Oregon
Theodore R. Kulongoski, Governor

Department of Land Conservation and Development
635 Capitol Street, Suite 150
Salem, OR 97301-2540
(503) 373-0050
Fax (503) 378-5518
www.lcd.state.or.us

NOTICE OF ADOPTED AMENDMENT

06/17/2013

TO: Subscribers to Notice of Adopted Plan or Land Use Regulation Amendments

FROM: Plan Amendment Program Specialist

SUBJECT: City of Silverton Plan Amendment
DLCD File Number 001-13

The Department of Land Conservation and Development (DLCD) received the attached notice of adoption. Due to the size of amended material submitted, a complete copy has not been attached. A Copy of the adopted plan amendment is available for review at the DLCD office in Salem and the local government office.

Appeal Procedures*

DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: Wednesday, July 03, 2013

This amendment was submitted to DLCD for review prior to adoption pursuant to ORS 197.830(2)(b) only persons who participated in the local government proceedings leading to adoption of the amendment are eligible to appeal this decision to the Land Use Board of Appeals (LUBA).

If you wish to appeal, you must file a notice of intent to appeal with the Land Use Board of Appeals (LUBA) no later than 21 days from the date the decision was mailed to you by the local government. If you have questions, check with the local government to determine the appeal deadline. Copies of the notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR Chapter 661, Division 10). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

*NOTE: The Acknowledgment or Appeal Deadline is based upon the date the decision was mailed by local government. A decision may have been mailed to you on a different date than it was mailed to DLCD. As a result, your appeal deadline may be earlier than the above date specified. NO LUBA Notification to the jurisdiction of an appeal by the deadline, this Plan Amendment is acknowledged.

Cc: Jason Gottgetreu, City of Silverton
Gordon Howard, DLCD Urban Planning Specialist
Angela Lazarean, DLCD Regional Representative
Gary Fish, DLCD Transportation Planner
Thomas Hogue, DLCD Economic Development Policy Analyst

<paa> Y

☐ In person ☐ electronic ☐ mailed

DEPT OF

June 14, 2013

AND CONSERVATION AND DEVELOPMENT

For Office Use Only

FORM 2 DLCD Notice of Adoption

This Form 2 must be mailed to DLCD within **20-Working Days after the Final Ordinance is signed** by the public Official Designated by the jurisdiction and all other requirements of ORS 197.615 and OAR 660-018-000

Jurisdiction: **City of Silverton**

Local file number: **CP 13-01**

Date of Adoption: **6/4/2013**

Date Mailed: **6/11/2013**

Was a Notice of Proposed Amendment (Form 1) mailed to DLCD? ☒ Yes ☐ No Date: 2-5-13

☒ Comprehensive Plan Text Amendment

☐ Comprehensive Plan Map Amendment

☐ Land Use Regulation Amendment

☐ Zoning Map Amendment

☐ New Land Use Regulation

☐ Other:

Summarize the adopted amendment. Do not use technical terms. Do not write "See Attached".

The proposal is Land Use and Transportation Plan for the West Side of Silverton containing area inside and outside the City Limits within the UGB. A community visioning process was undertaken to ascertain how the community would like to see the land develop in the future. The West-Side Plan should be adopted as a refinement plan of the Silverton Comprehensive Plan. A new section would be written for Chapter 2 – Urbanization that describes the area and policies

Does the Adoption differ from proposal? No, no explaination is necessary

Plan Map Changed from: to:

Zone Map Changed from: to:

Location: Acres Involved:

Specify Density: Previous: New:

Applicable statewide planning goals:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐

Was an Exception Adopted? ☐ YES ☒ NO

Did DLCD receive a Notice of Proposed Amendment...

35-days prior to first evidentiary hearing? ☒ **Yes** ☐ **No**

If no, do the statewide planning goals apply? ☐ **Yes** ☐ **No**

If no, did Emergency Circumstances require immediate adoption? ☐ **Yes** ☐ **No**

DLCD File No. 001-13 (19687) [17486]

DLCD file No. _____

Please list all affected State or Federal Agencies, Local Governments or Special Districts:

Marion County

Local Contact: **Jason Gottgetreu** Phone: **(503) 874-2212** Extension:

Address: **306 S Water St** Fax Number: **503-873-2207**

City: **Silverton** Zip: **97381-** E-mail Address: **Jgottgetreu@silverton.or.us**

ADOPTION SUBMITTAL REQUIREMENTS

This Form 2 must be received by DLCD no later than 20 working days after the ordinance has been signed by the public official designated by the jurisdiction to sign the approved ordinance(s)

per ORS 197.615 and OAR Chapter 660, Division 18

1. This Form 2 must be submitted by local jurisdictions only (not by applicant).
2. When submitting the adopted amendment, please print a completed copy of Form 2 on light **green paper if available.**
3. Send this Form 2 and **one complete paper copy** (documents and maps) of the adopted amendment to the address below.
4. Submittal of this Notice of Adoption must include the final signed ordinance(s), all supporting finding(s), exhibit(s) and any other supplementary information (ORS 197.615).
5. Deadline to appeals to LUBA is calculated **twenty-one (21) days** from the receipt (postmark date) by DLCD of the adoption (ORS 197.830 to 197.845).
6. In addition to sending the Form 2 - Notice of Adoption to DLCD, please also remember to notify persons who participated in the local hearing and requested notice of the final decision. (ORS 197.615).
7. Submit **one complete paper copy** via United States Postal Service, Common Carrier or Hand Carried to the DLCD Salem Office and stamped with the incoming date stamp.
8. Please mail the adopted amendment packet to:

ATTENTION: PLAN AMENDMENT SPECIALIST
DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT
635 CAPITOL STREET NE, SUITE 150
SALEM, OREGON 97301-2540

9. **Need More Copies?** Please print forms on **8½ -1/2x11 green paper only if available.** If you have any questions or would like assistance, please contact your DLCD regional representative or contact the DLCD Salem Office at (503) 373-0050 x238 or e-mail **plan.amendments@state.or.us**.

CITY OF SILVERTON
ORDINANCE
13-02

AN ORDINANCE OF THE SILVERTON CITY COUNCIL APPROVING COMPREHENSIVE PLAN AMENDMENT (CP-13-01) TO ADOPT THE 2013 SILVERTON WEST SIDE LAND USE AND TRANSPORTATION PLAN AS A SUPPORT DOCUMENT TO THE SILVERTON COMPREHENSIVE PLAN.

WHEREAS, the City of Silverton initiated a process to create a West Side Land Use and Transportation Plan; and

WHEREAS, OTAK was hired as a consultant to help in the community visioning effort and preparation of the West Side Land Use and Transportation Plan; and

WHEREAS, Public input was gathered to create a strategic plan to shape how the west side of Silverton develops in the future; and

WHEREAS, a draft Plan was prepared in February 2013; and

WHEREAS, after proper legal notice, a public hearing before the Planning Commission to consider this Comprehensive Plan Amendment to adopt the West Side Land Use and Transportation Plan as a support document to the Silverton Comprehensive Plan was held on March 12, 2013; and

WHEREAS, the Planning Commission recommended approval of the 2013 West Side Land Use and Transportation Plan to the City Council on March 12, 2013; and

WHEREAS, after proper legal notice, a public hearing before the City Council was held to consider this Comprehensive Plan Amendment to adopt the 2013 West Side Land Use and Transportation Plan as a support document to the Silverton Comprehensive Plan on May 6, 2013; and

WHEREAS, City Council adopted Ordinance No. 13-02 to adopt the Silverton West Side Land Use and Transportation Plan as a support document to the Silverton Comprehensive Plan on June 3, 2013.

NOW, THEREFORE, THE SILVERTON CITY COUNCIL ORDAINS AS FOLLOWS:

Section 1. The City Council finds that the proposed amendment CP-13-01 is consistent with the goals and policies of the Silverton Comprehensive Plan and the Oregon Statewide Planning Goals as described in the Staff Report and Findings attached as Exhibit 'A'.

Section 2. The City Council of the City of Silverton adopts the 2013 Silverton West Side Land Use and Transportation Plan as a support document to the 2002 Silverton Comprehensive Plan and attached as Exhibit 'B', which by this reference the Plan and all Appendixes are incorporated

herein.

Section 3: This ordinance shall be effective upon and from 30 days of adoption.

NOW FURTHER THEREFORE, a full copy of the Silverton West Side Land Use and Transportation Plan can be found on file in the Community Development Department at City Hall.

Ordinance adopted by the City Council of the City of Silverton, this 3rd day of June, 2013.

Mayor, City of Silverton
Stu Rasmussen

ATTEST:

City Manager/Recorder, City of Silverton
Bob Willoughby

City of Silverton
Community Development
306 South Water Street
Silverton, OR 97381

STAFF REPORT
CP-13-01

PROCEDURE TYPE IV

LAND USE DISTRICT:
GC, IP, LI, R-1, R-5 & P

PROPERTY DESCRIPTION:
232 ACRES BORDERED BY PINE ST, BROWN ST, WESTFIELD ST AND WEST MAIN ST

APPLICANT:
CITY OF SILVERTON
306 SOUTH WATER STREET
SILVERTON OR 97831

CONTACT PERSON:
JASON GOTTGETREU (503) 874-2212

PROPOSED DEVELOPMENT ACTION: The City of Silverton conducted a community visioning process to create a strategic plan to shape how the west side of Silverton develops in the future. The West Side contains large undeveloped properties that have the potential to be developed, and this Plan will guide future development in a focused manner, integrating land use, transportation, and open space planning.

DATE: APRIL 26, 2013

Attachments

A. Review Criteria
B. Staff Report
C. Testimony
D. West Side Land Use and Transportation Plan, February Draft
E. Appendix A, D, E, L F (Due to length, appendix items B, C, G, H, I, J & K are not included in the report but can be obtained at City Hall and are incorporated by reference)

ATTACHMENT A: REVIEW CRITERIA

REVIEW CRITERIA: Amendments to the Comprehensive Plan will be approved if the Council finds that the applicant has shown that the following applicable criteria are met, the applicant shall bear the burden of proof:

1. A legislative amendment is consistent with the goals and policies of the Comprehensive Plan, the state-wide planning goals, and any relevant area plans adopted by the City Council.

2. A legislative amendment is needed to meet changing conditions or new laws.

3. The result of the legislative amendment will result in an improvement to the Comprehensive Plan that furthers the adopted goals, policies or needs of the community above the current Comprehensive Plan.

FINDINGS OF FACT

A. Background Information:

In April 2011 the City started work on a West Side Land Use & Transportation Plan. The City hired OTAK to work as consultants with a technical assistance grant from the State of Oregon.

The City of Silverton conducted a community visioning process to create a strategic plan to shape how the west side of Silverton develops in the future. The West Side contains large undeveloped properties that have the potential to be developed, and this Plan will guide future development in a focused manner, integrating land use, transportation, and open space planning.

The West Side Land Use and Transportation Plan was developed through a series of interactive community workshops. The project was guided by a Project Advisory Committee comprised of local residents, business owners, and representatives of local civic and religious institutions and government agencies and commissions.

The Planning Commission of the City of Silverton on March 12th to discuss the plan and recommends the Council adopt the West-Side Land Use and Transportation Plan as a support document to the Silverton Comprehensive Plan.

B. West Side Vision Statement:

As West Side of Silverton develops in the future, it should:

- Continue to contribute to the small town character of Silverton.
- Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
- Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
- Fill out the existing shopping center at the corner of Westfield and Silverton Roads.
- Provide local employment opportunities through light industrial uses that are attractive and well designed.
- Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
- Provide strong connectivity throughout the area for all modes of transportation.

C. Review Criteria:

1. *A legislative amendment is consistent with the goals and policies of the Comprehensive Plan, the state-wide planning goals, and any relevant area plans adopted by the City Council.*

Findings of Fact:

The goal of the Urbanization element is to "Provide adequate land to meet anticipated future demands for urban development in a logical and orderly manner." Conducting a visioning process prior to development pressures allows a plan to be created that provides an overall framework on how development can integrate over multiple properties, thereby ensuring the development occurs in a logical and orderly manner.

The goal of the Citizen Involvement element of the Comprehensive Plan is to "Insure that the citizens of Silverton and those residents in the planning area have an opportunity to be involved with all phases of the planning process." On January 12th, 2012 community members participated in a workshop to provide their input and vision on what types of land uses and transportation facilities would be appropriate as the area develops. Using citizen input received at the workshop, the project team developed different draft land use and transportation plan alternatives. Another meeting was held on March 22nd, 2012 that allowed community members to review the alternatives and provide additional input. The City Council and Planning Commission met to discuss the progress on April 16th, 2012. The Project Team prepared a refined plan that was presented at a work shop on November 27th, 2012. A draft plan was created based on the citizen input.

