	25.3
Approach		601	0.9	0.840	30.4	LOS C	8.0	200.4	0.91	1.10	19.4
West: Warner Parrott Road											
5	L2	46	2.0	0.636	23.4	LOS C	7.3	186.2	1.00	2.45	21.8
2	T1	251	2.0	0.636	23.4	LOS C	7.3	186.2	1.00	2.45	21.8
12	R2	63	2.0	0.558	24.9	LOS C	5.0	126.8	1.00	2.31	20.8
12b	R3	136	2.0	0.558	24.9	LOS C	5.0	126.8	1.00	2.31	20.8
Approach		496	2.0	0.636	24.0	LOS C	7.3	186.2	1.00	1.20	21.4
SouthWest: Central Point											
5bx	L3	60	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
5ax	L1	50	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
12ax	R1	266	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
12bx	R3	64	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	2.56	16.1
Approach		440	2.0	0.885	45.3	LOS D	9.6	244.0	0.95	1.28	16.1
All Vehicles		3043	1.4	0.973	30.7	LOS C	19.3	487.4	0.93	1.14	19.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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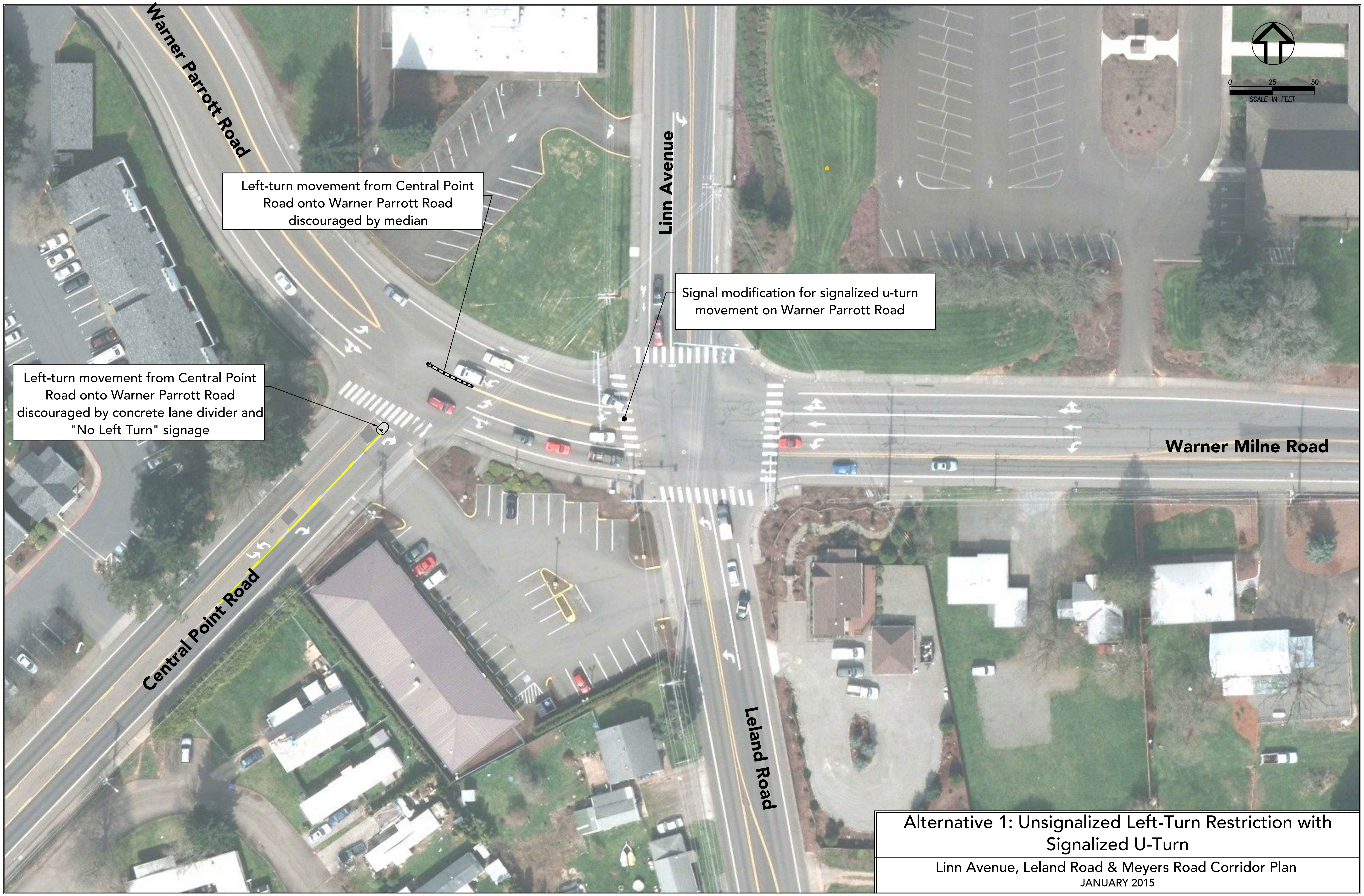
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ODOT Collision Data

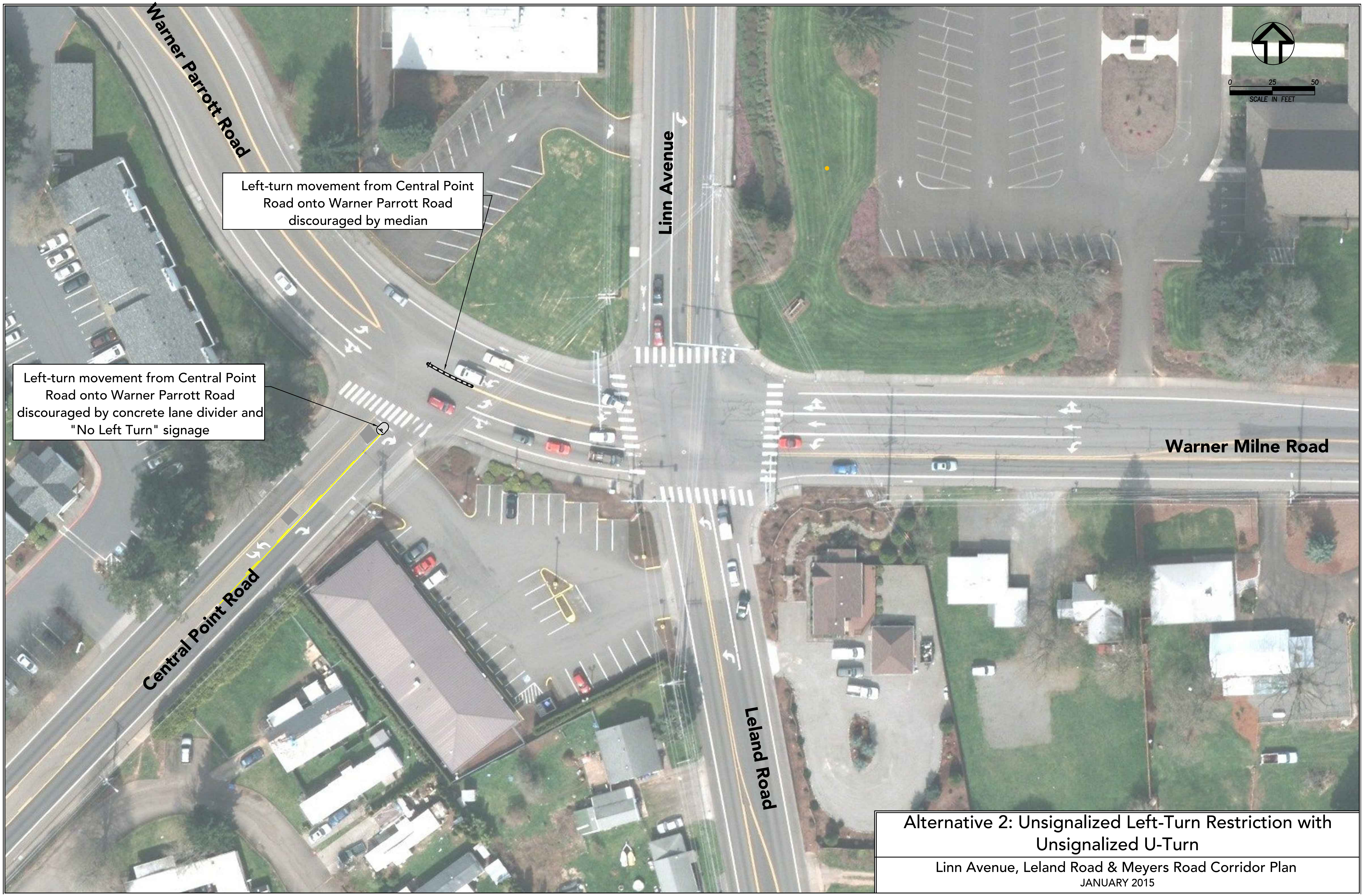
Crash ID	Serial #	Crash Date	Hour	1st Street	2nd Street	Dist.	Dir.	Lat	Long	Road Character	Crash Type	Col. Type	Veh Count	Veh Occu	Tot Per	Crash Sev	Weather	Road Surface	Light	Vehicle Movement	From - To	Vehicle Action	Vehicle Moveme	From - To	Vehicle Action
1323506	1439	4/16/2009	16	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	TURN-R	SW to SE	GO A/STOP	STRGHT	NW to SE	NONE
1356752	198	1/19/2010	6	LELAND RD	WARNER-MILNE RD	0	CN	45.336417	-122.604946	INTER	S-1STOP	REAR	2	8	8	INJ C	CLEAR	DRY	DARK-NO ST LIGHTS	STRGHT	W to E	NONE	STOP	W to E	STOPPED
1359936	639	2/23/2010	11	LINN AVE	WARNER-PARROTT RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	3	3	INJ C	RAIN	WET	DAYLIGHT	STRGHT	N to S	NONE	STRGHT	E to W	NONE
1356414	83	1/9/2010	18	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	O-1TURN	TURN	2	3	3	INJ C	CLEAR	DRY	DARK-NO ST LIGHTS	STRGHT	NW to SE	NONE	TURN-L	SE to SW	NONE
1368969	1214	4/12/2010	9	CENTRAL POINT RD	WARNER-MILNE RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	TURN-L	SW to NW	GO A/STOP	STRGHT	NW to SE	NONE
1376031	2537	7/21/2010	15	LINN AVE	WARNER-MILNE RD	20	N	45.336480	-122.604947	STRGHT	S-1STOP	REAR	2	2	2	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	N to S	NONE	STOP	N to S	STOPPED
1387492	3511	9/28/2010	13	LELAND RD	WARNER-MILNE RD	1000	SE	45.333720	-122.604165	STRGHT	S-1TURN	TURN	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	U-TURN	NW to NW	ENT OFFRD
1375822	2437	7/14/2010	14	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336497	-122.605533	INTER	ANGL-OTH	TURN	2	4	4	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	TURN-L	SW to NW	GO A/STOP
1399462	4763	12/13/2010	7	WARNER-PARROTT RD	CENTRAL POINT RD	218	NW	45.336911	-122.606136	CURVE	FIX OBJ	FIX	1	1	1	PDO	RAIN	WET	DAYLIGHT	STRGHT	SE to NW	NONE			
1409679	711	2/27/2011	12	LINN AVE	WARNER-MILNE RD	0	E	45.336411	-122.604946	INTER	S-1STOP	SS-O	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	E to W	AVOIDING	STOP	E to W	STOPPED
1439776	3858	10/14/2011	11	LINN AVE	WARNER-MILNE RD	0	CN	45.336417	-122.604939	INTER	O-1TURN	TURN	2	2	2	INJ C	CLOUDY	DRY	DAYLIGHT	STRGHT	E to W	NONE	TURN-L	W to N	NONE
1445677	4694	12/5/2011	7	LINN AVE	WARNER-MILNE RD	0	N	45.336417	-122.604939	INTER	ANGL-STP	TURN	2	2	2	PDO	FOG	ICE	DAWN	TURN-R	E to N	NONE	STOP	N to S	STOPPED
1469715	1720	5/10/2012	7	LELAND RD	WARNER-MILNE RD	137	S	45.336043	-122.604867	STRGHT	S-1STOP	REAR	2	3	3	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1471585	1973	5/30/2012	15	LINN AVE	WARNER-MILNE RD	95	N	45.336686	-122.604952	STRGHT	S-1STOP	REAR	2	4	4	INJ C	CLEAR	DRY	DAYLIGHT	STRGHT	N to S	NONE	STOP	N to S	STOPPED
1480291	2866	8/4/2012	12	LINN AVE	WARNER-MILNE RD	100	N	45.336686	-122.604952	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1486129	3422	9/14/2012	11	WARNER-MILNE RD	LELAND RD	100	E	45.336420	-122.604545	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	W to E	NONE	STOP	W to E	STOPPED
1488339	3639	10/1/2012	15	CENTRAL POINT RD	WARNER-PARROTT RD	0	SW	45.336497	-122.605533	INTER	BIKE	TURN	1	1	2	INJ B	CLEAR	DRY	DAYLIGHT	TURN-L	SE to SW	NONE	STRGHT	SW to NE	NONE
1490401	3835	10/15/2012	17	LELAND RD	WARNER-MILNE RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	4	4	INJ C	RAIN	WET	DUSK	STRGHT	E to W	NONE	STRGHT	S to N	NONE
1499513	4405	11/17/2012	20	LELAND RD	WARNER-PARROTT RD	31	S	45.336226	-122.604923	STRGHT	FIX OBJ	FIX	1	1	1	INJ B	RAIN	WET	DARK-NO ST LIGHTS	STRGHT	N to S	NONE	PRKD-P	NE to SW	PAR PARK
1499760	4652	12/1/2012	13	WARNER-PARROTT RD	CENTRAL POINT RD	473	NW	45.337400	-122.606825	CURVE	FIX OBJ	FIX	1	1	1	INJ C	CLOUDY	DRY	DAYLIGHT	STRGHT	W to E	NONE			
1506878	720	3/2/2013	20	LELAND RD	WARNER-PARROTT RD	0	SW	45.336417	-122.604946	INTER	PED	PED	1	1	2	INJ B	RAIN	WET	DUSK	TURN-R	W to S	NONE	STOP	SE to NW	STOPPED
1512521	1308	4/17/2013	14	WARNER-PARROTT RD	CENTRAL POINT RD	100	E	45.337289	-122.622501	STRGHT	S-1STOP	SS-O	4	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	W to E	AVOIDING	STOP	W to E	STOPPED
1519476	2048	6/5/2013	15	WARNER-PARROTT RD	CENTRAL POINT RD	500	NW	45.337401	-122.606909	STRGHT	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	NW to SE	NONE	STOP	NW to SE	STOPPED
1519762	2086	6/12/2013	7	LELAND RD	WARNER-MILNE RD	0	S	45.336417	-122.604946	INTER	S-1STOP	REAR	2	2	2	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STOP	S to N	STOPPED
1533493	3616	9/25/2013	16	CENTRAL POINT RD	WARNER-PARROTT RD	0	CN	45.336540	-122.605573	INTER	ANGL-OTH	TURN	2	2	2	PDO	CLOUDY	DRY	DAYLIGHT	TURN-L	SW to NW	GO A/STOP	STRGHT	NW to SE	NONE
1537350	4120	10/26/2013	17	LELAND RD	WARNER-PARROTT RD	0	CN	45.336417	-122.604946	INTER	ANGL-OTH	ANGL	2	5	5	PDO	CLEAR	DRY	DAYLIGHT	STRGHT	S to N	NONE	STRGHT	E to W	NONE
1544482	4879	12/17/2013	4	WARNER-PARROTT RD	CENTRAL POINT RD	96	NW	45.336680	-122.605795	STRGHT	FIX OBJ	FIX	1	2	2	PDO	CLOUDY	WET	DARK-ST LIGHTS	STRGHT	SE to NW	NONE	STOP	W to E	STOPPED

