

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





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 5^{th} 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.



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.

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

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





West shoulder on Leland Road

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.

The final plan is detailed according to

Chapter 5: Final Concept Plan



Concept Plan Alternative A for Meyers Road

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.

Chapter 2

Existing Conditions Analysis

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 5^{th} 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.



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.





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.

Street	Classification	Cross- section ¹	Posted Speed	Sidewalks	Bike lanes	On-street Parking	TriMet Service
Linn Ave – 5 th 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
5 th 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

Table 2-1: General Roadway Characteristics

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

²The 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*.



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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*.

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

Table 2-2: Acute Street Intersections

^{1.} Angle as measured from street centerlines from City of Oregon City GIS



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 <u>Linn Avenue between 3rd to 4th Streets:</u> 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 <u>Pearl and Oak Streets at Linn Avenue:</u> 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 <u>Narain Court and Park Drive at Linn Avenue</u>: 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 <u>Linn Avenue and Leland Road intersection with Warner Parrott Road and Warner</u> <u>Milne Road:</u> 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.

	Crash Severity ¹		Collision Type ²					
Intersection/Area	PDO	Injury	Rear -End	Turning	Fixed Object	Angle	Sideswipe	Total crashes
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

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

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 $3^{rd}(4^{th})$ Street – The intersection of 4^{th} 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. 4^{th} 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.

Linn Avenue

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

(10)

3

Leland Road

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

Central Point Road

Warmer Patrott Road

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

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

Warner Milne Road

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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.



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



Singer Creek Park

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.

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 <u>Asphalt trail from 5th Street to Terrace Avenue:</u> 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 <u>Route/trail from 3rd Street to Linn Avenue:</u> 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 <u>Crosswalk across Linn Avenue at Charman Street:</u> 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 <u>Asphalt trails through Singer Creek Park:</u> Portions of the existing asphalt-paved trails through this park do not meet ADA requirements due to excessive slopes.
- P5 <u>Crosswalk across Linn Avenue at Park Drive:</u> This crossing does not connect to a sidewalk on the west side of Linn Avenue.
- P6 <u>Midblock crossing on Linn Avenue:</u> 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.



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.

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*.



Wayfinding sign on Linn Avenue and Holmes Lane

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.





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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

Specific deficiency in connectivity or access

Sidewalk, Path or Trail

Stream

Desire Path



Lot Lines City Park or Green Space

City Owned Lot

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

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



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



Obstructions within sidewalk on Linn Avenue

cross-slopes at driveways. In addition, there are obstructions frequently located within the sidewalk in the form of utility poles and mailboxes.

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

Chapter 3

Future Needs Assessment

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.

Pearl and Oak Streets at Linn Avenue

Pearl and Oak Streets intersect Linn Avenue at offset locations which present an opportunity for realignment and



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

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 roundabout 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 5^{th} 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.



Chapter 4

Alternatives 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



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

completely developed with residences and some commercial buildings – in many cases buildings are located within twenty feet of the existing property line.

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



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

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-ofway 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.

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 5^{th} 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

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

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.

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 fullydeveloped 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

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

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

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

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 multimodal 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

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.

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

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



Segment 3 - Leland Road: Linn Avenue to Meyers Road

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

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



Figure 4-4: Segment 4 Concept Plan Alternatives

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

Segment 4 - Meyers Road: Leland Road to Moccasin Way

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

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.)

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



Rivercrest Park

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.

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*.









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







Figure 4-8: Potential Routes to Gardiner Middle School

Linn Avenue, Leland Road and 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 5-leg roundabout.

The comments made during this workshop were incorporated into the Plan, which was finalized and submitted to the Planning Commission. The Planning Commission reviews the Plan and makes a recommendation to the City Commission for adoption, or comments accordingly. If recommended for adoption, the City Commission reviews the Plan and makes a decision for adoption - or comments accordingly. 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 crosssections 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.

- Linn Ave: 5th to Park Dr.
l Bike Lanes
ed-Use Path or Sidewalk
) Improvement
Vall
ent

Figure 5-1: Segment 1 Improvements

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

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 5^{th} 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).

Figure 5-2: Singer Creek Connectivity Improvements

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

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

inn Ave: Park Dr to Leland Rd
walk and Bike Lanes
lewalk and Bike Lanes and Stormwater see Cross-Section)
rb Ramp Improvement
provement
Image: wide of the second s
5-3: Segment 2 Improvements
land Road, and Meyers Road Corridor Plan August 2014
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. A graphic illustration of this intersection treatment is shown in *Figure 5-5*.

It may be of value to the City to complete an intersection control analysis at these intersections. Though some analyses have been performed (as discussed in *Appendix D*), it may be of value to provide a more detailed evaluation in order to support the decision to construct a roundabout.

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







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 5^{th} 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.

Chapter 6

Implementation Plan

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.



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	Install crosswalk and pedestrian-	Not Likely to be Funded
Davis Road Crossing	activated flasher on Linn Ave at	Long-term Phase 2 with an
	AV Davis Rd	evaluation score of 69

Notes:

¹Funding 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*.

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

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

Notes:

¹Funding 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 6^{th} 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 5^{th} 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.

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

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

Notes:

¹Funding 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*.

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."

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

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

Notes:

¹Funding 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.

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."

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

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

Notes:

¹Funding 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.

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

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

Notes:

¹Funding 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.

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

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

Notes:

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

²This 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.

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

Table 6-8: Phased Improvements and Estimated Costs

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.