The goal of the Housing element is to "Meet the projected housing needs of citizens in the Silverton area." The development program translates the forecasted growth into a range of land uses that is achievable and appropriate for Silverton's West Side area, reflecting its physical location, opportunities and constraints, and competitive position compared to other commercial and residential development opportunities in Silverton. The housing program includes a range of different housing products in order to provide physical and architectural variety, to appeal to different market segments, and to allow for the property to develop in phases as market conditions evolve.

2. *A legislative amendment is needed to meet changing conditions or new laws.*

Findings of Fact:

Plans which guide development already exist for the area, and these plans have continued to evolve over the last 40 years. The original land use plan in the 1970's envisioned the area a mixture of single family residences and multi-family residences. The plan was updated in the 1980's and envisioned only single family residences. The plan was updated in the 1990's and envisioned almost all industrial uses. The same type of evolution is true for the area's transportation system plan, with the last one being adopted in 2008. This amendment has been developed with the goal to be reflective of current conditions and desires.

3. *The result of the legislative amendment will result in an improvement to the Comprehensive Plan that furthers the adopted goals, policies or needs of the community above the current Comprehensive Plan.*

Findings of Fact:

The West Side Land Use and Transportation Plan will improve the Comprehensive Plan by creating a refined vision that furthers the goals of the Comprehensive Plan in an area specific manner. The Comprehensive Plan was last updated in 2002. This area plan allows current citizen desires to be adopted into the plan which will create a development framework for the entire west-side area should it develop in the future.

D. Recommendation:

The Planning Commission recommends the City Council review the West Side Land Use & Transportation Plan at a public hearing and recommends the City Council approve the Comprehensive Plan amendment to adopt the West-Side Land Use and Transportation Plan as a support document to the Silverton Comprehensive Plan.

Sent by electronic mail

April 26, 2013

Jason Gottgetreu, Interim Planning Director
City of Silverton
306 S. Water Street
Silverton, OR 97381

RE: SAFEWAY #1580 and SILVERTON PLAZA
Silverton, OR

Dear Mr. Gottgetreu:

We are following up on our recent conversations regarding the West Side Vision Statement under City Council Review.

We appreciate the City's interest and involvement to improve the livability of the West Side and are pleased to be part of a community that has this focus.

We, however, would like to express a serious concern with the Transportation Plan. Specifically, we are looking at the addition of a Local Street that directly impacts the viability of the Safeway store operation by eliminating a significant portion of the parking field.

During our discussions, you have indicated that the goal is to add connectivity as other properties are developed or redeveloped and that there could be flexibility as to how this is carried out. We appreciate the intent but request that Staff work with the shopping center owner and Safeway to examine the alternatives of achieving this goal prior to including the subject Local Street in the Transportation Plan.

We have made a significant investment in the remodel and upgrade of the Safeway store and are concerned about the negative impact that this would have on our operation.

Thank you for the opportunity to express our opinions.

Very Truly Yours,

SAFEWAY, INC.

Diane Phillips
Real Estate Manager

SILVERTON PLAZA

Mike Hassem
Principal

Jason,

Thank you for talking to me this morning. As you know Safeway is very concerned with the transportation portion the city is proposing for the future. we both can agree that Safeway is a great community partner , and is an asset to Slverton, and one of the bigger employer . I am sure the vision is intended to help attract jobs, as well as enhance livability in the city.

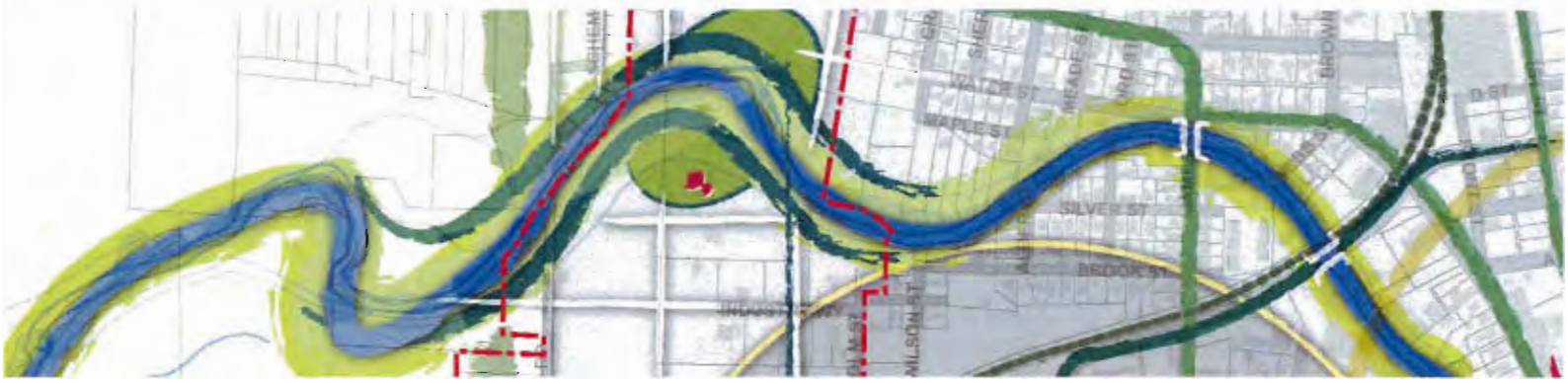
Diane Philip the Safeway representative sent you a letter which I also signed, expressing our objection to the transportation plan as presented . I would like to propose an alternative for the route showing on the city vision's of the plan to cut behind the Safeway , and the shopping center and exit on the same road where the Child learning center and near Dairy Queen into Westfield. this route is more logical and less intrusive and can provide us the connectivity desired without impacting Safeway.

I hope you share my E mail with the council, and I look forward to do our part in improving livability in the city of Silverton.

Thank you.

Mike Hashem
Silverton Plaza

West Side Land Use and Transportation Plan



Final Plan

June 3, 2013

Acknowledgements

Silverton City Council

Stu Rasmussen, Mayor
Laurie A. Carter
Bill Cummins
Jason Freilinger
Ken Hector
Randal Thomas
Scott Walker

Silverton Planning Commission

Victor Madge, Chairman
Clay Flowers, Vice Chairman
Jeff DeSantis
Gus Frederick
Joe Pelletier
Stacy Posegate

Project Advisory Committee

Dick Stonex, Silver Cr. Fellowship Church
Les Sasaki, Marion County
Gary Schmidt, First Baptist Church
Kristen Roisen, Propetty Owner
Ron Parvin, Fire District
Pete Paradis, Silver Falls School District
Greg Becker, Property Owner
John & Cathy Grace, Property Owner

City of Silverton Staff

Jason Gottgetreu, Community Development Director
Steve Kay, AICP, Community Development Director (through 2012)
Lisa Figueroa, Community Development Administrative Assistant

Project Team

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Martin Glastra van Loon - Otak, Inc.
Chris Zahas, AICP - Leland Consulting Group
Chris Maciejewski, P.E., PTOE - DKS Associates
Ray Delahanty, AICP - DKS Associates

Transportation and Growth Management Program Contract Manager

Naomi Zwerdling - ODOT Transportation/Land Use

This projeet is partially funded by a grant from the Transportation and Growth Management Program (TGM), a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds. The contents of this doeument do not necessarily reflect views or policies of the State of Oregon.

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Introduction

The City of Silverton conducted a community visioning process to create a strategic plan to shape how the west side of Silverton develops in the future. The West Side contains large undeveloped properties that have the potential to be developed, and this Plan will guide future development in a focused manner, integrating land use, transportation, and open space planning.

The West Side Land Use and Transportation Plan was developed through a series of interactive community workshops. The project was guided by a Project Advisory Committee comprised of local residents, business owners, and representatives of local civic and religious institutions and government agencies and commissions.

West Side Vision Statement

As West Side of Silverton develops in the future, it should:

- Continue to contribute to the small town character of Silverton.
- Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
- Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
- Fill out the existing shopping center at the corner of Westfield and Silverton Roads.
- Provide local employment opportunities through light-industrial uses that are attractive and well designed.
- Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
- Provide strong connectivity throughout the area for all modes of transportation.

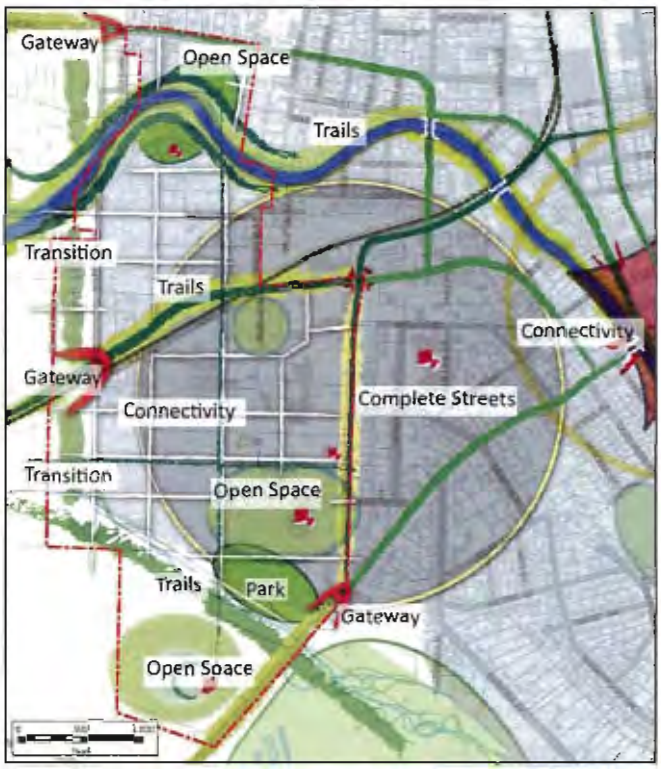
Urban Design Framework

The urban design framework illustrates the vision concepts for the area as developed with the community and creates a framework for the land uses and transportation options.

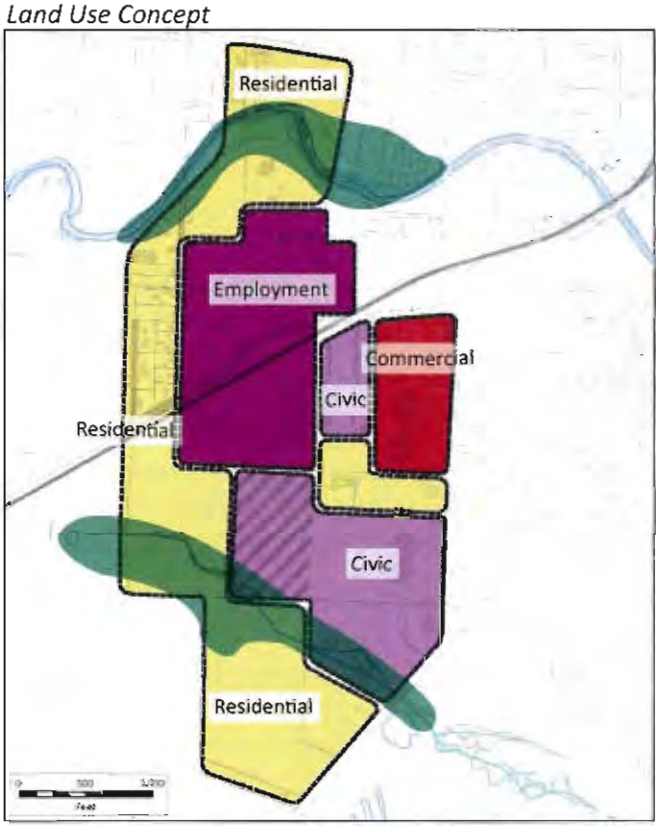
Land Use Concept

The land use concept reflects the urban design framework and market analysis and shows the desired location of residential, employment, commercial and civic land uses. The concept also shows special consideration for the two prominent natural features of the Silver Creek floodplain and the drainage area designated a "green buffer".

Urban Design Framework



Land Use Concept



Development Program

The development program translates the forecasted growth into a range of land uses that is achievable and appropriate for Silverton's West Side area, reflecting its physical location, opportunities and constraints, and competitive position compared to other commercial and tesidential development opportunities in Silverton. Included in the program are the various civic and cultural land uses that complement private sector development to create a compelling sense of place that serves existing and future residents and employees of the area.