Alternative Conceptual Drawings



Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn

Linn Avenue, Leland Road & Meyers Road Corridor Plan
JANUARY 2015



Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by median

Left-turn movement from Central Point Road onto Warner Parrott Road discouraged by concrete lane divider and "No Left Turn" signage

Alternative 2: Unsignalized Left-Turn Restriction with Unsignalized U-Turn

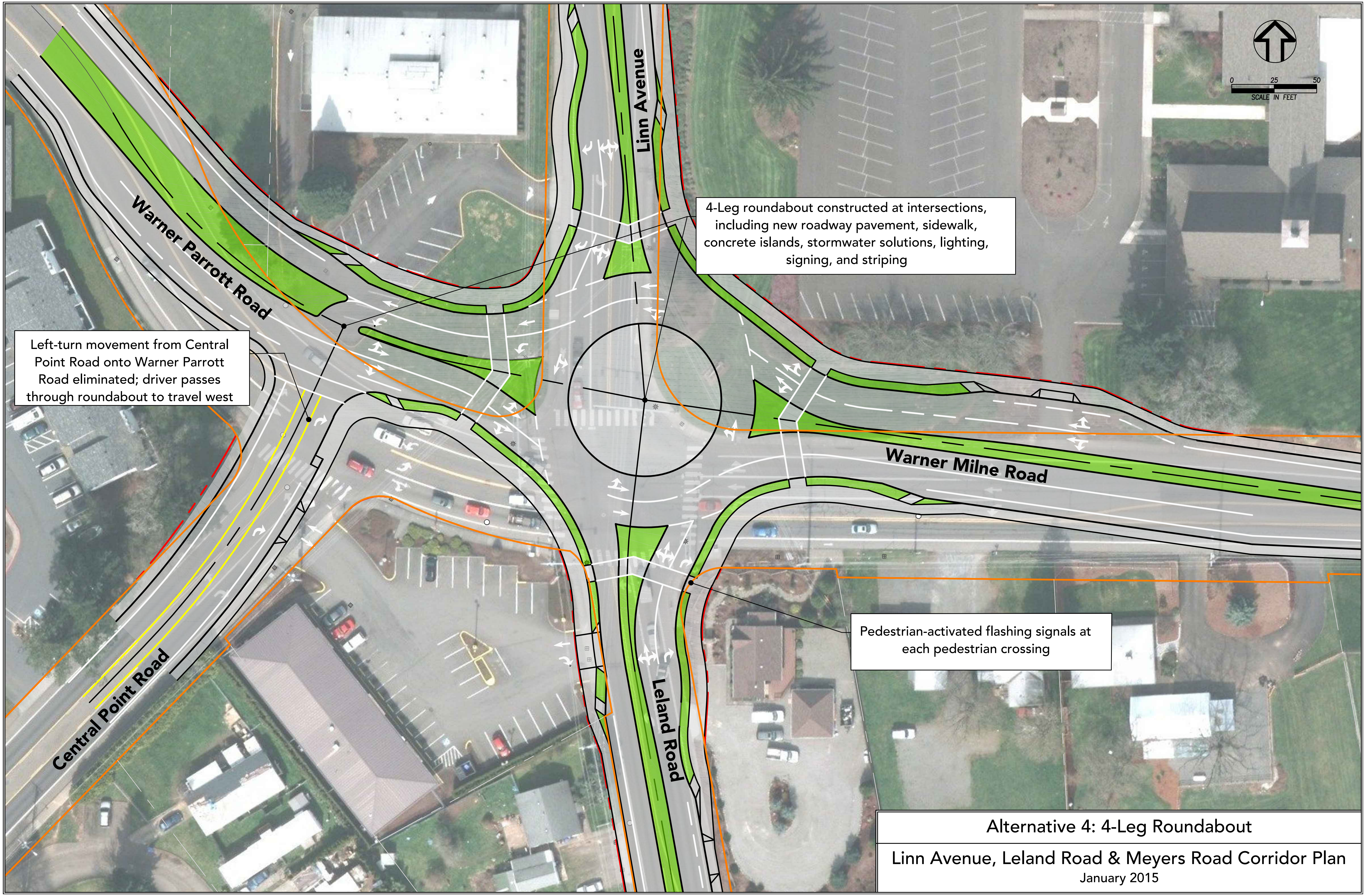
Linn Avenue, Leland Road & Meyers Road Corridor Plan
JANUARY 2015

New signal for Central Point Road and Warner Parrott Road with associated pedestrian improvements at intersection

Signal modification to sync with intersection of Central Point Road and Warner Parrott Road