Land Use	Acres	Density	Amount
Gross Developable Area	142.0		
less 20% for ROW	-28.4		
less 20% for Open Space	-28.4		
Net Developable Area	**85.2**		
Housing			636
Apartments	*5.2*	*25/acre*	*130*
Townhomes	*8.0*	*16/acre*	*128*
Senior Housing	*5.0*	*30/acre*	*150*
Cottage Housing	*15.0*	*12/acre*	*180*
Single-Family Housing	*8.0*	*6/acre*	*48*
Light Industrial	25.0	FAR 0.30	326,700
Commercial/Retail	12.0	FAR 0.35	182,952
Civic	7.0	FAR 0.30	91,476

Transportation Plan

The Transportation Plan shows conceptual roadway alignments to serve future development in the area and how new streets might connect with the existing system. The ultimate alignment of new roads will depend on how parcels are developed in the future. Within the West Side area, new roadway connections will be Local Streets in the City's functional classification system, with the exception of one Collector that is the roadway extending south of Silverton Road on the Monson Road alignment.

Specific network improvements to existing roads and intersections include:

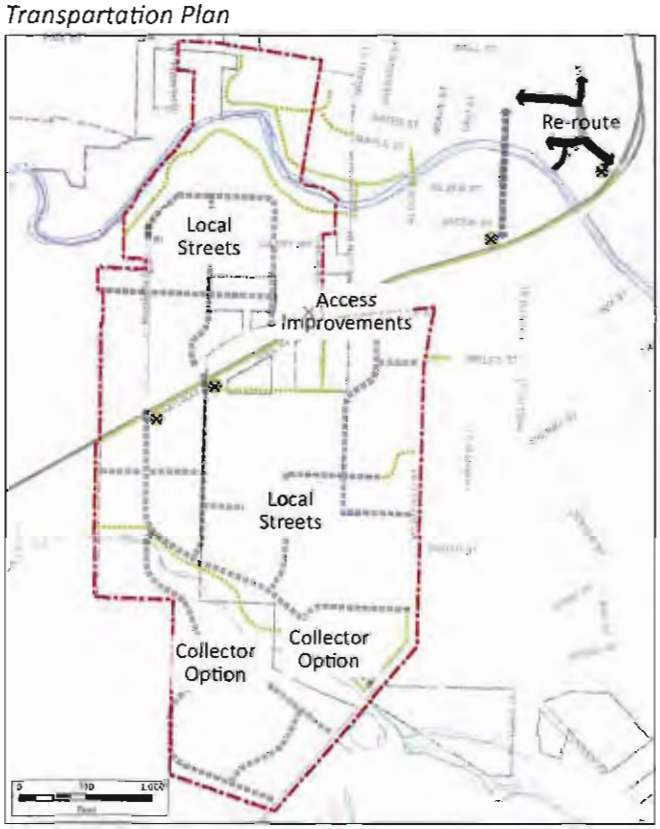
Access changes at the Fosholm Street/Silverton Road/ Railway Street intersection to improve safety and circulation. Northbound left turns and northbound through movements from Railway Street should be prohibited except for emergency vehicles, and southbound through movements from Fosholm Street to Railway Street should be prohibited as well.

Re-routing Brown Street and making improvements to the James Street/Pine Street intersection to meet mobility standards. The recommended improvements to mitigate the traffic impacts at this intersection and meet the State Transportation Planning Rule (TPR) requirements would re-route vehicles currently using James Street and Water Street to a new a new arterial link along Pine Street and Brown Street.

The Transportation Plan also shows conceptual trail alignments throughout the area. These connections are important because the proposed roadway system relies primarily on Local Streets, which do not include bicycle lanes or planting strips as part of the typical cross section. Several east/west trails are recommended including along Silver Creek and Silverton Road, and north/south trails including along Monson Road and Westfield Street.

Railroad Crossings would remain as they currently exist. If the railroad is ever abandoned, a new crossing between Monson Road and Fosholm Street should be created for a future north/south roadway.

Transportation Plan



Implementation

Comprehensive Plan

The West Side Plan should be adopted as a refinement of the Silverton Comprehensive Plan. The Comprehensive Plan text should be amended to add policies pertaining to the West Side to Chapter 2, Urbanization. The West Side vision statement serves as the specific policies for the area. The cuttent map designations of Commercial, Residential, Industrial, and Public/Semi-Public would continue to be used (with the exception of two properties noted below), but would be supplemented by the West-Side Plan vision statement.

The two property-specific amendments to the Comprehensive Plan Map, as shown in Figure 11, are:

(1) The 24.5 acre property that forms part of the western boundary of the planning area immediately south of Silverton Road needs to change from Industrial to Single-Family Residential designation.

(2) For the purpose of consistency with other churcb properties, the designation on the First Baptist Church property on Westfield Street should be changed to entirely Multi-Family Residential as opposed to its current splir designation.

Development Code

Implementation of the desired mix of housing types and open space and trails can be achieved through the Planned Development Review process as stated in the Silverton Development Code. No amendments to the Development Code or zoning map are required.

The planned development review criteria require that "all relevant provisions of the comprehensive plan are met." Since the West Side Plan will be a refinement to the Silverton Comprehensive Plan, the desired mixture of housing types and the creation of the open space and trails as shown in the West Side Plan would be criteria for approval in a planned development review.

Transportation System Plan

To implement the changes described in the West Side Transportation Plan, the following amendments to the City's Transportation System Plan are needed:

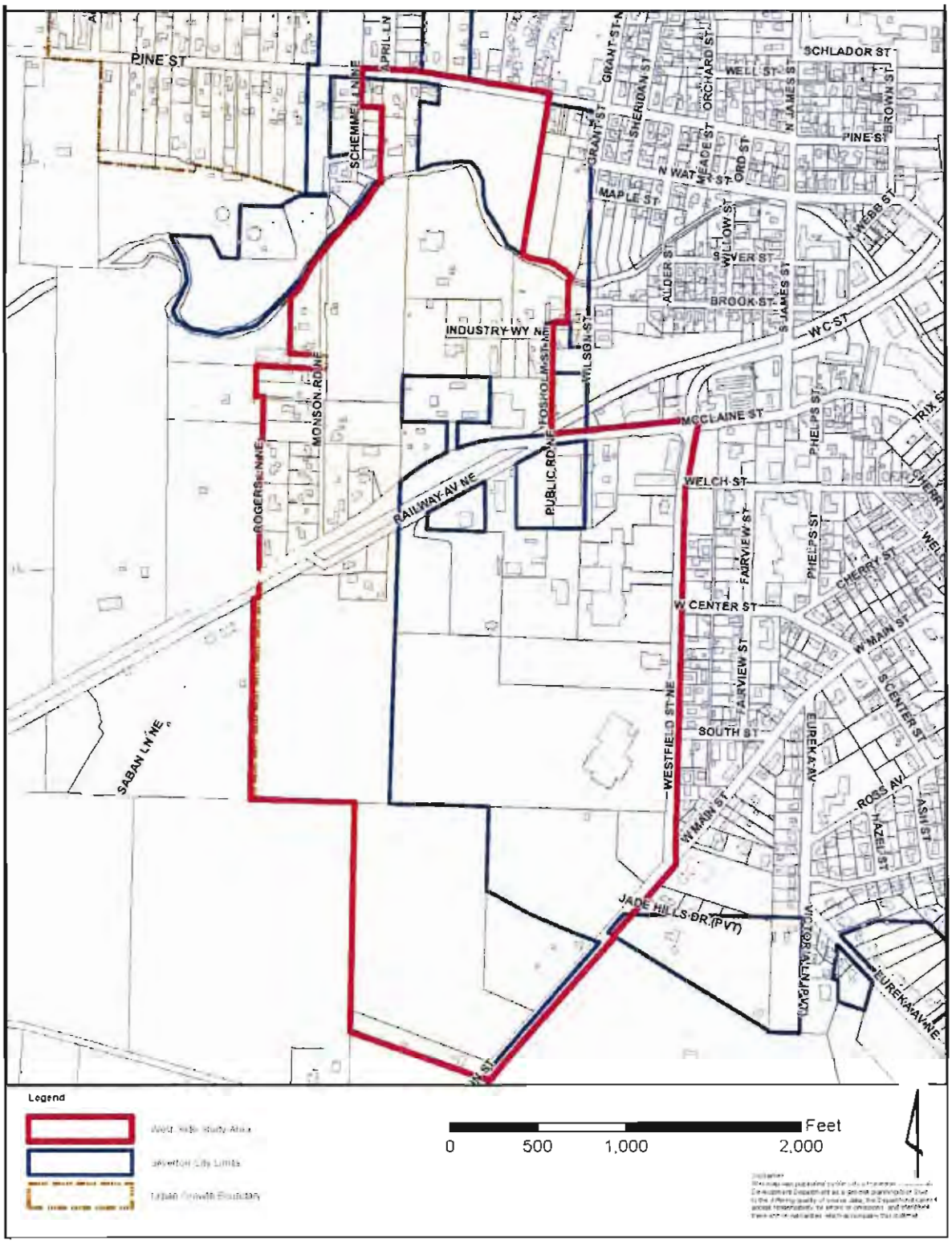
- Remove the North-South Connector Project (replaced with local street connections).
- Add the Brown Street re-route as a new arterial corridor and improvement project.
- Add the James Street/Pine Street intersection improvements, which could have an option as either a signal or roundabout configuration to be determined through a design process.
- Consider changing the functional classification of Water Street between Brown Street and James Street to a local roadway (when Brown Street becomes the arterial corridor through the area). This could also include removing the pedestrian and bicycle improvement projects along this portion of Water Street; however, consideration should be given to keeping bike facilities on Water as a Local Street due to the right-of-way constraints associated with upgrading the classification of Brown & Pine to Arterial.

Action Strategy

The West Side Plan is character-oriented, focusing upon the few key actions needed to guide the area toward the community's vision, land use and transportation. As stated in the project purpose, The West Side Land Use and Transportation Plan is not intended to spur development or use public money to finance it. Rather, it articulates a vision for the future of the West Side to ensure new development is reflective of the community's values. Therefore, the Plan will be implemented in pieces. Some actions may be initiated immediately; others will be initiated in the years to follow as development occurs.

Actions that may be initiated immediately include a review of industrial zoning, including allowed uses and size, design standards, and adjacent uses; parks and trails planning; and gateway and streetscape improvements. Longer term actions include ongoing development of roadways and trails as development occurs in the future.

Figure 1. West Side Study Area



Purpose of the Project

The City of Silverton conducted a community visioning process to create a strategic plan to shape how the west side of Silverton develops in the future. The West Side contains large undeveloped properties that have the potential to be developed, and this Plan will guide future development in a focused manner, integrating land use, transportation, and open space planning.

Development in this area is going to follow its own time line. The West Side Land Use and Transportation Plan is not intended to spur development or use public money to finance it. Rather, it articulates a vision for the future of the West Side to ensure new development is reflective of the community's values.

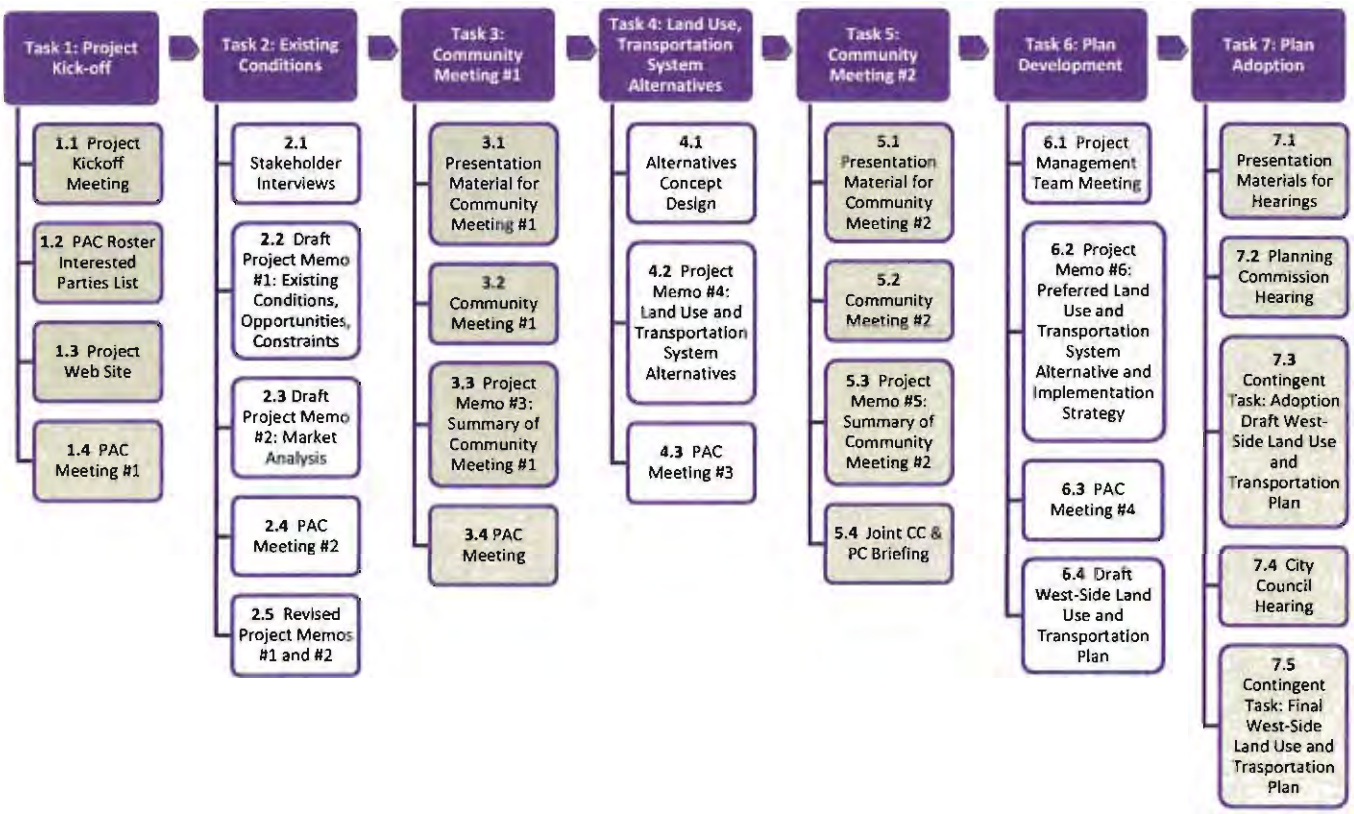
The project objectives were to:

- Identify feasible patterns of land uses for the West Side area consistent with the City's goals for urbanization and livability.
- Identify transportation facilities needed for circulation of people, walking, bicycling, and driving in the area and to integrate the West Side with surrounding neighborhoods.
- Recommend any necessary comprehensive plan, development code, or transportation system plan amendments, and facility standards to implement preferred alternatives for land use and transportation in the West Side area.

Planning Process

The West Side Land Use and Transportation Plan was developed through a series of interactive community workshops. The project was guided by a Project Advisory Committee comprised of local residents, business owners, and representatives of local civic and religious institutions and government agencies and commissions. Figure 2 shows the overall planning process.

Figure 2. West Side Planning Process



Silverton's West Side

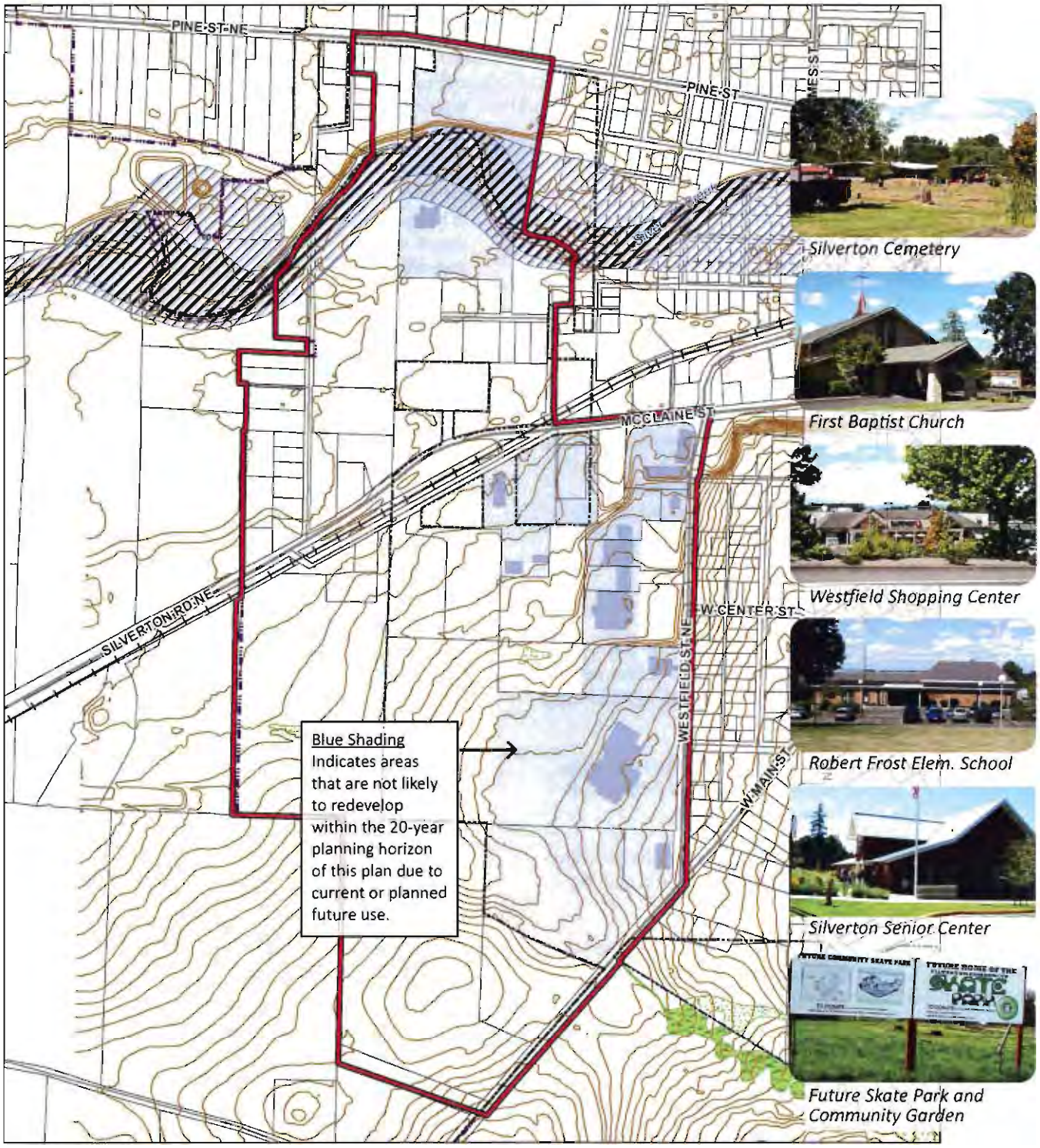
The West Side area is a gateway to the City of Silverton. It is the first thing people see as they approach from the west along Silverton Road. The West Side is bisected by Silverton Road and the Willamette Valley Railroad. Most of the properties north of Silverton Road are outside the Silverton city limits in unincorporated Marion County. The area includes a mixture of single family residences, commercial and industrial uses, vacant land, Silver Creek Fellowship, and the City yards. South of Silverton Road, the properties are much larger and contain the Westfield Shopping Center and some commercial uses along Silverton Road, a few single family residences, large vacant lands, Silverton Cemetery, and several institutional uses including Robert Frost Elementary School, First Baptist Church, Silverton Senior Center, Head Start, and a future city park. Access to the area is limited to Silverton Road and the main perimeter roads. There are very few roads or trails in the West Side area, particularly south of Silverton Road. The roads that exist north of Silverton Road are not connected and dead end into private property.

The West Side area slopes from Westfield Road down to Silverton Road and on to Silver Creek with natural dips and valleys between higher points, creating opportunities for views and open space. Silver Creek not only provides an opportunity to create a linear park or greenway along its banks, but it also presents challenges for conneetivity, crossings, and the placement of development due to periodie flooding. The drainage way that runs from West Main towatd Silverton Road also presents opportunity for trails and incorporation of natural beauty and challenges for connectivity.

Silver Creek near the Silver Creek Fellowship

Figure 3. West Side in Context of the City

Figure 4. Development Constraints



Market Analysis Summary

In July 2011, a market analysis was completed for the study area that summarizes important demographic, economic, and real estate market conditions citywide, assesses the comparative advantages of the project study area, and addresses the amount, mix, and type of development the market is likely to support. The market analysis drew on recent analysis completed as part of the city's Economic Opportunities Analysis, stakeholder interviews, physical site assessments, and adopted forecasts from the city's 2006 Transportation Systems Plan. The key findings from the market analysis ate as follows:

Overall Market Conditions

- Silverton's population is growing. Between 2000 and 2010, the city's population increased ar an average annual rate of 2.7 percent, resulting in a 2010 population of 9,222 according to the U.S. Census. During the next 20 years, this trend of steady population growth is projected to continue, with a forecast population of 14,418 in 2030 in the Silverton Transportation System Plan.
- Silverton is known to be a small, comfortable bedroom community in which people live, then commute to work in Salem, Woodburn, or the Portland metropolitan area. The eity has a very close-knit, small-town feel, with a variety of newer and older housing options.
- The city also has many attractive amenities including a new high school, well-attended senior center, and recently expanded hospital.
- Silverton is close to many tourist attractions including the Oregon Garden, Silver Falls State Park, and Mt. Angel's Oktoberfest.
- Silverton's downtown offers an attractive mix of local retail and an active downtown organization. Additionally, the city's retail offerings are primarily local with few regional or national food, service, and apparel options. The city's largest retailers are its grocery anchors and pharmacies including Safeway, Roth's, and Hi School Pharmacy.
- Silverton's proximity to Salem and distance from large, high-traffic freeways make it unlikely that Silverton will attract national or regional apparel retailers or shopping centers, so in the long-term, the city is likely to experience retail growth in the food and convenience retail to serve the local market and visitors.

Housing Market Conditions

- Silverton has seen significant housing development in the east and south sections of the city. The supply of housing throughout the city has included primarily single-family detached homes. There is only a very small supply of land zoned for multi-family development to accommodate young families, aging baby boomers looking to downsize, and affordable housing.
- There is demand in the marker for more workforce/ affordable housing and multi-family housing, which could be appropriate in the study area.

Commercial and Employment Market Conditions

- Silverton's highest concentration of vacant or partially vacant lots range between half an acre to five acres rendering it ehallenging to attract large industrial users and employment.
- The existing cluster of industrial land, existing food-related manufacturing, and proximity to agriculture help favor food and beverage processing industrial uses in the future.
- The highest amount of job growth in the market is expected to be in health services, professional and business services, leisure and hospitality, as well as retail within the next 20 years, according to the Economic Opportunity Analysis. The low existing surplus of commercial lands coupled with anticipated employment demand in commercial services suggests an opportunity for commercial development in the study area.
- Silverton's new hospital has been a source of substantial employment in the city as well as a valuable resource for its aging seniors. As is reflected nationally, health-related services and employment are expected to grow markedly in the coming years.
- The study area can accommodate expansion of community uses like the Senior Center and Hospital.

Visioning

As one of the first steps in the West Side Land Use and Transportation Plan, the first of two scheduled community meetings for the project was held on January 12, 2012 at the Community Center in Silverton. The community meeting was open to all members of the public. The City of Silverton widely advertised the meeting by sending notices directly to property owners, posting flyers in store windows, and placing a notice in the newspaper.

The meeting was a visioning workshop to identify the community's desired future for the West Side of Silverton. Community members were asked to imagine that they had returned to Silverton twenty years in the future, the West Side Plan had been fully implemented, and that they really liked what rhey saw. The discussion focused on what they envisioned for the successful future of the West Side.

The project team compiled the feedback from the community meeting and identified the ideas that had the general support of the participants. These points of consensus were derived into vision concepts for the West Side. Elements in which the community expressed differing opinions were also gathered to form the basis for land use and transportation options.

The Project Advisory Committee reviewed the draft vision concepts created by the project team to ensure they were consisrent with what was expressed at the community meeting. The group offered a few recommended changes and corrections based on their observations at the meeting.

The resulting vision concepts were confirmed by the participants at the second community meeting that was held on March 22, 2012.

West Side Vision Statement

As West Side of Silverton develops in the future, it should:

- Continue to contribute to the small town characrer of Silverton.
- Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
- Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
- Fill out the existing shopping center at the corner of Westfield and Silverton Roads.
- Provide local employment opportunities through light-industrial uses that are attractive and well designed.
- Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
- Provide strong connectivity throughout the area for all modes of transportation.

Visioning work at the first public meeting

As shown in Figure 5, the urban design framework illustrates the vision concepts for the area as developed with the community and creates a framework for the land uses and transportation options.

Local Connections

Streets are important not only as connections between spaces and places, but also because streets are spaces themselves. They are defined by their physical dimension and character as well as the size, scale, and character of the buildings that line them. The pattern of the street network is part of what defines a city and what makes each area unique. As the West Side develops in the future, a system of local streets should be developed to make new connections to adjacent areas and neighborhoods. The area should be easy to understand and navigate by car, bike or on foot.

Gateways

Gateway features help define towns and districts through the design of landscape, building, or art installations to symbolize an entrance or arrival to a special area or place. If they are unique and attractive, gateways help to establish the town's identity and send a signal, to visitors and residents alike, that the area is a special place that takes pride in itself. Gateways often feature physical structures, such as landmarks, public art, special signs, and highly visible archways or other drive-through entries. The main West Side gateway is upon arrival on Silverton Road. Secondary gateways include the entrance to town on Pine Street and the intersection of West Main and Westfield Streets near the Senior Center.