Alternative 3: Both Intersections Signalized

Linn Avenue, Leland Road & Meyers Road Corridor Plan
JANUARY 2015



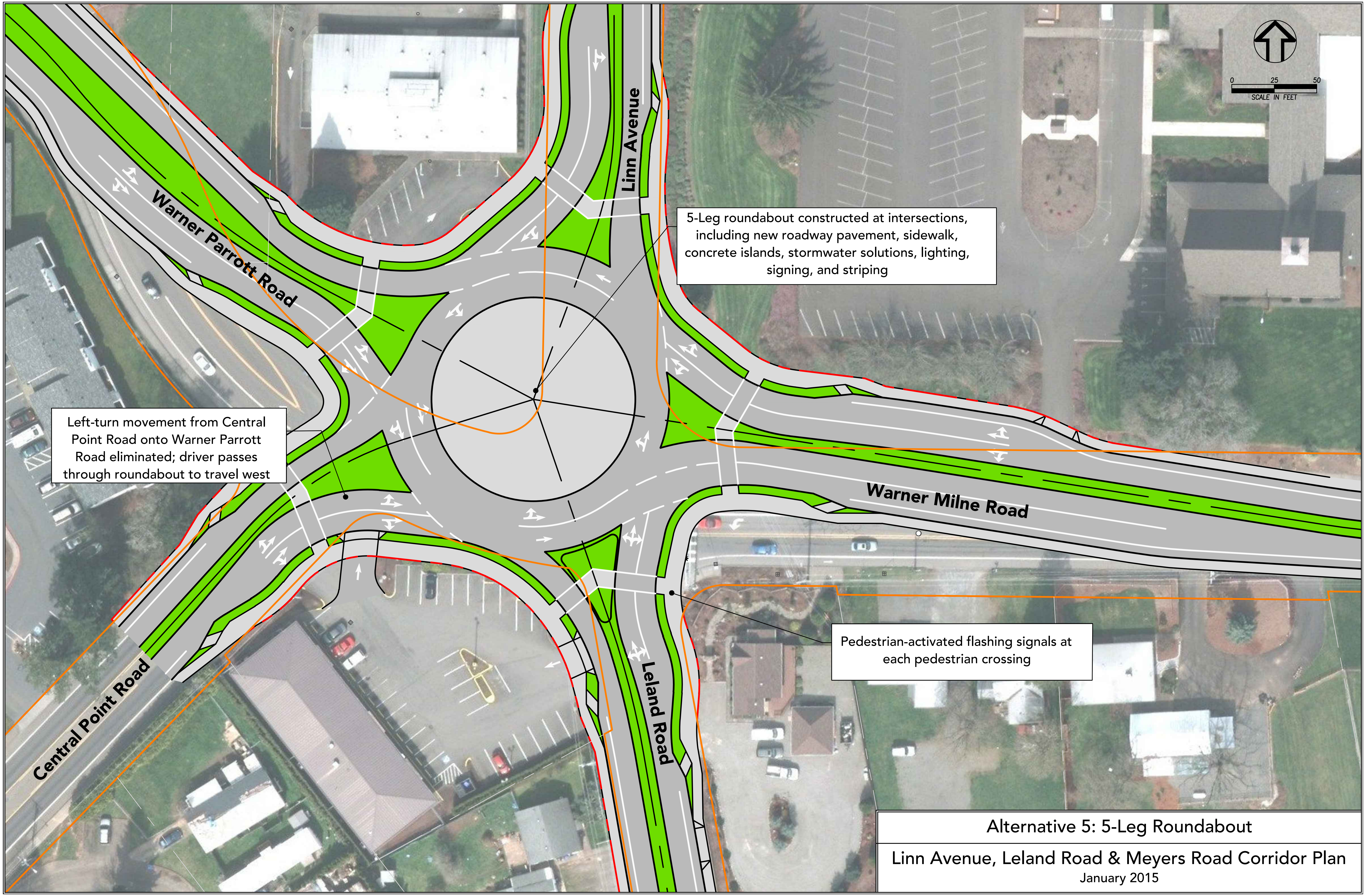
4-Leg roundabout constructed at intersections, including new roadway pavement, sidewalk, concrete islands, stormwater solutions, lighting, signing, and striping

Left-turn movement from Central Point Road onto Warner Parrott Road eliminated; driver passes through roundabout to travel west

Pedestrian-activated flashing signals at each pedestrian crossing

Alternative 4: 4-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan
January 2015



5-Leg roundabout constructed at intersections, including new roadway pavement, sidewalk, concrete islands, stormwater solutions, lighting, signing, and striping

Left-turn movement from Central Point Road onto Warner Parrott Road eliminated; driver passes through roundabout to travel west

Pedestrian-activated flashing signals at each pedestrian crossing

Alternative 5: 5-Leg Roundabout

Linn Avenue, Leland Road & Meyers Road Corridor Plan
January 2015

Cost Estimates

Alternative 1: Unsignalized Left-Turn Restriction with Signalized U-Turn
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$3,600
Traffic Control	1	L.S.	$3,200
Erosion Control	1	L.S.	$700
Channelizing Island & Median	1	L.S.	$9,000
Signing and Striping	1	L.S.	$2,300
Signal Improvements	1	L.S.	$40,000
Construction Subtotal			*$58,800*
Construction and Project Contingency at 30%			*$17,640*
Construction Total			***$76,440***
Right of Way			
Right of Way			$0
Right of Way Contingency at 50%			$0
Right of Way Total			***$0***
Engineering and Permitting			
Design Engineering and Administration			$20,000
Construction Engineering Services			$10,000
Environmental Permitting			$5,000
Engineering and Permitting Total			***$35,000***
PROJECT GRAND TOTAL			**$111,440**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. New signal pole on SE corner of Linn/Leland/Warner Milne/Warner Parrott (cost would be significantly less if existing pole is structurally adequate for new equipment)
6. Environmental Permitting is lump sum.

Alternative 2: Unsignalized Left-Turn Restriction without Signalized U-Turn
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$800
Traffic Control	1	L.S.	$700
Erosion Control	1	L.S.	$170
Channelizing Island & Median	1	L.S.	$9,000
Signing and Striping	1	L.S.	$2,300
Construction Subtotal			*$12,970*
Construction and Project Contingency at 30%			*$3,891*
Construction Total			***$16,861***
Right of Way			
Right of Way			$0
Right of Way Contingency at 50%			*$0*
Right of Way Total			***$0***
Engineering and Permitting			
Design Engineering and Administration			$15,000
Construction Engineering Services			$5,000
Environmental Permitting			$5,000
Engineering and Permitting Total			***$25,000***
PROJECT GRAND TOTAL			**$41,861**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Environmental Permitting is lump sum.

Alternative 3: Signalized Intersections
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/10/15
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$ 24,500
Traffic Control	1	L.S.	$ 21,000
Erosion Control	1	L.S.	$ 5,200
Channelizing Island & Median	1	L.S.	$ 5,700
Sidewalk and Curb Ramps	1	L.S.	$ 10,100
Signing and Striping	1	L.S.	$ 3,980
Signal Improvements	1	L.S.	$ 275,000
Lighting	1	L.S.	$ 50,000
Construction Subtotal			*$ 395,480*
Construction and Project Contingency at 30%			*$ 118,644*
Construction Total			***$ 514,124***
Right of Way			
Right of Way			$ 0
Right of Way Contingency at 50%			$ 0
Right of Way Total			***$ 0***
Engineering and Permitting			
Design Engineering and Administration at 13%			$ 66,836
Construction Engineering Services at 12%			$ 61,695
Environmental Permitting			$ 50,000
Engineering and Permitting Total			***$ 178,531***
PROJECT GRAND TOTAL			**$ 692,655**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 6% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. New signal at Central Point Rd/Warner Parrott Rd.
6. Signal at Linn Ave/Leland Rd/Warner Parrott Rd/Warner Milne Rd is modified to work as one signalized intersection with new signal at Central Point Rd/Warner Parrott Rd.
7. Environmental Permitting is lump sum.

Alternative 4: Four-Leg Roundabout
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering   Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$111,700
Traffic Control	1	L.S.	$111,700
Erosion Control	1	L.S.	$24,000
Roundabout	1	L.S.	$1,024,600
Signing and Striping	1	L.S.	$60,000
Stormwater	1	L.S.	$74,700
Landscaping	1	L.S.	$41,740
Pedestrian-Activated Signals	1	L.S.	$120,000
Lighting	1	L.S.	$250,000
Construction Subtotal			*$1,818,440*
Construction and Project Contingency at 30%			*$545,532*
Construction Total			***$2,363,972***
Right of Way			
Right of Way			$143,820
Right of Way Contingency at 50%			$71,910
Right of Way Total			***$215,730***
Engineering and Permitting			
Design Engineering and Administration at 13%			$307,316
Construction Engineering Services at 12%			$283,677
Environmental Permitting			$50,000
Engineering and Permitting Total			***$640,993***
PROJECT GRAND TOTAL			**$3,220,695**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Landscaping includes excavation, soil, and light landscaping.
6. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
7. Signing and striping assumed to include all striping within roundabout limits, all signing within roundabout limits and directional signing leading up to roundabout.
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Alternative 5: 5-leg Roundabout
Planning Level Opinion of Cost

Linn Avenue, Leland Road and Meyers Road Corridor Plan
City of Oregon City, OR

Prepared by: Wallis Engineering Date: 1/13/2015
WE Job No. 1366A

Construction			
Description	Quantity	Units	Cost
Mobilization	1	L.S.	$114,600
Traffic Control	1	L.S.	$114,600
Erosion Control	1	L.S.	$24,200
Roundabout	1	L.S.	$1,023,000
Signing and Striping	1	L.S.	$60,000
Stormwater	1	L.S.	$74,700
Landscaping	1	L.S.	$54,000
Pedestrian-Activated Signals	1	L.S.	$150,000
Lighting	1	L.S.	$250,000
Construction Subtotal			*$1,865,100*
Construction and Project Contingency at 30%			*$559,530*
Construction Total			***$2,424,630***
Right of Way			
Right of Way			$179,750
Right of Way Contingency at 50%			$89,875
Right of Way Total			***$269,625***
Engineering and Permitting			
Design Engineering and Administration at 13%			$315,202
Construction Engineering Services at 12%			$290,956
Environmental Permitting			$50,000
Engineering and Permitting Total			***$656,158***
PROJECT GRAND TOTAL			**$3,350,413**

ASSUMPTIONS

1. For reference: ENR Construction Cost Index for Seattle for July 2014; 10161.68.
2. Mobilization at 7% of construction subtotal.
3. Temporary traffic control at 7% of construction subtotal.
4. Erosion control at 1.5% of construction subtotal.
5. Landscaping includes excavation, soil, and light landscaping.
6. Stormwater improvements include collection and conveyance improvements, and quality and treatment (assumed necessary for new impervious surfaces).
7. Signing and striping assumed to include all striping within roundabout limits, all signing within roundabout limits and directional signing leading up to roundabout.
8. ROW needs determined through Oregon City GIS maps.
9. All ROW is assumed to be partial strip takes. No relocations are assumed.
10. Environmental Permitting is lump sum.

Present Worth Analysis

Present Worth Analysis

Option #	Annual Weekday PM Peak Hour Delay Cost	Construction Cost	Annual Crash Savings	Annual Maintenance Cost	Present Worth	Is option viable from an operations perspective?
no-build	$316,593	$0	$0	$2,000	($4,329,783)	no
1	$279,270	$115,000	$18,760	$2,000	($3,678,173)	yes
2	$254,475	$45,000	$18,760	$2,000	($3,273,894)	yes
3	$751,158	$700,000	$0	$3,000	($10,922,330)	no
4	$98,658	$3,220,000	$90,360	$1,500	($3,229,312)	yes
5	$91,872	$3,350,000	$149,120	$1,500	($2,463,520)	yes

Notes

1. Assumed interest rate is 4%.
2. Assumed 20-year design life for improvements.
3. Maintenance costs do not include maintenance of pavement or utilities within the intersection.
4. Maintenance costs for the intersection signal are recent costs for the existing signal.
5. Maintenance costs for the roundabout are assumed to be equal to the landscaping costs for a similar roundabout at Washington/Clackamas River Drive.