Example of on artistic monument-style gateway

Network of Parks and Trails

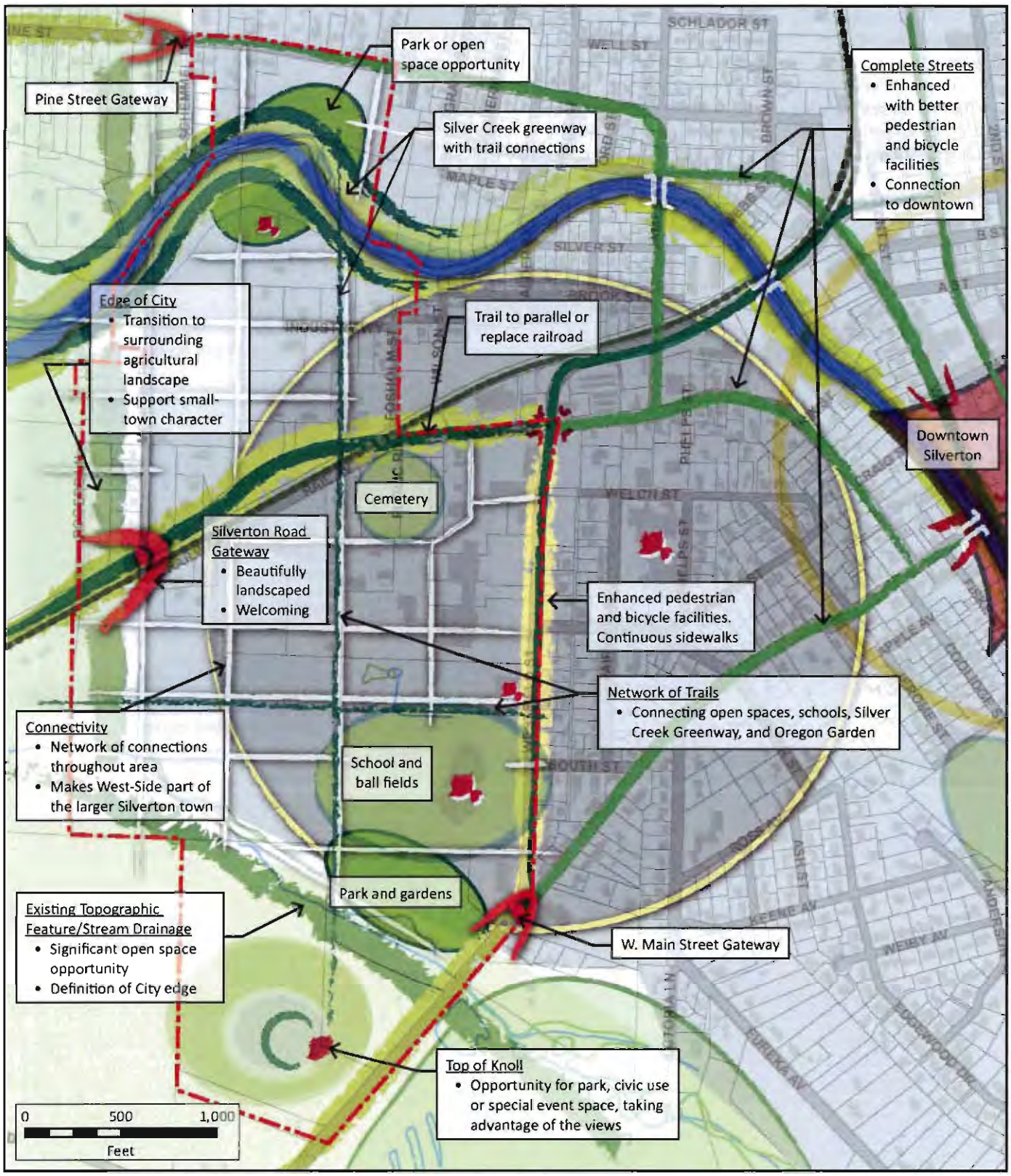
In addition to recreation and respite opportunities, parks and trails contribute to the area's sense of place and identity. The West Side is currently characterized by much open land and natural features that should be enhanced for their natural beauty and views. The existing and planned amenities, including the ball fields and open space of Robert Frost Elementary, the Silverton Senior Center, and future City dog park and skate park, should be connected to adjacent neighborhoods and other park as part of the City's overall open space network. Working with the natural topography and resources of the area, key features would include trail along Silver Creek and along the drainage way in the southern portion of the area and preservation of the views the "knoll."

Example of a trail parallel to and separated from the railroad tracks

Westfield Street

Improvements should be made to make Westfield a more attractive and safe street for motorists, cyclists, and pedestrians. Continuous sidewalks should be provided from Silverton Road up to West Main to improve safety and comfort for pedestrians walking to the school, church parks, senior center, or residences. In addition, there are a number of tools that can be used to improve its appearance, such as well-maintained sidewalks, landscaping, decorative lighting, and signage. Increasing pedestrian safety can be achieved by making the pedestrian more visible through illuminated crosswalk warning devices and medians, which can also make the street more attractive overall.

Figure 5. Urban Design Framework



The land use concept reflects the urban design framework and market analysis and shows the desired location of residential, employment, commercial and civic land uses. The concept also shows special consideration for the two prominent natural features of the Silver Creek floodplain and the drainage area designated a "green buffer". Parks, open space, and trails shall be incorporated into proposed developments in the locations as generally shown on the Land Use Concept Map, Figure 6.

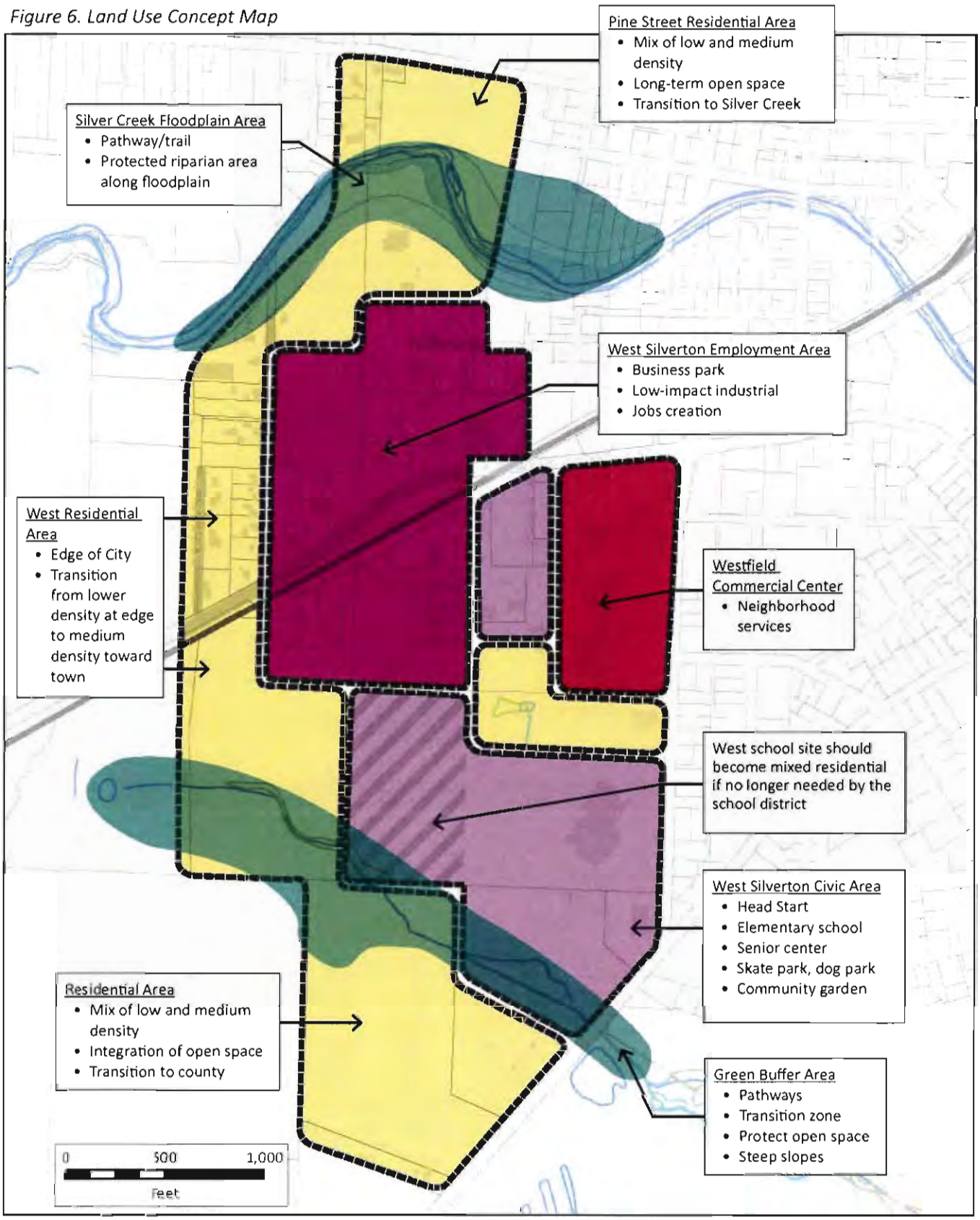
The layout considers current uses and longer-term redevelopment potential, as well as community preferences. It also considers the urban design framework that calls for a transition from low to more dense development moving from the western edge of the City toward the center of town. The employment area is intended to be comprised of light industrial manufacturing and flexible space in an attractive business park setting in order to reduce potential conflicts between the employment uses and adjacent residential area.

Residential areas should include a mix of housing types. While multi-family housing is needed, it should not be placed in a single area. Rather, it should be integrated with single family housing throughout the area. Multi-family housing should be well designed to fit the scale and character of neighborhoods. All future residential developments should vary the types of housing provided. Developments of five to 10 acres should provide at least two housing or building types with each type comprising at least 20 percent of the total units. Developments greater than 10 acres should provide at least three housing or building types with each type comprising at least 20 percent of the total units, as allowed through the Planned Development application process.

Example of cottage-style multi-family housing

Connections should consider multiple modes of transportation

Figure 6. Land Use Concept Map



A development program is a narrative and quantitative description of how an area is recommended for development. Such a program serves as a guide to the physical planners (land planners, architects, landscape architects, and others) who have responsibility for translating the narrative and quantitative program into plans for physical land use, transportation, civic amenities, utilities, and more. A development program includes an overall identity for the area and how the plan unfolds over time.

The development program, therefore, translates the forecast growth into a range of land uses that is achievable and appropriate for Silverton's West Side area, reflecting its physical location, opportunities and constraints, and competitive position compared to other commercial and residential development opportunities in Silverton. Included in the program are the various civic and cultural land uses that complement private sector development to create a compelling sense of place that serves existing and future residents and employees of the area.

The program begins by allocating a reasonable share of Silverton's future residential growth to the study area. According to Marion County's Population Forecast Project, the population of Silverton is expected to grow to 14,418 by 2030, an annual growth rate of 1.3 percent. Assuming a comparable average household size (currently 2.71), the city will need 1,917 new dwelling units by 2030. Based on the Housing Element of the City's Comprehensive Plan, these units are expected to be 65 percent single-family homes, 35 percent multi-family homes, and five percent mobile homes. This results in a 2010-2030 demand for 1,246 new single-family homes, 575 multi-family units, and 96 mobile homes.

From this potential opportunity of housing, a fair share was allocated to the West Side area that reflected the following principles and conditions:

- Silverton has significant amounts of vacant single-family land on its east side, which are expected to accommodate much of the future growth for that type of housing.
- New commercial uses on the West Side will not compete directly with those in the historic downtown core. This means that commercial uses will be limited to larger retail buildings (that cannot fit in nor would be appropriate for the historic downtown) and employment uses (light industrial).
- Numerous properties throughout the West Side are already developed and are not likely to redevelop during the planning horizon, such as the elementary school, senior center, churches, shopping center, and cemetery, see Figure 4. Additionally, a few properties have been dedicated to open space and future City park facilities. Removing these lands from development consideration leaves roughly 142 acres of gross developable area in the West Side.

Therefore, the development program is as follows.