Table 12: Future Alternatives Evaluation Summary Table

Alternative	Alternative Description	TRAFFIC OPERATIONS				CONSTRUCTION COSTS		SAFETY		System Context	Right-of-way/Access Impacts
		v/c ratio at Central Point	v/c ratio at Linn Ave	Annual Weekday PM Peak Hour Delay Cost	Queuing Between Intersections	Construction Assumptions	Estimated Construction Cost	Safety Elements	Annual Savings due to crash reduction		
No Build	Maintain existing lane configuration	1.38	0.91	$316,610	There is currently queuing between the study intersections due to the close proximity	None	$0	No changes	$0	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	Does not meet Oregon City's intersection access spacing standards.
1	Unsignalized northbound left-turn restriction at the Central Point Rd/Warner Parrott Rd intersection with an eastbound U-turn option for passenger vehicles at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.	0.54	0.92	$279,361	Queuing between the two study intersections due to their close proximity could have a similar impact to existing conditions	Key costs for this alternative include: • modifications to signal due to added U-Turn • channelizing island	$115,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash CONS • U-turn movement adds conflict points, and is only allowed for passenger vehicles • Traffic signals generally result in more severe crashes	$18,760	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - none Accesses Closed - none Accesses Modified - 1 (restricts northbound left from Central Point Road) Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
2	Unsignalized northbound left-turn restriction at the Central Point Rd/Warner Parrott Rd intersection without an eastbound U-turn option at the signalized Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection.	0.53	0.92	$254,529	Queuing between the two study intersections due to their close proximity could have a similar impact to existing conditions	Key costs for this alternative include: • channelizing island	$45,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash CONS • Traffic signals generally result in more severe crashes • Requires an alternate route	$18,760	Similar to other signalized intersections throughout the Oregon City area. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - none Accesses Closed - none Accesses Modified - 1 (restricts northbound left from Central Point Road) Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
3	No movements are restricted and both study intersections are fully signalized. Due to the close proximity of the study intersections, the two signals would essentially need to operate as one intersection.	0.53	1.12	This alternative does not meet mobility standards and is not considered for further evaluation and comparison.							
4	The Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection would be converted into a four-legged roundabout that allows U-turns for all vehicle types. Northbound left turns at the Central Point Rd/Warner Parrott Rd intersection would be restricted by the installation of a median along Warner Parrott Road.	0.54	0.77	$98,708	Queuing due to the close intersectionproximity could have a greater impact to existing conditions because of the roundabout configuration at the Warner Parrott Rd/Warner Milne Rd/Linn Ave/Leland Rd intersection	Key costs for this alternative include: • construction of roundabout • right-of-way acquisition • lighting	$3,220,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash • Roundabouts generally result in less severe crashes than a traffic signal. Studies show a 72-80% reduction in injury crashes. This evaluation assumes a 70% reduction in injury crashes at Linn Ave (After accounting for the injury crashes eliminated due to restricted movements, 5 more injury crashes are reduced to PDO crashes) CONS • Pedestrian crossings more challenging especially for impaired pedestrians • Complex roundabout • Queuing into roundabout is likely to occur	$90,360	A roundabout may be less familiar to Oregon City area drivers than a traffic signal. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - 4,590 square feet Accesses Closed - none Accesses Modified - 3 (restricts northbound left from Central Point Road and relocates driveways to businesses between Central Point Rd and Leland Rd. Both driveways would be right-in/right-out. Out of Direction Travel - some Does not meet Oregon City's intersection access spacing standards.
5	A single five-legged roundabout that includes the Central Point Road approach with no motor vehicle movement restrictions.	n/a	0.83	$91,879	No queuing between intersections will occur under this alternative (the two intersections will become one)	Key costs for this alternative include: • construction of roundabout • right-of-way acquisition (slightly more than Alternative 4) • lighting	$3,350,000	PROS • Restricting the northbound left at Central Point removes a conflict point - reduces 2 PDO and 1 injury crash • Removal of the westbound left at Central Point eliminates 1 injury crash • Roundabouts generally result in less severe crashes than a traffic signal. Studies show a 72-80% reduction in injury crashes. This evaluation assumes a 70% reduction in injury crashes at Linn Ave and Central Point Rd (After accounting for the injury crashes that were eliminated due to restricted movements, 8 more INJ crashes are reduced to PDO crashes) CONS • Pedestrian crossings more challenging especially for impaired pedestrians • Complex two lane roundabout	$149,120	A roundabout may be less familiar to Oregon City area drivers than a traffic signal. Pedestrian, bicycle, and transit connections can be provided.	ROW acquisition - 6,980 square feet Accesses Closed - none Accesses Modified - 2 (relocates driveways to businesses between Central Point Rd and Leland Rd. Both driveways would be right-in/right-out.) Out of Direction Travel - none Meets Oregon City's intersection access spacing standards.

KEY

Green =

Yellow =

Orange =

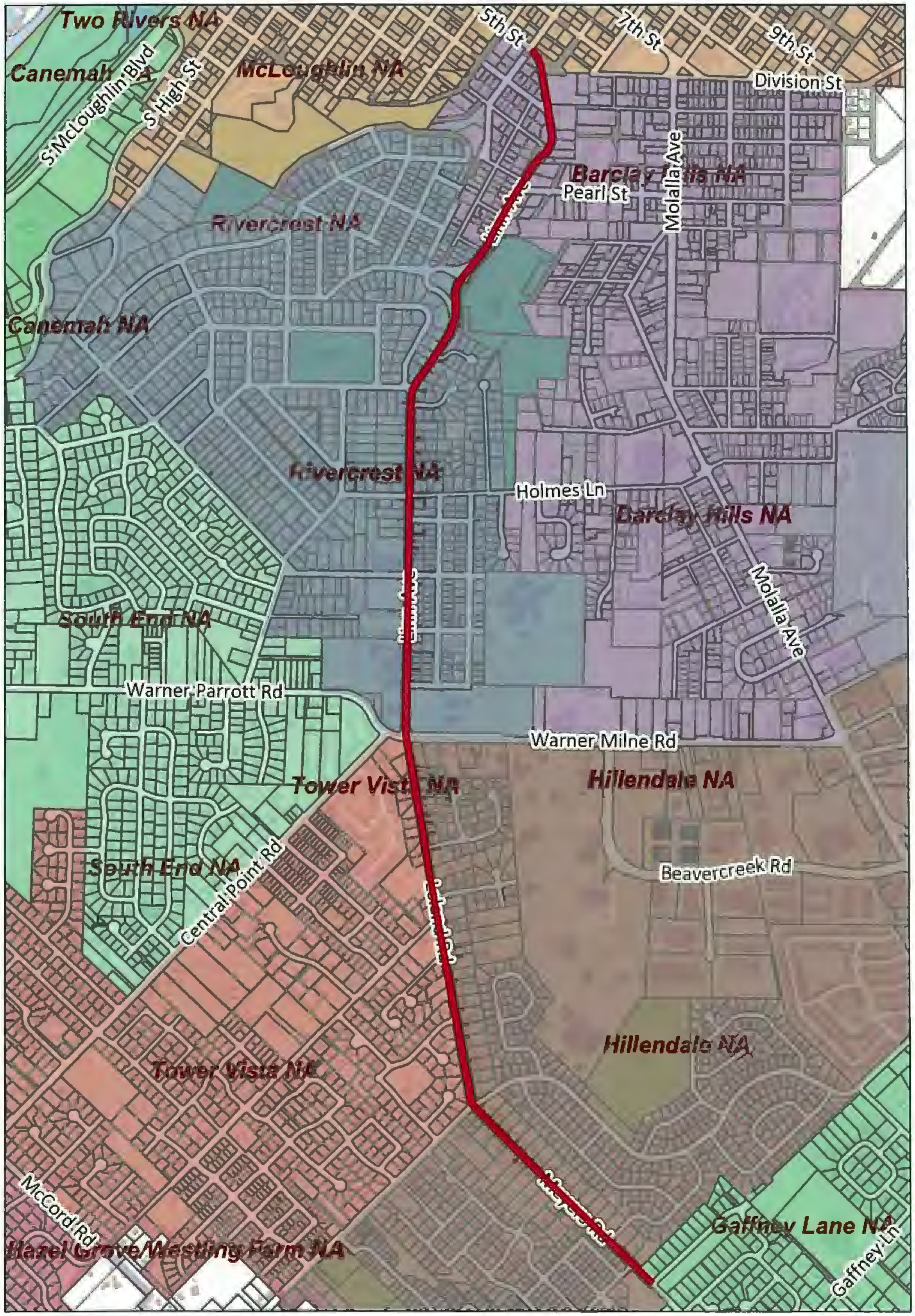
Present Worth Analysis

Option #	**Annual Weekday PM Peak Hour Delay Cost**	**Construction Cost**	**Annual Crash Savings**	**Annual Maintenance Cost**	**Present Worth**	**Is option viable from an operations perspective?**
no-build	$316,593	$0	$0	$2,000	($4,329,783)	no
1	$279,270	$115,000	$18,760	$2,000	($3,678,173)	yes
2	$254,475	$45,000	$18,760	$2,000	($3,273,894)	yes
3	$751,158	$700,000	$0	$3,000	($10,922,330)	no
4	$98,658	$3,220,000	$90,360	$1,500	($3,229,312)	yes
5	$91,872	$3,350,000	$149,120	$1,500	($2,463,520)	yes

Notes

1. Assumed interest rate is 4%.
2. Assumed 20-year design life for improvements.
3. Maintenance costs do not include maintenance of pavement or utilities within the intersection.
4. Maintenance costs for the intersection signal are recent costs for the existing signal.
5. Maintenance costs for the roundabout are assumed to be equal to the landscaping costs for a similar roundabout at Washington/Clackamas River Drive.

Linn/LeLand/Meyers Concept Plan

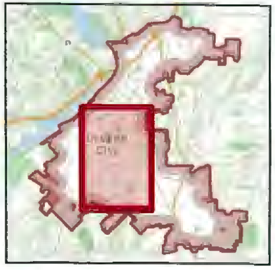


Legend

- ☐ Taxlots
- ☐ Taxlots (Outside UGB)
- ■ Unimproved ROW
- Neighborhood Associations
  - ■ Barclay Hills
  - ■ Canemah
  - ■ Caufield
  - ■ Gaffney Lane
  - ■ Hazel Grove/Westling Farm
  - ■ Hillendale
  - ■ McLoughlin
  - ■ Park Place
  - ■ Rivercrest
  - ■ South End
  - ■ Tower Vista
  - ■ Two Rivers
- — City Limits
- — UGB

Notes

Overview Map



The City of Oregon City makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, surveying or navigation purposes. Notification of any errors is appreciated.

N

0 1,250 Feet

1: 15,000

City of Oregon City
PO Box 3040
625 Center St
Oregon City
OR 97045
(503) 657-0891
www.orcity.org

Map created 3/6/2014

625 Center Street
Oregon City, OR 97045
503-657-0891

City of Oregon City

Staff Report

File Number: PC 14-093

Agenda Date: 8/25/2014

Status: Agenda Ready

To: Planning Commission

Agenda #: 3b.

From: Community Development Director Tony Konkol

File Type: Planning Item

SUBJECT:
The Linn Avenue / Leland Road / Meyers Road Corridor Plan (Planning File LE 14-04)

RECOMMENDED ACTION (Motion):
Staff recommends that the Planning Commission recommend approval of planning file LE 14-04 to the City Commission.

BACKGROUND:
The applicant, Oregon City Public Works Department, has requested legislative review of the Linn Avenue / Leland Road / Meyers Road Corridor Plan. The consultant, Wallis Engineering, has completed the final draft of the plan for Planning Commission and City Commission review.