Land Use	Acres	Density	Amount	Notes
Gross Developable Area	142.0			
less 20% for ROW	-28.4			
less 20% for Open Space	-28.4			
Net Developable Area	**85.2**			
Housing			636	Total housing units
Apartments	*5.2*	*25/acre*	*130*	*2-3 apartment sites*
Townhomes	*8.0*	*16/acre*	*128*	*2-3 townhome neighborhoods*
Senior Housing	*5.0*	*30/acre*	*150*	*1-2 senior housing developments*
Cottage Housing	*15.0*	*12/acre*	*180*	*Several cottage communities*
Single-Family Housing	*8.0*	*6/acre*	*48*	*Traditional single-family homes*
Light Industrial	25.0	FAR 0.30	326,700	Small manufacturers, food processors
Commercial/Retail	12.0	FAR 0.35	182,952	Hotel, restaurants, services
Civic	7.0	FAR 0.30	91,476	Education, library, cultural
Total	85.2			

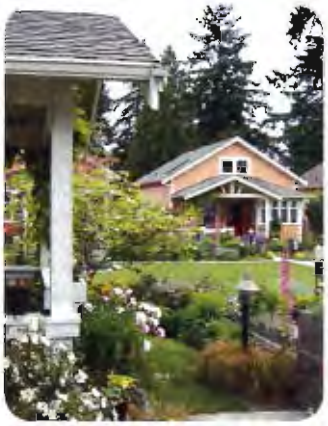
Source: Leland Consulting Group

Housing

Housing is a core element of the program for the West Side area. The housing program includes a range of different housing products in order to provide physical and architectural variety, to appeal to different market segments, and to allow for the property to develop in phases as market conditions evolve. Housing is an optimal use for the study area for several reasons:

- The study area includes and is close to a mix of amenities that would complement residential development including a school, Silverton Plaza, and Silverton Hospital.
- The study area's location on the west side of the city along Silverton Road offers a convenient commute to employment in Salem without requiring residents to drive through town.
- The market analysis indicates a demand for multi-family housing, a use for which there is a very limited supply of vacant land in Silverton.

The program is deliberately designed to include a range of housing types. This allows for the opportunity for housing to be built at many different price points and in many different configurations in order to appeal to a broad cross-section of Silverton's residents. This diversity also ensures a greater architectural variety, helping to ensure that as the area is built out, a residential neighborhood is the result rather than a single project. The following images describe some of the specific attributes of the various housing types that are included in the program.



Cottage Housing

- 8 – 14 du/acre
- 1 to 2 stories
- On-street parking, clustered in shared lot, or garages in alleys

Townhouse

- 12 – 20 du/acre
- 2 to 3 stories
- Surface parking or parking within each unit

Wood Frame Apartments

- 20 – 35 du/acre
- 2 to 3 stories
- Surface, garage, or tuck under parking

Senior Housing

- 25 – 35 du/acre
- 2 to 4 stories
- Surface, garage, or tuck under parking

Employment Uses

Employment uses, which can include a broad mix of retail, office, and industrial uses, are an important element of the program. The concept plan includes two primary employment districts. One is a commercial retail and services area centered on the existing Silverton Plaza shopping center on Westfield Street. The second is a light industrial employment zone straddling both sides of Silverton Road in the center of the study area. The study area has several assets that make it an appropriate location for employment uses:

- The West Side area is located along Silverton Road, which serves as the western gateway to the city. This ensures convenience, visibility, and easy access. In particulat, this means that trucks serving businesses do not need to navigate through the city center.
- The study area's proximity to the Oregon Gatden is a strong advantage for retail tenants, as it offers visitors to the garden and its hotel nearby access to convenient shopping, restaurants, and cafes.
- Several parcels in the study area could potentially be served by rail, provided that spurs are constructed to provide sire access.
- Much of the study area is undeveloped and has large lot sizes, providing flexibility for future users.

Silverton currently has a surplus of employment land according to the 2011 Economic Opportunities Analysis. However, the locational attributes of the study area may make it an attractive site for employment uses, drawing more employment in the short term. This is also in keeping with the existing mix of uses in the study area along Silverton Road. Potential retail uses in the study area are not intended to compete with or draw business away from Silverton's downtown historic core. Downtown is the heart of the community and community feedback strongly supports reinforcing this role. Therefore, the intent of the plan is that retail employment uses in the study area will be limited to the Silverton Plaza area and those retail uses allowed in the City's light industrial zoning. This would include larger format retailers that would likely not locate in downtown Silverton duc to parking, site size, and visibility constraints. Therefote, any retail development in the light industrial employment area of the study area is not expected to have a negative impact on the vitality of downtown Silverton.

Employment uses in the area could also include some services to support the new neighborhoods and surrounding businesses, particularly in the health care sector, which is projected to grow at a faster rate than other job sectors in Silverton. In the light industrial zone, small manufacturers and warehouses could locate in the area, particularly in the food processing industry, an existing business cluster in Silverton. At roughly one to two jobs per 1,000 square feet of building, the employmcnt areas of the study area could accommodate between 500 and 1,000 jobs at full build out.

The following images summarize some of the attributes of potential employment uses that could locate in the light industrial and commercial areas of the concept plan.

Flexible Open Space

3,000 to 15,000 SF

Light Manufacturing

Production

Office/Warehouse

Showroom

Restaurant

2,000 to 4,000 SF

Hotel

75 to 100 units

Services

1,000 to 3,000 SF

Retail

Larger footprint
Noncompetitive with downtown

Employment/Residential Context

Employment and residential uses are frequently located next to one another without any significant conflicts. Several tools are available to ensure that employment and industrial uses do not create safety, health, or quality of life impacts on nearby residents. These can include:

- Building use guidelines that prohibit certain industries that have especially severe noise, traffic, or other external impacts. These uses are typically defined in the zoning code.
- Use of design standards to help screen industrial uses from view and ro ensure a high quality of architectural design that is compatible with residential buildings.
- Separation of transportation access to keep trucks off of residential streets.
- Good neighbor agreements that open lines of communication and establish shared goals regarding business hours, noise, and other aspecrs.

Roadway Network

Figure 7 shows conceptual roadway alignments to serve future development in the area and how new streets might connect with the existing system. The ultimate alignment of new roads will depend on how parcels are developed in the future.

Southern Collector Road

Within the West Side area, new roadway connections will be Local Streets in the City's functional classification system. The exception to this is the roadway extending south of Silverton Road on the Monson Road alignment, which is assumed to be a Collector. There are two options for extending this new Collector roadway south to Main Street:

- Align collector along the northern edge of existing drainage, creating a T intersection at Main Street north of the Oregon Garden entrance; or
- Cross the existing drainage along the Monson Road alignment using a culvert, and then align collector along the southern edge of the drainage, creating a four-way intersection at Main Street connecting directly to the Oregon Garden entrance. This is the City's preferred option.

Fosholm Street Connection

To improve safety and circulation, access changes at the Fosholm Street/Silverton Road/Railway Street intersection are recommended. Northbound left turns and northbound through movements from Railway Street should be prohibited except for emergency vehicles (i.e., a raised island that is mountable for emergency vehicle movements could be used to channelize vehicles to turn right). Southbound through movements from Fosholm Street to Railway Street should be prohibited as well.

Intersection of Silverton Road and Fosholm Street from Railway Street

Railroad Crossings

Figure 7 shows where railroad crossings exist in the West Side area (in yellow), and where a future crossing could be located (in green).

- The crossings at Silverton Road/Fosholm Street, James Street, and Water Street would be unchanged.
- The railroad crossing shown at Monson Road is a realignment of the existing crossing at the west end of Railway Street.
- The new crossing between Monson Road and Fosholm Street would be for a future north-south roadway. Note that this crossing will not be possible unless the railroad is abandoned.

Trail Connections

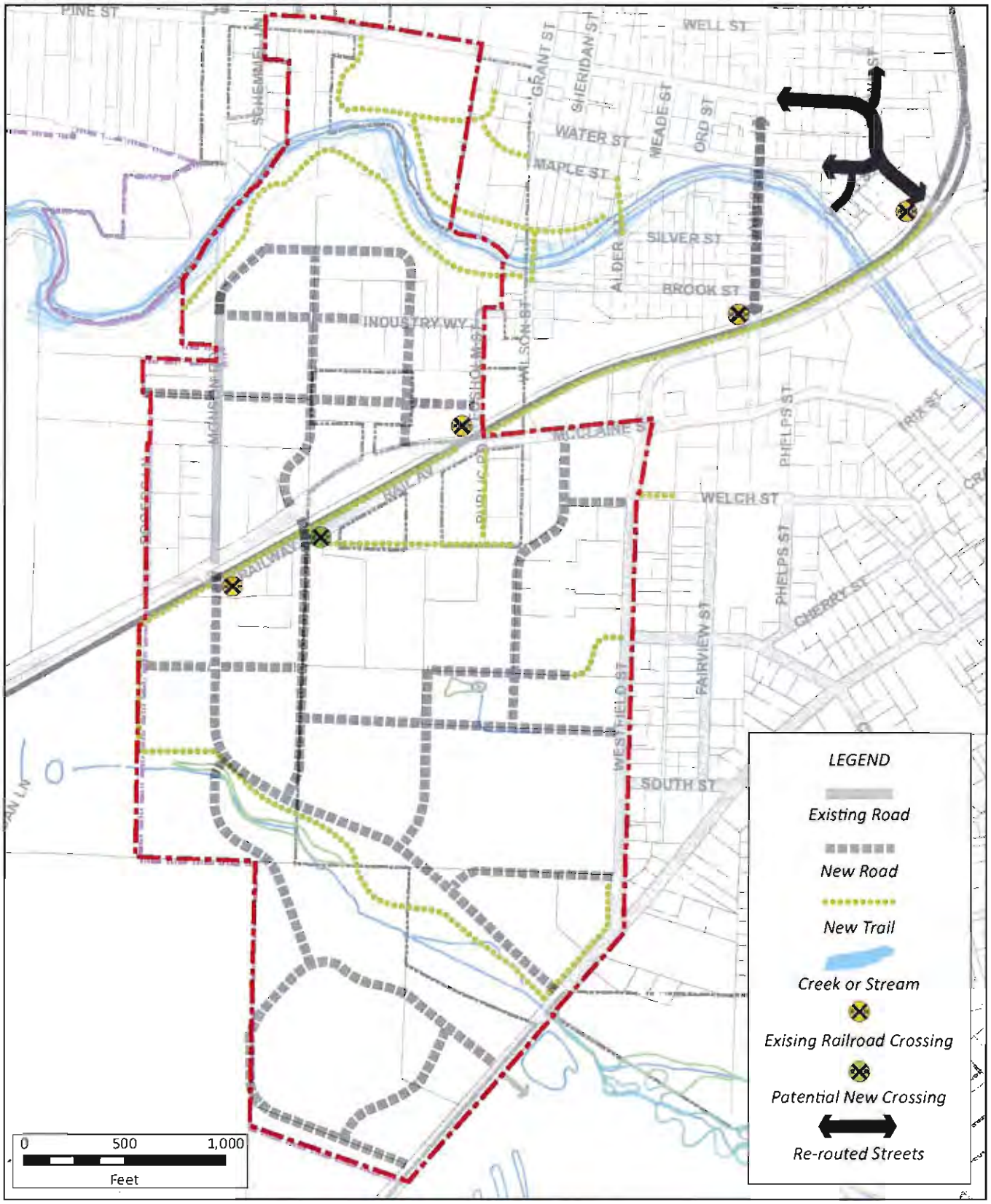
Trails provide convenient connections for pedestrian and bicycle travel through the West Side area. These connections are important because the proposed roadway system relies primarily on Local Streets, which do not include bicycle lanes or planting strips as part of the typical cross section. Conceptual alignments for trail connections are shown in Figure 7, including east-west trails along:

- Silver Creek
- Silverton Road
- the roadway alignment in the vicinity of Center Street
- the drainage in the southern part of the area

Opportunities for north-south connections should also be pursued. These include pathways or shared roadway treatments on:

- Monson Road south of Silver Creek
- Westfield Street between Main Street and McClaine Street