Planning staff has completed its review of the Legislative File LE 14-04 and has provided findings for adoption by the Planning Commission in the attached Staff Report. This item was continued from July 11, 2014.

The Linn Avenue - Leland Road - Meyers Road Corridor Concept Plan is being developed to address deficiencies in the pedestrian and bicycle facilities along the corridor. The area of the plan is from 5th Street at Jackson Street to Meyers Road at Moccasin Way. Along this route there are very few existing sidewalks and designated bicycle lanes. The plan will develop the City's preferred street sections to address these deficiencies when future development occurs. The plan will also look at connecting important features along the corridor (i.e. parks and schools) by means of paths, sidewalks and bicycle lanes. In addition the plan will address the needs of the Linn Avenue, Warner Milne, Warner Parrot, Central Point Road intersection by proposing an intersection improvement plan.

The initial City Commission public hearing on this matter was identified as August 20th, 2014. The Planning Commission held a public hearing on this matter on July 11, 2014 and continued the hearing to the August 25, 2014 meeting date.

BUDGET IMPACT: See Cost Estimates - Chapter VI of Plan.
Amount:
FY(s):
Funding Source: See Page 76 of Plan.

OREGON CITY
Community Development – Planning
221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LEGISLATIVE APPLICATION

PUBLIC HEARING: Planning Commission: 8/25/2014 (Continued from 7/11/2014)
City Commission: 8/20/2014 (Continuance requested to 9/17/2014)

FILE NO.: LE 14-04: Linn Avenue/Leland Road/Meyers Road Corridor Concept Plan

APPLICANT: Oregon City Public Works Department
John Lewis, P.E., Public Works Director
625 Center Street, Oregon City, Oregon 97045

REPRESENTATIVE: Wallis Engineering

REQUEST: Adopt the Linn Avenue/Leland Road/Meyers Road Corridor Plan as an amendment to the Oregon City Transportation System Plan (2014), an Ancillary Document to the Oregon City Comprehensive Plan.

LOCATION: Linn Avenue/Leland Road/Meyers Road Corridor from 5th Street at Jackson Street to Meyers Road at Moccasin Way.

RECOMMENDATION: Approval

REVIEWER: Tony Konkol, Community Development Director
Pete Walter, AICP, Associate Planner

17.50.170 - Legislative hearing process.
A. Purpose. Legislative actions involve the adoption or amendment of the city's land use regulations, comprehensive plan, maps, inventories and other policy documents that affect the entire city or large portions of it. Legislative actions which affect land use must begin with a public hearing before the planning commission.
B. Planning Commission Review.
1. Hearing Required. The planning commission shall hold at least one public hearing before recommending action on a legislative proposal. Any interested person may appear and provide written or oral testimony on the proposal at or prior to the hearing. The community development director shall notify the Oregon Department of Land Conservation and Development (DLCD) as required by the post-acknowledgment procedures of ORS 197.610 to 197.625, as applicable.
2. The community development director's Report. Once the planning commission hearing has been scheduled and noticed in accordance with Section 17.50.090(C) and any other applicable laws, the community development director shall prepare and make available a report on the legislative proposal at least seven days prior to the hearing.
3. Planning Commission Recommendation. At the conclusion of the hearing, the planning commission shall adopt a recommendation on the proposal to the city commission. The planning commission shall

make a report and recommendation to the city commission on all legislative proposals. If the planning commission recommends adoption of some form of the proposal, the planning commission shall prepare and forward to the city commission a report and recommendation to that effect.
C. City Commission Review.
1. City Commission Action. Upon a recommendation from the planning commission on a legislative action, the city commission shall hold at least one public hearing on the proposal. Any interested person may provide written or oral testimony on the proposal at or prior to the hearing. At the conclusion of the hearing, the city commission may adopt, modify or reject the legislative proposal, or it may remand the matter to the planning commission for further consideration. If the decision is to adopt at least some form of the proposal, and thereby amend the city's land use regulations, comprehensive plan, official zoning maps or some component of any of these documents, the city commission decision shall be enacted as an ordinance.
2. Notice of Final Decision. Not later than five days following the city commission final decision, the community development director shall mail notice of the decision to DLCD in accordance with ORS 197.615(2).
(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 10-1003, § 1(Exh. 1), 7-7-2010)

IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION, PLEASE CONTACT THE PLANNING DIVISION OFFICE AT 503-722-3789.

Proposed Project
The proposal is to update the Oregon City Transportation System Plan (2013), by adopting the Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan. The Oregon City Transportation System Plan is an Ancillary Document to the Oregon City Comprehensive Plan.

According to the 2004 Oregon City Comprehensive Plan (Introduction, “Implementing the Plan” Page 4): “Ancillary Plans are adopted by the City Commission for such things as parks and recreation, transportation systems, water facilities, and sewer facilities. Usually prepared by City departments through a public process, ancillary plans are approved by the City Planning Commission and adopted by the City Commission to provide operational guidance to city departments in planning for and carrying out city services. These plans are updated more frequently than the Comprehensive Plan.”

The Oregon City Water Distribution System Master Plan is a "public facilities plan", which is defined in the administrative rules implementing Goal 11, OAR 660-0110005(1), and provides: "A public facility plan is a support document or documents to a comprehensive plan. The facility plan describes the water, sewer and transportation facilities which are to support the land uses designated in the appropriate acknowledged comprehensive plans within an urban growth boundary containing a population greater than 2,500. Certain elements of the public facility plan also shall be adopted as part of the comprehensive plan, as specified in OAR 660-11-045.".

The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan is being developed to address deficiency’s in the pedestrian and bicycle facilities along the corridor. The area of the plan is from 5th Street at Jackson Street to Meyers Road at Moccasin Way. Along this route there are very few existing sidewalks and designated bicycle lanes. The plan will develop the City’s preferred street sections to address these deficiencies when future development occurs. The plan will also look at connecting important features along the corridor (i.e. parks and schools) by means of paths, sidewalks and bicycle lanes. In addition the plan will address the needs of the Linn Avenue, Warner Milne, Warner Parrot, Central Point Road intersection by proposing an intersection improvement plan.

Plan Document

The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan is a necessary part of the city's public facilities program relating to transportation infrastructure. The plan is attached as Exhibit 1.

Public Involvement and Public Comment

The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan update process provides opportunities for public involvement in the legislative decision making process through the public hearing process, newspaper noticing, meetings with the Transportation Advisory Committee, Historic Review Board and Citizen Involvement Committee, affected agencies such as the School District, and work sessions with the Planning Commission and City Commission.

The public involvement and public comment process included placing a questionnaire on the City's web site, meeting with the (5) neighborhood associations along the corridor, meeting with the (3) private property owners that would be affected by the construction of a roundabout, meeting with Oregon City School District representative, (3) meetings with the Transportation Advisory Committee, meeting with the Historic Review Board, meeting with the Citizen Involvement Committee, public open house, (3) meetings with the Planning Commission, (3) meetings with the City Commission.

The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan has been available for review on the Oregon City website at the following address: http://www.orcity.org/publicworks/linn-avenue-leland-road-meyers-road-corridor-plan.

Planning Commission Public Hearings

The Planning Commission held public hearings on July 14 and July 25, 2014, continuing the Public Hearing to August 25.

City Commission Public Hearings

The first evidentiary public hearing before the City Commission for this file has been publicly noticed for August 20, 2014. Staff will request a continuance to September 17, 2014 so that the Planning Commission's recommendation may be made part of the legislative file.

Public Comments

The following public comments were received prior to issuance of this staff report:

Betty Savage – Owner of Tax Lot 3-2E-06DB-02303

Mrs. Savage spoke at the hearing on July 14 and is primarily concerned about city taking her property, and business impacts associated with roundabout. She stated that the traffic counts for 2009 - 2012 indicated 9 accidents which was low and does not justify safety improvements. Mrs. Savage also submitted more detailed written comments on August 4, 2014 (Exhibit 3), with a range of questions and a set of prioritized recommendations.

Norma Belding – Ethel Street Resident

Ms. Belding is a Resident on Ethel Street and is concerned about costs to adjacent property owners and how the improvements will be paid for.

Laura Sadowski - Plaid Pantry Owner
Ms. Sadowski testified on July 14 and had questions about how the roundabout improvements at the five-legged intersection will affect large trucks loading and making deliveries into the Plaid Pantry site.

Arnold Wagner
Landlord with residential property on Linn. Mr. Wagner is interested in seeing more detailed designs and how this will affect his property.

Pam Harris
Ms. Harris sent email comments on July 14. She was wondering if the city had any estimates for cost to property owners for the addition of sidewalks in Phase II (on Linn Avenue between Park and Holmes). Also, she asked whether the project would bring any other fees levied on property owners other than sidewalks.

Many of the above comments relate to future site specific construction impacts and costs to adjacent property owners that might result as a consequence of implementation of the corridor plan.

The plan documents contains planning level cost estimates and a generalized overview of additional right-of-way needs. Engineering level construction documents and costs would be determined following adoption of the plan as funding to implement the project comes available.

Public Notice
Notice of the first Planning Commission and City Commission public hearings for the proposal was published in the Clackamas Review on June 18, 2014. Notice of the public hearings was mailed to affected property owners and residents within 300 feet of the corridor plan area on July 3, 2014.

Notice of the August 25 Planning Commission continuance for the public hearing for the plan was emailed to the affected agencies, the CIC and all Neighborhood Associations on July 24, 2014.

In accordance with ORS 197.610 and OAR 660-018-000, a Notice of Proposed Amendment to the Oregon City Comprehensive Plan was provided to the Oregon Department of Land Conservation and Development 35 days prior to the first noticed Evidentiary Hearing on June 9, 2014 (Exhibit 4).

Notice of the proposed amendment was provided to the following affected agencies: South Fork Water Board (SFWB), Clackamas River Water (CRW), Clackamas County, Clackamas Fire District #1, Oregon City School District, City of West Linn, City of Gladstone, City of Milwaukie, Tri-City Services District, Metro, and Oregon Department of Transportation (ODOT).

DECISION-MAKING CRITERIA:

Oregon City Comprehensive Plan
According to the 2004 Oregon City Comprehensive Plan (Introduction, “Implementing the Plan” Page 4): “Ancillary Plans are adopted by the City Commission for such things as parks and recreation, transportation systems, water facilities, and sewer facilities. Usually prepared by City departments through a public process, ancillary plans are approved by the City Planning Commission and adopted by the City Commission to provide operational guidance to city departments in planning for and carrying out city services. These plans are updated more frequently than the Comprehensive Plan.”

As an ancillary plan, the Water Distribution System Master Plan requires findings for consistency with applicable Comprehensive Plan Goals and Policies and also with Statewide Planning Goals. These findings are presented below.

Consistency with Oregon City Comprehensive Plan
Chapter O of the 2004 Oregon City Comprehensive Plan, Comprehensive Plan Maintenance and Update, contains criteria for approving changes to the comprehensive plan and plan map. Review of the comprehensive plan should consider:

1. *Plan implementation process.*
2. *Adequacy of the Plan to guide land use actions, including an examination of trends.*
3. *Whether the Plan still reflects community needs, desires, attitudes and conditions. This shall include changing demographic patterns and economics.*
4. *Addition of updated factual information including that made available to the City of regional, state and federal governmental agencies.*

Chapter O. Comprehensive Plan Maintenance and Update
Regular Review and Update. Another method of Plan maintenance and updating is a continuous technical review of the Plan by the Planning staff. This review and any subsequent recommendations for Plan updating should be presented to the Neighborhood Associations, Planning Commission and City Commission for input and discussion in the same manner as requested Plan changes. The continuous review should consider:

- ***Plan implementation process;***

Finding: The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan is a special purpose plan that is part of the City's Transportation System Plan, an adopted Ancillary Document to the Oregon City Comprehensive Plan. The TSP is both a technical document and a conceptual guide that requires regular review in order to maintain and update it. The applicant, Oregon City Public Works Department, has or presented the update for input by the residents, affected agencies, Citizen Involvement Committee, Neighborhood Associations, Planning Commission and City Commission in accordance with the recommended method described in the Comprehensive Plan and pursuant to the applicable process described in Oregon City Municipal Code section 17.50.170. The plan implementation process is consistent with the Comprehensive Plan.

- ***Adequacy of the Plan to guide land use actions, including an examination of trends.***

Finding: The Linn Avenue, Leland Road, Meyers Road Corridor Concept Plan provides an analysis of existing conditions and provides direction for future development, funding and needs. The plan provides a comprehensive review of the corridor system for all modes of transportation and provides an adequate guide for future land use actions and the development of criteria to be utilized in land use actions. The update includes phased construction cost estimates and contingencies for the planning and design of recommended system facilities for the corridor (See Chapter VI, Implementation).

- ***Whether the Plan still reflects community needs, desires, attitudes and conditions. This shall include changing demographic patterns and economics.***

Finding: The 2013 Transportation System Plan identified the corridor plan as a necessary planning document to be developed to respond to increased use of the corridor and safety concerns for all modes of transportation system users (vehicles, pedestrian, bicycles, freight, and motorcycles). As part of this planning effort, the consultant conducted existing conditions analysis (Chapter II) of the existing transportation system, a future needs assessment (Chapter III), and an analysis of alternatives (Chapter IV), within the planning area. The City completed an update in 2013 to the Transportation System Plan (TSP). The TSP projected motor vehicle travel growth for year 2035 and the corridor plan identifies roadway geometry and safety needs, vehicle capacity needs, pavement needs, multi-modal capacity needs, and project needs initially identified in the TSP and also the City's Trails Master Plan. The TSP includes an analysis of changing demographic patterns and economics (using TAZ methodology or Transportation Area Zone modeling) to account for changing community conditions within and outside of the city's Urban Growth Boundary which affect the city's transportation system.

- ***Addition of updated factual information including that made available to the City by regional, state and federal governmental agencies.***

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides updated factual information including but not limited to recent ODOT crash data, traffic counts, Tri-Met ridership data and cost estimates for the various projects within the plan. These items are included in the technical appendix (Exhibit 1a).

Consistency with Oregon City Comprehensive Plan Goals and Policies

Section 1 Citizen Involvement

Goal 1.2 Community and Comprehensive Planning

Ensure that citizens, neighborhood groups, and affected property owners are involved in all phases of the comprehensive planning program.

Policy 1.2.1 - Encourage citizens to participate in appropriate government functions and land-use planning.

Goal 1.3 Community Education - Provide education for individuals, groups, and communities to ensure effective participation in decision-making processes that affect the livability of neighborhoods.

Goal 1.4 Community Involvement - Provide complete information for individuals, groups, and communities to participate in public policy planning and implementation of policies.

Policy 1.4.1 - Notify citizens about community involvement opportunities when they occur.

Goal 1.5 Government/Community Relations -Provide a framework for facilitating open, two-way communication between City representatives and individuals, groups, and communities.

Finding: Development of the plan included an extensive public involvement effort. Oregon City Public Works Department has presented the project to the public at a series of meetings including the Traffic Advisory Committee, Citizen Involvement Council, Neighborhood Associations, Historic Review Board, Planning Commission and City Commission. Documentation produced with the corridor plan has been posted on the project website throughout the duration of the project and comments have been integrated into the final product. Existing city maintained community e-mail lists have been used to share links to the website and on-line survey. The product will be reviewed through the Legislative approval process.

Section 2: Land Use

Goal 2.2 Downtown Oregon City

Develop the Downtown area, which includes the Historic Downtown Area, the "north end" of the Downtown, Clackamette Cove, and the End of the Oregon Trail area, as a quality place for shopping, living, working, cultural and recreational activities, and social interaction. Provide walkways for pedestrian and bicycle traffic, preserve views of Willamette Falls and the Willamette River, and preserve the natural amenities of the area.
Policy 2.2.2 - Support multi-modal transportation options throughout the Regional Center and to other Regional and Town Centers.
Policy 2.2.8 - Implement the Oregon City Downtown Community Plan and Oregon City Waterfront Master Plan with regulations and programs that support compatible and complementary mixed uses, including housing, hospitality services, restaurants, civic and institutional, offices, some types of industrial and retail uses in the Regional Center, all at a relatively concentrated density.
Policy 2.2.9 -Improve connectivity for vehicles, bicycles, and pedestrians within the Oregon City Downtown community and waterfront master plan areas and improve links between residential areas and the community beyond.
Policy 2.4.3 -Promote connectivity between neighborhoods and neighborhood commercial centers through a variety of transportation modes.
Policy 2.6.7 -Establish priorities to ensure that adequate public facilities are available to support the desired industrial development.

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides opportunities to facilitate increased travel opportunities for vehicles, pedestrians and bicyclists by providing a complete travel facility. Implementation of the plan will result in a more complete transportation system with a variety of multi-modal travel options.

Section 5: Natural Resources
Goal 5.4 Natural Resources
Identify and seek strategies to conserve and restore Oregon City's natural resources, including air, surface and subsurface water, geologic features, soils, vegetation, and fish and wildlife, in order to sustain quality of life for current and future citizens and visitors, and the long-term viability of the ecological systems.
Policy 5.4.1 - Conserve and restore ecological structure, processes and functions within the city to closely approximate natural ecosystem structure, processes, and functions.
Policy 5.4.2 - Cooperate with Clackamas County, Metro and other agencies to identify and protect wildlife habitat, distinctive natural areas, corridors and linkages and other ecological resources within the Urban Growth Boundary and incorporate the information into the Urban Growth Management Agreement with Clackamas County.
Policy 5.4.4- Consider natural resources and their contribution to quality of life as a key community value when planning, evaluating and assessing costs of City actions.
Policy 5.4.8 - Conserve natural resources that have significant functions and values related to flood protection, sediment and erosion control, water quality, groundwater recharge and discharge, education, vegetation and fish, and wildlife habitat.
Policy 5.4.9 - Protect and enhance riparian corridors along streams in Oregon City to increase shade, reduce streambank erosion and intrusion of sediments, and provide habitat for a variety of plants, animals, and fish.
Policy 5.4.12 - Use a watershed-scale assessment when reviewing and planning for the potential effects from development, whether private or public, on water quality and quantity entering streams.

Finding: Portions of the Linn Avenue/Leland Road/Meyers Road Corridor Plan area fall within the Geologic Hazard and Natural Resource Overlay Districts. In particular, Linn Avenue follows the Singer Creek drainage within the NROD for approximately 2800 feet between Glenwood Court and JQ Adams

Street. If any extensions / expansions or the right-of-way are proposed within a an adopted City overlay district such as a Floodplain Overlay District, Natural Resource Overlay District or Geologic Hazard Overlay District, then applicable overlay review processes will apply when the construction of those facilities is proposed. Within each of these overlay districts, the review process for public roads currently codified in the Oregon City Municipal Code is as follows:

Code Title	**OCMC**	**Subsection**
Natural Resource Overlay District	17.49	-.080 (Exempt Uses), I. Routine repair and maintenance of existing structures, roadways, driveways and utilities. J. Replacement, additions, alterations and rehabilitation of existing structures, roadways, utilities, etc., where the ground level impervious surface area is not increased. 17.49.150 Standards for vehicular or pedestrian paths and roads.
Geologic Hazard Overlay District	17.44	-.035 (Exemption for existing ROW) -.080 (new utilities require permit)
Flood Management Protection District	17.42	Water lines may be reviewed administratively by city engineer (subject to applicable site and construction standards / i.e. no net fill) 9. New culverts, stream crossings and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.
Willamette River Overlay District	17.48	-.100 (compatibility review and public access to Willamette River).
Historic Overlay District	17.40	May apply to new facilities not in existing ROW and where proposed development affects native soils, designated landmarks and structures.
Tree Protection	17.41	Applies to removal of trees on private property, if applicable – permit may be required
Public and Street Trees	12.04	Applies to the proposed removal of existing trees in public ROW and replacement if required.

Additionally, the City's stormwater standards in Chapter 13.12 and erosion control standards in Chapter 17.47 apply to construction activities in the public ROW to the extent applicable. The above review processes mandated within the Oregon City Municipal Code provide means for assessing impacts to and mitigating for the impacts of city projects on identified natural resources, when the specific design for these projects is developed.

The Historic Review Board reviewed the project on June 24, 2014 (See comment in Exhibit 5). The HRB determined that 1. No additional review will be required for work being done in the small area of the project located within the McLoughlin Conservation District. 2. As part of the 2011 citywide survey project, the Rivercrest neighborhood was identified for potential creation of an historic district and the Board looked at this plan to see how the Rivercrest area may be affected by the prospered plan. In this case, the Board found that Linn Avenue has existed as a city/county road long before the platting of the Rivercrest subdivision and holds distinct characteristic different from the neighborhood. The Board saw the existence of sidewalks in many portions of Linn Avenue and found that the project will not adversely affect the historic significance of the Rivercrest Neighborhood which has a historic landscape little to no sidewalks.

Section 6: Quality of Air, Water and Land Resources

Goal 6.1 Air Quality -Promote the conservation, protection and improvement of the quality of the air in Oregon City.

Policy 6.1.2 -Ensure that development practices comply with or exceed regional, state, and federal standards for air quality.

Finding: See also findings above for Section 5. The installation of sidewalks and bike lanes and a complete segment of the facilities will encourage travel via walking and bicycle and thus reduce automobile trips. The construction of the intersection improvements at the Linn/Warner Milne/Warner Parrot/Central Point intersection will increase capacity and reduce idling vehicles thus improving air quality. The plan includes provisions to establish unobstructed paths as well as pedestrian and bicycle crossings.

Section 11: Public Facilities

Goal 11.1 Provision of Public Facilities

Serve the health, safety, education, welfare, and recreational needs of all Oregon City residents through the planning and provision of adequate public facilities.

Finding: Goal 11 requires that public facilities and services be provided in a timely, orderly and efficient manner. The goal's central concept is that local governments should plan public services in accordance with the community's needs as a whole rather than be forced to respond to individual developments as they occur. The Linn Avenue/Leland Road/Meyers Road Corridor Plan will provide a design for public facilities as well as a means to obtain future funding.