Figure 7. Roads and Trails Network



Brown Street Re-route

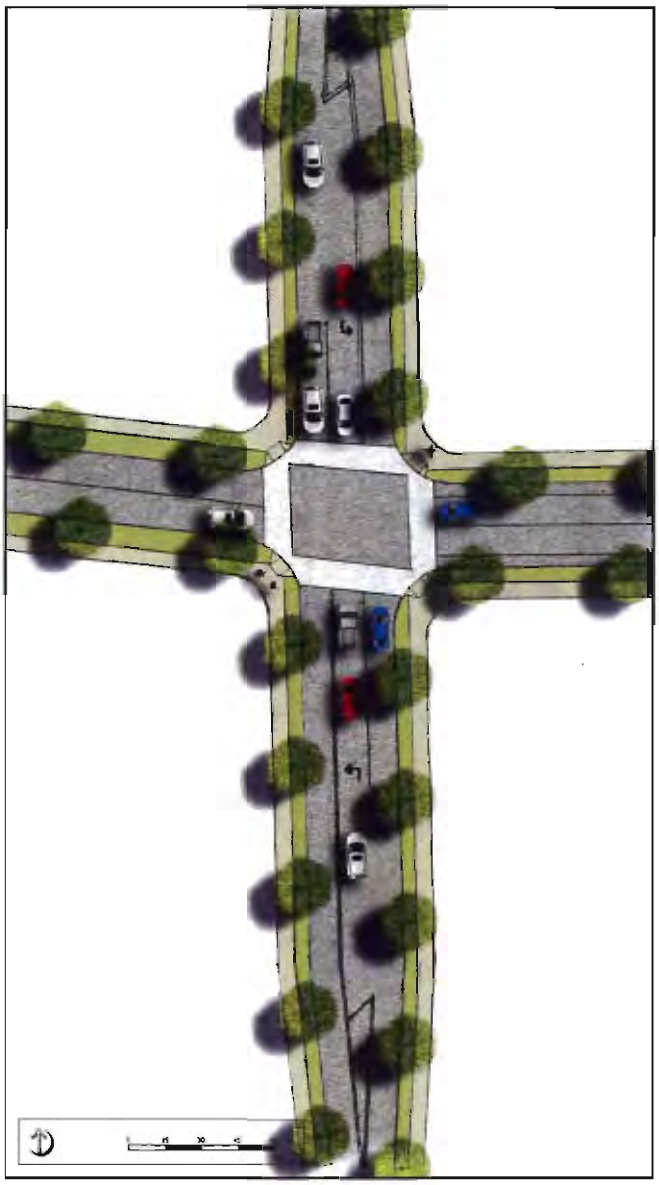
The recommended transportation network calls for re-routing Brown Street and making improvements to the James Street/Pine Street intersection. Traffic impact analysis conducted as part of the West Side planning effort found that under the proposed West Side land use concept, traffic operations at the James Street/Pine Street intersection fail to meet mobility standards and degrade from the existing Transportation System Plan (TSP) levels. The recommended improvements to mitigate the traffic impacts at this intersection and meet the State Transportation Planning Rule (TPR) requirements would re-route vehicles currently using James Street and Water Street to a new a new arterial link along Pine Street and Brown Street. The needed improvements to the Pine Street/James Street intersection could be implemented through a roundabout or a signalized intersection and could be determined at such time in the future when it is needed.

Because existing right-of-way on Brown Street and Pine Street will not accommodate the City's standard arterial cross section, strategies could be pursued to minimize impact on existing fronting uses. These strategies could include a design exception allowing a narrower cross section, such as:

- Removing the landscaping area between the roadway and the sidewalk
- Providing bicycle facilities on streets parallel to the new arterial link rather than on Brown Street and Pine Street

Figure 8. Brown Street Re-route

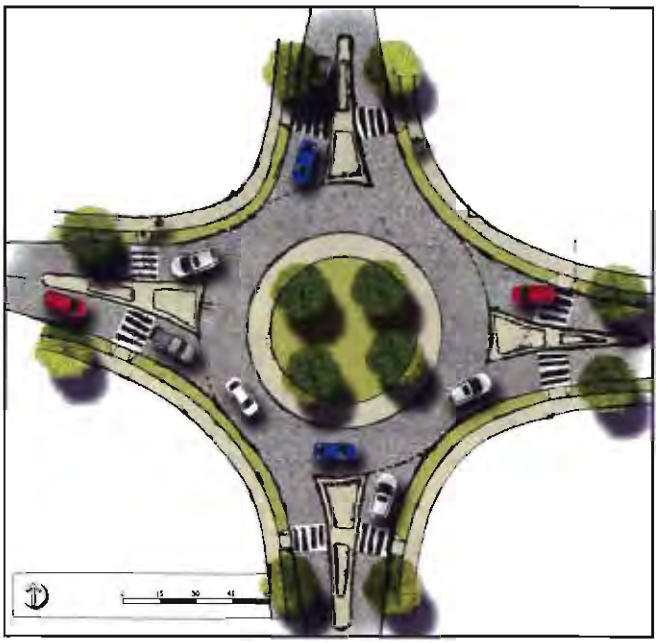
Figure 9. Signalized Intersection Option



30 mph Design Speed on James Street
160' Taper Length
14' Turn Lanes

The James Street bridge just south of Water Street is a constraint as it cannot be widened. Hence the maximum possible left turn storage length on the northbound approach is 80 feet.

Figure 10. Roundabout Intersection Option



120' ICD
20' Circulatory Roadway Width
10' Truck Apron

ROW Requirements: 6400 SF and
7x Residential Buildings

Comprehensive Plan

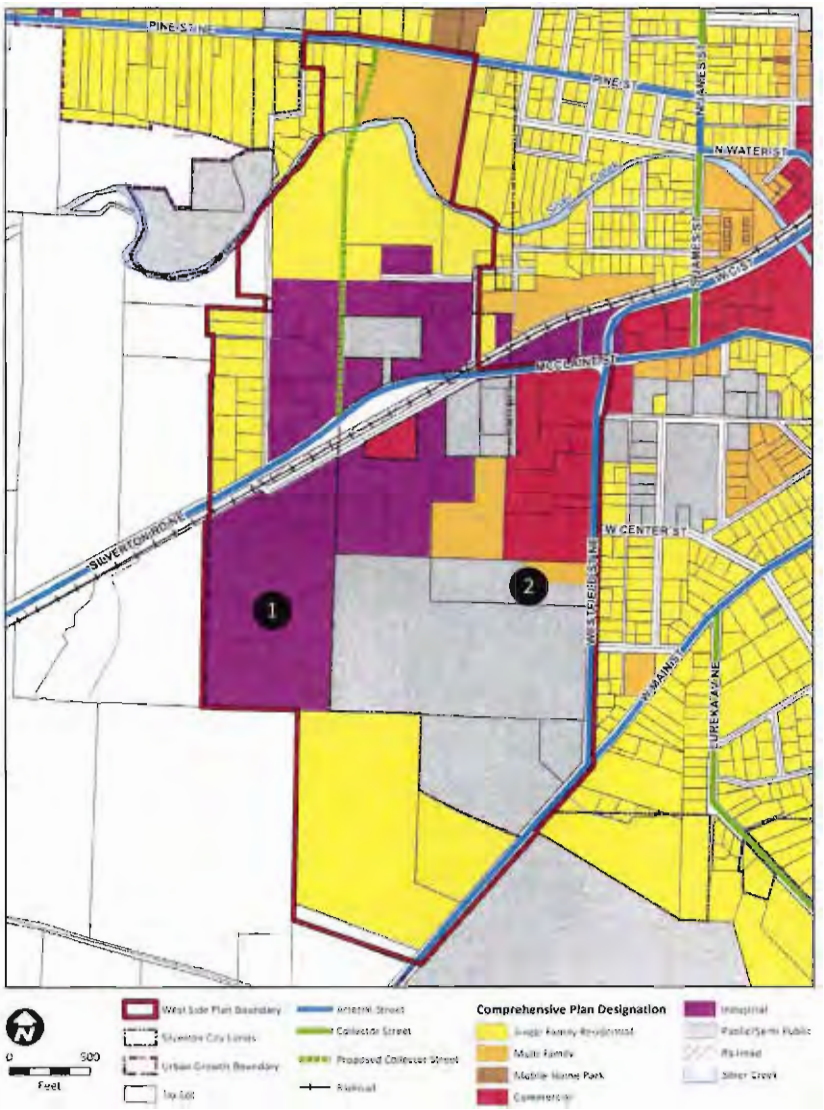
The West Side Plan should be adopted as a refinement of the Silverton Comprehensive Plan. The Comprehensive Plan text should be amended to add policies pertaining to the West Side to Chapter 2, Urbanization. The West Side vision statement serves as the specific policies for the area. The current map designations of Commercial, Residential, Industrial, and Public/Semi-Public would continue to be used (with the exception of two properties noted below), but would be supplemented by the West-Side Plan vision statement.

This approach provides guidance for policy and regulation development in the future at such time that properties are brought into the city limits. As part of the Comprehensive Plan, the West-Side Plan will provide the city's policies toward the character and development of the area.

This provides flexibility in implementation as the overall plan provides the vision and intent for the area without prescriptive regulations. It will show the desire for multi-use trails through green areas and also reflect the community's desire for the school property to become residential if the school district were to ever sell the western portion of its property.

The two property-specific amendments to the Comprehensive Plan Map, as shown in Figure 11, are:

Figure 11. Comprehensive Plan Map



(1) The 24.5 acre property that forms part of the western boundary of the planning area immediately south of Silverton Road needs to change from Industrial to Single-Family Residential designation.

(2) For the purpose of consistency with other church properties, the designation on the First Baptist Church property on Westfield Streer should be changed to entirely Multi-Family Residential as opposed to its current split designation.

Development Code

Implementation of the desired mix of housing types and open space and trails can be achieved through the Planned Development Review process as stated in the Silverton Development Code. No amendments to the Development Code or zoning map are required.

The planned development review criteria require that "all relevant provisions of the comprehensive plan are met." Since the West Side Plan will be a refinement to the Silverton Comprehensive Plan, the desired mixture of housing types and the creation of the open space and trails as shown in the West Side Plan would be criteria for approval in a planned development review.

Planned development review would be required for land division proposals for much of the developable residential land in the West Side. In addition, the Silverton Development Code allows the City to require properties that are subject to the Hillside Protection Overlay to be processed as planned developments.

The land use concept shows two areas of green open space with pathways. Each occurs along with a natural landscape feature: Silver Creek on the north and the steep drainage way on the south. Much of area is also covered by the Floodplain Overlay, Hillside Overlay, or both. This would cover the area along Silver Creek and some of the desired trail area in the south. In addition, the approval criteria already require the creation and conveyance of open space in a master plan. The trails could meet or contribute to meeting that requirement.

Transportation System Plan

To implement the changes described in the West Side Transportation Plan, the following amendments to the City's Transportation System Plan are needed:

- Remove the North-South Connector Project (replaced with local street connections).
- Add the Brown Street re-route as a new arterial corridor and improvement project.
- Add the James Street/Pine Street intersection improvements, which could have an option as either a signal or roundabout configuration to be determined through a design process.
- Consider changing the functional classification of Water Street between Brown Street and James Street to a local roadway (when Brown Street becomes the arterial corridor through the area). This could also include removing the pedestrian and bicycle improvement projects along this portion of Water Street; however, consideration should be given to keeping bike facilities on Water as a Local Street due to the right-of-way constraints associated with upgrading the classification of Brown & Pine to Arterial.

Hilly topography and tree lined drainage feature in the sauthern portion of the West Side area

James Street approaching Water Street

The West Side Plan describes the desired future character of the area, focusing upon the few key actions needed to ensure new development is reflective of the community's values as the area is built out ovet time. As stated in the project purpose, development in the West Side area will be initiated and financed by the private sector (or public or nonprofit institutions in the case of schools and churches). The West Side Land Use and Ttansportation Plan is not intended to accelerate the pace of development or use public money to finance it. Rather, it articulates a vision for the future of the West Side, the desired patrern and character of land uses, and the transportation framework that will ensure that safe and efficient access is available for all transportation modes in the future. Therefore, the Plan will be implemented incrementally as property owners initiate development and market conditions support that incremental growth. Some actions to implement the Plan may be initiated immediately, and others will be initiated in the years to follow as development occurs.

The City should review the West Side Plan on a regularly scheduled basis, and make amendments as opportunity or changing community and economic circumstances necessitate. If there be a desire to change the vision statement or concepts, the Plan update process provides the mechanism for doing so within the context of reviewing the plan as a whole.

Short Term Actions

Actions that may bc initiated immediately by the City of Silverron include a review of industrial zoning, parks and trails planning, and gateway and streetscape improvements. These are described below.

Industrial Zoning Review: Since the Plan will apply or retain existing industrial zoning designations in parts of the Plan area, the City needs to analyze allowed uses and standards within industrial zoning districts to assess: (1) the impacts on adjacent residential areas since the Plan envisions that employment and residential uses will be located in close proximity, and (2) limiting commercial enterprises to those that are not appropriate for and would not compete with downtown Silverton. This will ensure that commercial uses in industrial zones are in keeping with the vision described in this Plan.

Gateways and Streetscape: To determinc the desired look, feel, and budget of gateway treatments, the City should initiate a gateway and streetscape plan.

Parks and Trails Planning: A network plan should be created to analyze trail alignments and identify priorities, feasibility and cost estimates for trails to connect the greater Silverton area park system. It is important that more detailed planning of the trails network be done early so that development in the area can respond to the planned trail network before development actually takes place.