Policy 11.1.1

Ensure adequate public funding for the following public facilities and services, if feasible:

- *Transportation infrastructure*

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan will provide a design for public facilities as well as a means to obtain future funding.

Policy 11.1.2

Provide public facilities and services consistent with the goals, policies and implementing measures of the Comprehensive Plan, if feasible.

Finding: As demonstrated within this report the Linn Avenue/Leland Road/Meyers Road Corridor Plan provides guidance for transportation facilities within the existing city consistent with the relevant goals, policies and implementing measures of the Comprehensive Plan. The proposed TSP update is consistent with this policy.

Policy 11.1.5

Design the extension or improvement of any major public facility and service to an area to complement other public facilities and services at uniform levels.

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides opportunities to facilitate increased travel opportunities for vehicles, pedestrians and bicyclists by providing a complete travel facility. Implementation of the plan will result in a more complete transportation system with a variety of multi-modal travel options.

Policy 11.1.7

Develop and maintain a coordinated Capital Improvements Plan that provides a framework, schedule, prioritization, and cost estimate for the provision of public facilities and services within the City of Oregon City and its Urban Growth Boundary.

Finding: The Linn Avenue/Leland Road/Meyers Road concept plan breaks the corridor into 4 segments. Each segment has the preferred street section identified. These street sections will be used to direct new development along the corridor as well as allow the City to pursue grants to construction the improvements. The plan includes cost estimates to complete the construction of the corridor plan.

Goal 11.6 Transportation Infrastructure

Optimize the City's investment in transportation infrastructure.

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides opportunities to facilitate increased travel opportunities for vehicles, pedestrians and bicyclists by providing a complete travel facility. Implementation of the plan will result in a more complete transportation system with a variety of multi-modal travel options.

Policy 11.6.1

Make investments to accommodate multi-modal traffic as much as possible to include bike lanes, bus turnouts and shelters, sidewalks, etc., especially on major and minor arterial roads, and in regional and employment centers.

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan includes solutions related to walking, biking, shared-use paths, family friendly facilities, transit, and crossings along a Minor Arterial.

Policy 11.6.2

Advocate for local, state, and regional cooperation in achieving an integrated connected system such as for the Amtrak station, light rail, and bus transit.

Finding: TriMet, as the city's only public transportation provider, was consulted and their comments were incorporated into the plan.

Section 12: Transportation

Goal 12.1 Land Use-Transportation Connection

Ensure that the mutually supportive nature of land use and transportation is recognized in planning for the future of Oregon City.

Policy 12.1.1 - Maintain and enhance citywide transportation functionality by emphasizing multi-modal travel options for all types of land uses.

Policy 12.1.4 - Provide walkable neighborhoods. They are desirable places to live, work, learn and play, and therefore a key component of smart growth.

Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides opportunities to facilitate increased travel opportunities for vehicles, pedestrians and bicyclists by providing a complete travel facility. Implementation of the plan will result in a more complete transportation system with a variety of multi-modal travel options.

Goal 12.2 Local and Regional Transit

Promote regional mass transit (South Corridor bus, Bus Rapid Transit, and light rail) that will serve Oregon City.
Finding: The proposed plan supports mass transit by providing a complete transportation facility which will allow safe access for mass transit users and building and automotive and bicycle parking designs.

Goal 12.3 Multi-Modal Travel Options
Develop and maintain a transportation system that provides and encourages a variety of multi-modal travel options to meet the mobility needs of all Oregon
City residents.
Policy 12.3.1 -Provide an interconnected and accessible street system that minimizes vehicle miles traveled and inappropriate neighborhood cut through traffic.
Policy 12.3.2 -Provide an interconnected and accessible pedestrian system that links residential areas with major pedestrian generators such as employment centers, public facilities, and recreational areas.
Policy 12.3.3 - Provide a well-defined and accessible bicycle network that links residential areas, major bicycle generators, employment centers, recreational areas, and the arterial and collector roadway network.
Policy 12.3.4 -Ensure the adequacy of pedestrian and bicycle connections to local, county, and regional trails.
Policy 12.3.5 -Promote and encourage a public transit system that ensures efficient accessibility, mobility, and interconnectivity between travel modes for all residents of Oregon City.
Policy 12.3.6 -Establish a truck route network that ensures efficient access and mobility to commercial and industrial areas while minimizing adverse residential impacts.
Policy 12.3.8 -Ensure that the multi-modal transportation system preserves, protects, and sup- ports the environmental integrity of the Oregon City community.
Policy 12.3.9 -Ensure that the city's transportation system is coordinated with regional transportation facility plans and policies of partnering and affected agencies.
Finding: The Linn Avenue/Leland Road/Meyers Road Corridor Plan provides opportunities to facilitate increased travel opportunities for vehicles, pedestrians and bicyclists by providing a complete travel facility. Implementation of the plan will result in a more complete transportation system with a variety of multi-modal travel options. The plan was created in conjunction with other affected agencies.

Goal 12.5 Safety
Develop and maintain a transportation system that is safe.
Policy 12.5.1 -Identify improvements that are needed to increase the safety of the transportation system for all users.
Policy 12.5.2 -Identify and implement ways to minimize conflict points between different modes of travel.
Policy 12.5.3 -Improve the safety of vehicular, rail, bicycle, and pedestrian crossings.
Finding: The plan will increase safety along the corridor by providing a safe place for bicyclists and pedestrians to travel along the corridor. The plan also includes crossings to assist pedestrians and bicyclists in crossing the Minor Arterial.

Goal 12.6 Capacity
Develop and maintain a transportation system that has enough capacity to meet users' needs.
Policy 12.6.1 - Provide a transportation system that serves existing and projected travel demand.
Policy 12.6.2 - Identify transportation system improvements that mitigate existing and projected areas of congestion.
Policy 12.6.3 - Ensure the adequacy of travel mode options and travel routes (parallel systems) in areas of congestion.

Policy 12.6.4 - Identify and prioritize improved connectivity throughout the city street system.
Finding: The suggested improvements will serve existing and projected travel demands projected by the TSP. The Linn Avenue/Leland Road/Meyers Road Concept Plan includes a compilation of projects identified in the TSP. This plan will identify capacity improvements that meet the needs of pedestrians and bicyclists by completing sidewalks and bicycle lanes throughout the corridor. The plan will also include recommendations for connectivity of existing sidewalks, paths and bicycle lanes in the surrounding areas of the corridor, linking parks, schools, churches and other destination locations. In addition, the plan will improve the intersection of Linn Avenue, Warner Milne, Warner Parrot and Central Point Road by identifying capacity improvements for the intersection. The intersection improvements will ease delays and increase the capacity of the intersection for vehicles as well as pedestrians and bicyclists.

Goal 12.7 Sustainable Approach

Promote a transportation system that supports sustainable practices.
Policy 12.7.4 - Promote multi-modal transportation links and facilities as a means of limiting traffic congestion.
Finding: The proposed plan will allow for a complete transportation network for all modes of transportation. The improved intersection will also improve air quality by greatly reducing the number of vehicles that sit at the intersection idling while waiting for the traffic signal to change.

Goal 12.8 Implementation/Funding

Identify and implement needed transportation system improvements using available funding.
Policy 12.8.1 - Maximize the efficiency of the Oregon City transportation system, thus minimizing the required financial investment in transportation improvements, wit out adversely impacting neighboring jurisdictions and facilities.
Policy 12.8.2 - Provide transportation system improvements that facilitate the timely implementation of the Oregon City Downtown Community Plan and protect regional and local access to the End of the Oregon Trail Interpretive Center.
Finding: The proposed projects in the concept plan will maximize the efficiency of the transportation system by providing multi-modal connectivity throughout the corridor and the surrounding areas. By combining several projects into a more detailed analysis and study, the plan, when adopted, leverages developer requirements, grant funds and local funds for more comprehensive and planned projects.

CONSISTENCY WITH STATEWIDE PLANNING GOALS

STATEWIDE PLANNING GOAL 1:

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.
Finding: This goal is implemented through the applicable Goals and Policies in Section 1 of the Oregon City Comprehensive Plan: Citizen Involvement. Development of the plan included an extensive public involvement effort. Oregon City Public Works Department has presented the project to the public at a series of meetings including the Traffic Advisory Committee, Citizen Involvement Council, Neighborhood Associations, Historic Review Board, Planning Commission and City Commission. Documentation produced with the corridor plan has been posted on the project website throughout the duration of the project and comments have been integrated into the final product. The product will be reviewed through the Legislative approval process.

STATEWIDE PLANNING GOAL 2:
To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions.
Finding: This goal is implemented through the applicable Goals and Policies in Section 2 of the Oregon City Comprehensive Plan: Land Use. Because the plan is an ancillary document to the City's Transportation System Plan and Comprehensive Plan, the application was processed pursuant to the legislative hearing process outlined in Section 17.50.170 of the Oregon City Municipal Code.

STATEWIDE PLANNING GOAL 5:
To protect natural resources and conserve scenic and historic areas and open spaces.
Finding: This goal is implemented through the applicable Goals and Policies in Section 5 of the Oregon City Comprehensive Plan: Open Spaces, Scenic and Historic Areas, and Natural Resources. The Oregon City Municipal Code contains review criteria for uses within overlay districts to assure that designated Goal 5 resources are appropriately considered when development is proposed. In particular, the Natural Resource Overlay District designation: "provides a framework for protection of Metro Titles 3 and 13 lands, and Statewide Planning Goal 5 resources within Oregon City. The Natural Resource Overlay District (NROD) implements the Oregon City Comprehensive Plan Natural Resource Goals and Policies, as well as Federal Clean Water Act requirements for shading of streams and reduction of water temperatures, and the recommendations of the Metro ESEE Analysis. Trails, paths, and roads are permitted either outright or with restrictions in the Natural Resource Overlay District as identified in OCMC 17.49.150 as part of a Type II or Type III review process.

Within the Historic Overlay District, which includes the McLoughlin Conservation District, designated Landmarks and Historic corridors, proposed public utility projects may be reviewed by the Historic Review Board to determine potential impact historic resources. The Historic Review Board has adopted character guidelines that pertain to improvements in the public right of way, utilities and related equipment to assure compatibility with historic resources.

Individual construction projects to implement the Linn Avenue/Leland Road/Meyers Road Corridor Plan will be reviewed through the land use process pursuant to the above resource protection guidelines.

STATEWIDE PLANNING GOAL 6:
To maintain and improve the quality of the air, water and land resources of the state.
Finding: This goal is implemented through the applicable Goals and Policies in Section 6 of the Oregon City Comprehensive Plan: Quality of Air, Water and Land Resources. By planning system improvements based on projected demand and land use patterns, the plan will ensure that land suited for development will be served efficiently.

The improvements recommended in the plan will result in less pollution by providing a safe opportunity for pedestrian and bicycle travel. The new sidewalk construction will incorporate the use of curb cuts and landscaped swales to treat stormwater runoff. The intersection improvements will also improve air quality by greatly reducing the number of vehicles that sit at the intersection idling while waiting for the traffic signal to change.

STATEWIDE PLANNING GOAL 7:
To protect people and property from natural hazards.
Finding: This goal is implemented through the applicable Goals and Policies in Section 7 of the Oregon City Comprehensive Plan: Natural Hazards. This goal primarily addresses how the city should plan

development to avoid hazard posed by floods, steep slopes, geologically unstable areas and other natural hazards. Prior to implementation of the plan, the projects will be reviewed by the Planning Division for review with the Natural Resources Overlay District in chapter 17.49 and the Geologic Hazards Overlay District in chapter 17.44 of the Oregon City Municipal Code.

STATEWIDE PLANNING GOAL 11:
To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.
Finding: This goal is implemented through the applicable Goals and Policies in Section 11 of the Oregon City Comprehensive Plan: Public Facilities. As stated in Section 11, the transportation infrastructure in Oregon City is governed by the Oregon City Transportation System Plan (Oregon City TSP). The relevant Public Facilities goals and policies and findings are discussed in greater detail above.

STATEWIDE PLANNING GOAL 12:
To provide and encourage a safe, convenient and economic transportation system.
Finding: This goal is implemented at the local level through the applicable Goals and Policies in the updated TSP, Section 2 (The Vision). This goal is also implemented at the state level through the Transportation Planning Rule (TPR), OAR 660-012. The plan will increase safety along the corridor by providing a safe place for bicyclists and pedestrians to travel along the corridor. The plan also includes crossings to assist pedestrians and bicyclists in crossing the Minor Arterial.

STATEWIDE PLANNING GOAL 13: To conserve energy.
Land and uses developed on the land shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles.
Finding: This goal is implemented through the applicable Goals and Policies in Section 13 of the Oregon City Comprehensive Plan: Energy Conservation. The multimodal transportation system and improvements proposed will support efficient use of land and encourage walking and biking by providing a cohesive transportation system for a variety of modes.

Oregon Transportation Plan (2006)
The Oregon Transportation Plan (OTP) is the state's long-range multimodal transportation plan. The OTP is the overarching policy document among a series of plans that together form the state transportation system plan (TSP). A TSP must be consistent with applicable OTP goals and policies. Findings of compatibility will be part of the basis for TSP approval. The most pertinent OTP goals and policies for city transportation system planning are provided below.

POLICY 1.2 – Equity, Efficiency and Travel Choices
It is the policy of the State of Oregon to promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.
Finding: The plan will increase safety along the corridor by providing a safe place for bicyclists and pedestrians to travel along the corridor. The plan also includes crossings to assist pedestrians and bicyclists in crossing the Minor Arterial and improvements associated with transit stops.

POLICY 2.1 - Capacity and Operational Efficiency
It is the policy of the State of Oregon to manage the transportation system to improve its capacity and operational efficiency for the long term benefit of people and goods movement.

Finding: The plan will improve capacity by providing safe routes for pedestrians and bicyclists along the corridor as well as interconnectivity of sidewalks, paths and bicycle lanes to features surrounding the corridor. Capacity and operational efficiency of the Linn Avenue, Warner Milne, Warner Parrot, Central Point Road intersection will also be increased by the construction of intersection improvements.

POLICY 2.2 – Management of Assets
It is the policy of the State of Oregon to manage transportation assets to extend their life and reduce maintenance costs.
Finding: The construction of sidewalks and bicycle lanes along the corridor and surrounding facilities will encourage usage of these facilities thus reducing traffic which can increase the life of the roadway which will decrease operation and maintenance costs. All plans for new infrastructure will include the city's latest design standards.

POLICY 4.1 - Environmentally Responsible Transportation System
It is the policy of the State of Oregon to provide a transportation system that is environmentally responsible and encourages conservation and protection of natural resources.
Finding: The construction of sidewalks and bicycle lanes along the corridor and surrounding facilities will encourage usage of these facilities thus reducing traffic which will improve air quality by reducing vehicle exhaust. The construction of the new sidewalk sections in segments 2,3 & 4 will allow for curb side stormwater treatment by usage of landscaped swales which will improve water quality in the area's streams. Due to topographic constraints, segment 1 will address stormwater quality through basin planning improvements. In addition, the construction of an intersection improvement at the Linn Avenue, Warner Milne, Warner Parrot, Central Point Road intersection will allow vehicles to move through the intersection quicker, thus reducing the amount of vehicle idling.

POLICY 5.1 – Safety
It is the policy of the State of Oregon to continually improve the safety and security of all modes and transportation facilities for system users including operators, passengers, pedestrians, recipients of goods and services, and property owners.
Finding: The goal of the Linn Avenue/Leland Road/Meyers Road Concept Plan is to improve the safety of pedestrians and bicyclists by providing safe routes through the corridor. This will be accomplished by filling in the missing sections of sidewalk and assigning dedicated bicycle lanes. The construction of the intersection improvements at the Linn Avenue/Warner Milne/Leland Road/Central Point Road/Warner Parrot Road intersection will improve the safety of pedestrians, bicyclists and vehicles.

POLICY 7.1 – A Coordinated Transportation System
It is the policy of the State of Oregon to work collaboratively with other jurisdictions and agencies with the objective of removing barriers so the transportation system can function as one system.
Finding: Staff from the Oregon City Public Works Department meet with representatives from OC School District and consulted with TriMet to present the project and gather feedback.

POLICY 7.3 – Public Involvement and Consultation
It is the policy of the State of Oregon to involve Oregonians to the fullest practical extent in transportation planning and implementation in order to deliver a transportation system that meets the diverse needs of the state.
Finding: Development of the plan included an extensive public involvement effort. Oregon City Public Works Department has presented the project to the public at a series of meetings including the Traffic

Advisory Committee, Citizen Involvement Council, Neighborhood Associations, Historic Review Board, Planning Commission and City Commission. Documentation produced with the corridor plan has been posted on the project website throughout the duration of the project and comments have been integrated into the final product. The product will be reviewed through the Legislative approval process.

POLICY 7.4 – Environmental Justice

It is the policy of the State of Oregon to provide all Oregonians, regardless of race, culture or income, equal access to transportation decision-making so all Oregonians may fairly share in benefits and burdens and enjoy the same degree of protection from disproportionate adverse impacts.

Finding: Development of the plan included an extensive public involvement effort. Oregon City Public Works Department has presented the project to the public at a series of meetings including the Traffic Advisory Committee, Citizen Involvement Council, Neighborhood Associations, Historic Review Board, Planning Commission and City Commission. Documentation produced with the corridor plan has been posted on the project website throughout the duration of the project and comments have been integrated into the final product. The improvements to the pedestrian and bicycle facilities as well as the roundabout construction will aid all citizens of Oregon City and any other individual(s) that travel through the corridor regardless of their race, sex, color, national origin or income level.

The product will be reviewed through the Legislative approval process.

Oregon Highway Plan

The 1999 Oregon Highway Plan (OHP) establishes policies and investment strategies for Oregon's state highway system over a 20-year period and refines the goals and policies found in the OTP. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local road, bicycle, pedestrian, transit, rail, and air systems. The policies applicable to the Oregon City TSP are addressed below.

Policy 1G *(Major Improvements) requires maintaining performance and improving safety by improving efficiency and management before adding capacity. ODOT works with regional and local governments to address highway performance and safety.*

Finding: The Linn Avenue/Leland Road/Meyers Road Concept Plan will improve both safety and efficiency of the corridor by addressing the needs of sidewalks and bicycle lanes and construction of intersection improvements at the Linn Avenue/Warner Milne/Leland Road/Central Point Road/Warner Parrot Road intersection.

Policy 2B *(Off-System Improvements) helps local jurisdictions adopt land use and access management policies.*

Finding: Complies. Improvements recommended in the Linn Avenue/Leland Road/Meyers Road Concept Plan include installation of turn lanes and intersection improvements, sidewalk construction, bike lane striping, reconstruction of roadways to City standards, installation of crossings and curb ramps, and citywide programmatic measures such as wayfinding tools, transit stop improvements, expanded bicycle parking design guidance and requirements, and Safe Routes to Schools. These local system improvements will help to reduce traffic and improve conditions on State roadways in the city.

Policy 2F *(Traffic Safety) improves the safety of the highway system.*
Finding: This section is Not Applicable as there are no State Highways in the corridor study area.

Policy 4B (Alternative Passenger Modes) *It is the policy of the State of Oregon to advance and support alternative passenger transportation systems where travel demand, land use, and other factors indicate the potential for successful and effective development of alternative passenger modes.*
Finding: The Linn Avenue/Leland Road/Meyers Road Concept Plan support alternative passenger transportation systems by recommending solutions related to walking, biking, shared-use paths, family friendly facilities, safe routes to schools, transit and crossings.

OAR 660 Division 12 Transportation Planning Rule (TPR)
The purpose of the TPR is "to implement Statewide Planning Goal 12 (Transportation) and promote the development of safe, convenient and economic transportation systems that are designed to reduce reliance on the automobile so that the air pollution, traffic and other livability problems faced by urban areas in other parts of the country might be avoided." A major purpose of the Transportation Planning Rule (TPR) is to promote more careful coordination of land use and transportation planning, to ensure that planned land uses are supported by and consistent with planned transportation facilities and improvements.
Finding: Complies. The Linn Avenue/Leland Road/Meyers Road Concept Plan is in compliance with the TPR.

Regional Transportation Plan
The Regional Transportation Functional Plan (RTFP) directs how Oregon City should implement the RTP through the TSP and other land use regulations. The RTFP codifies existing and new requirements which local plans must comply with to be consistent with the RTP. If a TSP is consistent with the RTFP, Metro will find it to be consistent with the RTP.
Finding: The Linn Avenue/Leland Road/Meyers Road Concept Plan has identified projects listed in the TSP. The TSP is consistent with the RTFP.

Transportation System Plan
Finding: The Transportation System Plan was used as the source to identify the improvement projects recommended in the Linn Avenue/Leland Road/Meyers Road Concept Plan.

RECOMMENDATION

The Planning Commission may recommend that the City Commission adopt the draft Linn Avenue/Leland Road/Meyers Road Concept Plan finding that it is consistent with the City's Comprehensive Plan and the Statewide Land Use Goals. With respect to financing, rather than take a position on the most appropriate financing solution, the Planning Commission could acknowledge that under any of the financing scenarios identified in the plan, the plan provides an adequate basis to guide land use decisions affected by the plan within the vicinity of the corridor, and provide a safe and multi-modal transportation system to serve planned development.

Staff recommends that the Planning Commission recommend approval of the Linn Avenue/Leland Road/Meyers Road Concept Plan, included as Exhibit 1, as an ancillary document to the Oregon City Comprehensive Plan to the City Commission for their consideration at their September 17, 2014 public hearing.

EXHIBITS

1) Draft Linn Avenue/Leland Road/Meyers Road Concept Plan 2014 – 8/12/2014
    a) Appendices 8/12/2014
2) Legislative Application Narrative
3) Public Comments
4) Public Notices
5) Historic Review Board comments