Property and Developer Outreach: Development of the West Side will be driven by market conditions and the decisions of current and future property owners in the area. These factors will impact the specific location, scale, character, timing, and mix of uses to be built. Maintaining ongoing communications with property owners will help the City of Silverton monitor and anticipate the phasing of development. Ongoing communications also helps to avoid surprises and fosters an atmosphere of cooperation where public and private infrastructure can be coordinated to maximize design opportunities and achieve cost savings. This outreach effort will require the designation of a specific staff person whose role (among their other duties) will be to maintain property owner outreach efforts and monitor development proposals.

Long-Term Actions

Longer term actions include ongoing development of roadways and trails as development occurs in the future. The Plan intends that the development of this infrastructure be built incrementally in response to the need for improvements by development that occurs within the area. Detailed planning and designs for these improvements would be conducted at that time. Road extensions through the project area and other on-site project infrastructure will largely be built by private developers as properties are developed. Off-site improvements such as nearby transportation improvements or utility upgrades will also be built only after certain level of service "triggers" are met. These projects may be built by the City of Silverton or utilities, but paid for in parr through development fees generated by previous and concurrent development projects. Public amenities such as parks are also paid for in part through development impact fees, which are intended to generate revenues to expand the parks system to support the new population. This does not preclude additional funding through a community-wide bond measure that could accelerate the pace of development of the trail network and other parks elements that would benefit the entire Silverton community. Specific long-term actions are anticipated to include:

Transportation Network Improvements: The analysis indicates the Brown Street Re-Route is needed by 2020 in order to mitigate sub-standard operations in the a.m. peak hour at the James Street/Pine Street intersection. The signal at the James Street/Pine Streer intersection will be needed by 2030. As traffic increases approach this threshold, the City of Silverton will need to develop more detailed designs and cost estimates for this intersection project.

Appendix A	Project Memorandum #1: Existing Conditions
Appendix B	Project Memotandum #2: Market Analysis
Appendix C	Project Memorandum #3: Community Meeting Summary - August 25, 2011
Appendix D	Project Memorandum #3B: Community Meeting Summary - January 12, 2012
Appendix E	Project Memorandum #4: Land Use & Transportation System Alternatives
Appendix F	Project Memorandum #5: Community Meeting Summary - March 22, 2012
Appendix G	Project Memorandum #6: Transportation Analysis Methodology
Appendix H	Project Memorandum #7: Preferred Land Use & Transportation System Alternative, Part 1 - Land Use
Appendix I	Project Memorandum #7: Preferred Land Use & Transportation System Alternative, Part 2 - Transportation System
Appendix J	Project Memorandum #7: Preferred Land Use & Transportation System Alternative, Part 2 - Appendix
Appendix K	Project Advisory Committee Meeting & Community Forum Summary - November 27, 2012
Appendix L	Comprehensive Plan Amendment
Appendix M	Transportation System Plan Amendment

Silverton West-Side Land Use and Transportation Plan
Project Memorandum #1

otak
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In association with
DKS Associates
Leland Consulting Group

To:	City of Silverton Steve Kay, AICP – Community Development Director
From:	Otak Team Jennifer Mannhard, AICP, LEED AP – Project Manager
Date:	July 15, 2011
Deliverable:	2E. Revised Project Memorandum #1
Subject:	Existing Conditions

Introduction

The purpose of the Silverton West-Side Land Use and Transportation Plan project is to ensure that urbanization of the Project Study Area occurs in an integrated, connected manner that facilitates multimodal travel, reduces reliance on the automobile, reduces use of highways for local travel, and provides certainty about planned transportation investments to encourage economic development. The project objectives are to:

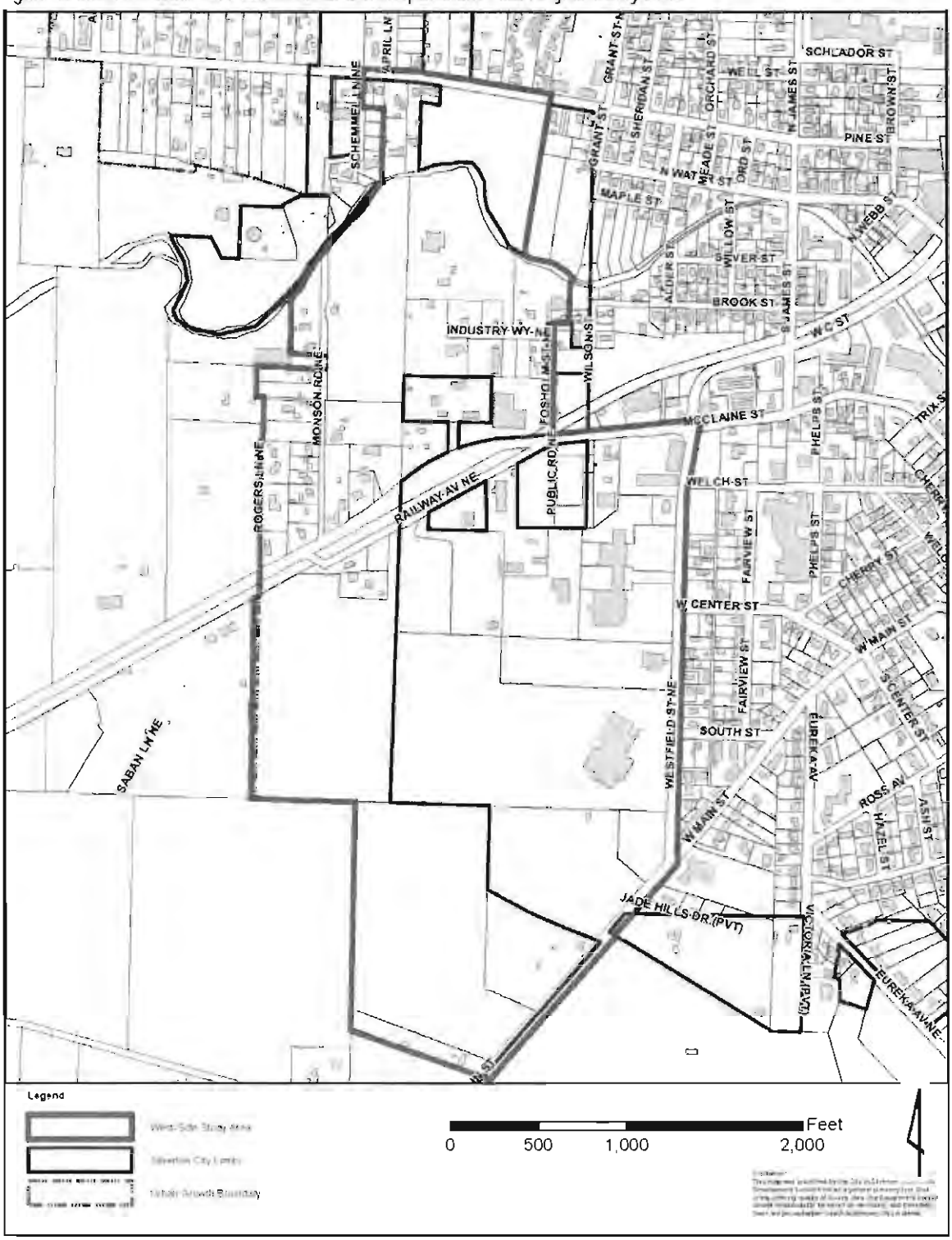
- Identify feasible patterns of land uses for the Project Study Area consistent with the City's Goals for urbanization and livability.
- Identify transportation facilities needed for circulation of people, walking, bicycling, and driving in the project Study Area and to integrate the Project Study Area with surrounding neighborhoods.
- Recommend Comprehensive Plan and Zoning designations, plan and development code amendments, and facility standards to implement preferred alternatives for land use and transportation in the Project Study Area.

The purpose of this memorandum is to provide information on land use and transportation-related existing conditions, opportunities for development, and constraints to development in the project study area within the west-side of the City of Silverton. The memorandum includes a review of the existing land use and transportation network, environmental and physical constraints, planned growth and conservation, and implications of existing plans and policies.

Study Area

The study area for the West-Side Land Use and Transportation Plan includes incorporated and unincorporated properties within the Silverton Urban Growth Boundary. The general scope of the area is south of Pine Street, west of Fossholm Road and Westfield Street, north of West Main Street, and east of Rogers Lane. Figure 1 illustrates the precise study area, which provides the context for assessing existing conditions.

Figure 1: Silverton West-Side Land Use and Transportation Plan Project Study Area



Planned Growth and Conservation

The following section summarizes policy and planning information relevant to development the West-Side planning area.

City of Silverton Comprehensive Plan

The Silverton Comprehensive Plan contains a number of policies that are directly relevant to this project. These include:

Open Space, Natural and Cultural Resources
Land within the urban growth boundary (UGB) currently used for agriculture is desirable as open space. The policies in the Agricultural Lands element support retention of existing farmland within UGB until urban services are available and land is needed for development.

> **Open Space, Natural and Cultural Resources Policies**
> Preserve the wildlife habitat along Silver Creek as permanent to protect fish, wildlife, and riparian vegetation.

Urbanization
Over the next 20 years, new units are expected to be 65% single-family, 30% multi-family and 5% manufactured homes in parks. Within the City limits the percentage of residential land used for single-family homes has slightly decreased from 89% in 1979 to 87% in 2001.

"...single-family homes are expected to account for 60% of all units, while multi-family units (including duplexes) and manufactured homes in parks are projected to account for 35% and 5% of total dwellings, respectively.

The City updated the Parks and Recreation Master Plan in 2008. Findings from that effort indicate Silverton currently needs at least two additional neighborhood parks and one 30-50 acre community park to meet future needs for these types of parks. Other recommendations that have implications within the project area include calling for a increase the connectivity of the greenspace within the City; a new joint park with the school district to provide recreation amenities; expanding the senior center by 20,000 square feet to become a full community center; and the addition of a skate park and dog park.

> **Urbanization Policies**
> Planned Unit Development. Planned unit developments will be encouraged, especially on large tracts of undeveloped land, as alternative to traditional subdivisions. A planned unit development offers the potential to develop land efficiently by allowing the opportunity for flexibility with regards to traditional zoning requirements.
>
> Multiple Family Development. Multiple family development will be encouraged, especially in but not limited to, areas close to the central business district, or within walking distance of neighborhood commercial areas, or in areas designated for mixed use. It is also desired that multiple family development should be scattered around the community and not concentrated within any one particular area. Small developments which fit in the existing neighborhood are preferred. All multi-family greater than a two-family development shall comply with the design standards as outlined in the City's Design Review Ordinance.
>
> Note: As the last update to the Comprehensive Plan was completed in 2002, the multi-family housing land supply needs identified in the Comprehensive Plan are currently understated.

Orderly Growth. Orderly growth within the residentially designated land between the city limits and the urban growth boundary will be encouraged by discouraging partitions that impede redevelopment at urban density at a later date.

Preservation of Industrial Lands. Land designated for industrial use shall be preserved for that use unless the size, shape topography, adjacent uses, or other factors limit the reasonable industrial use of the property.

Extension of Services of Lands Designated for Industrial Use. The City will pursue annexation and extension of sewer and water services to lands designated for industrial use.

Future Actions – Urbanization
The City will develop a program for parkland acquisition in newly developing areas, including possibly dedication of land or contribution to a parkland fund by subdivision developers. The program will be consistent with the Parks Master Plan updated in 2008.

The City will adopt standards for new development along major western and northern entrance ways to the City to improve aesthetics in these areas.

Comprehensive Plan Designations

Properties within the Study Area consist of lands that are currently designated Single-Family, Industrial, Multi-Family, Commercial, and Public/Semi Public within the City of Silverton Comprehensive Plan.

The majority of the study area is designated Industrial. The Industrial lands include parcels both the north and south side of Silverton Road NE (Highway 213), which bisects the Project Study Area. The second largest designation appears to be Single-F on both the north and south boundary of the study area. The third primary designation appears to be designated Public/Semi-Public land followed by Commercial and Multi-Family residential lands generally located along the east boundary of the site.

The Public/Semi-Public lands are occupied by the Robert Frost Elementary School Property, Silverton Fire Department, Silverton Cemetery, and the municipal maintenance and operations yard on the north side of Silverton Road.

The Industrial-designated lands include a variety of uses such as a farm machine shop, animal clinic, public mini-storage, transmission shop, single-family residences, and large parcels on the west end of the study area that appear to be farmed. The majority of the parcels in designated industrial are underdeveloped.

The Commercial-designated lands are developed with two large suburban shopping centers and associated parking. The centers contain a variety of businesses including retail, fast food, grocery, and personal services.

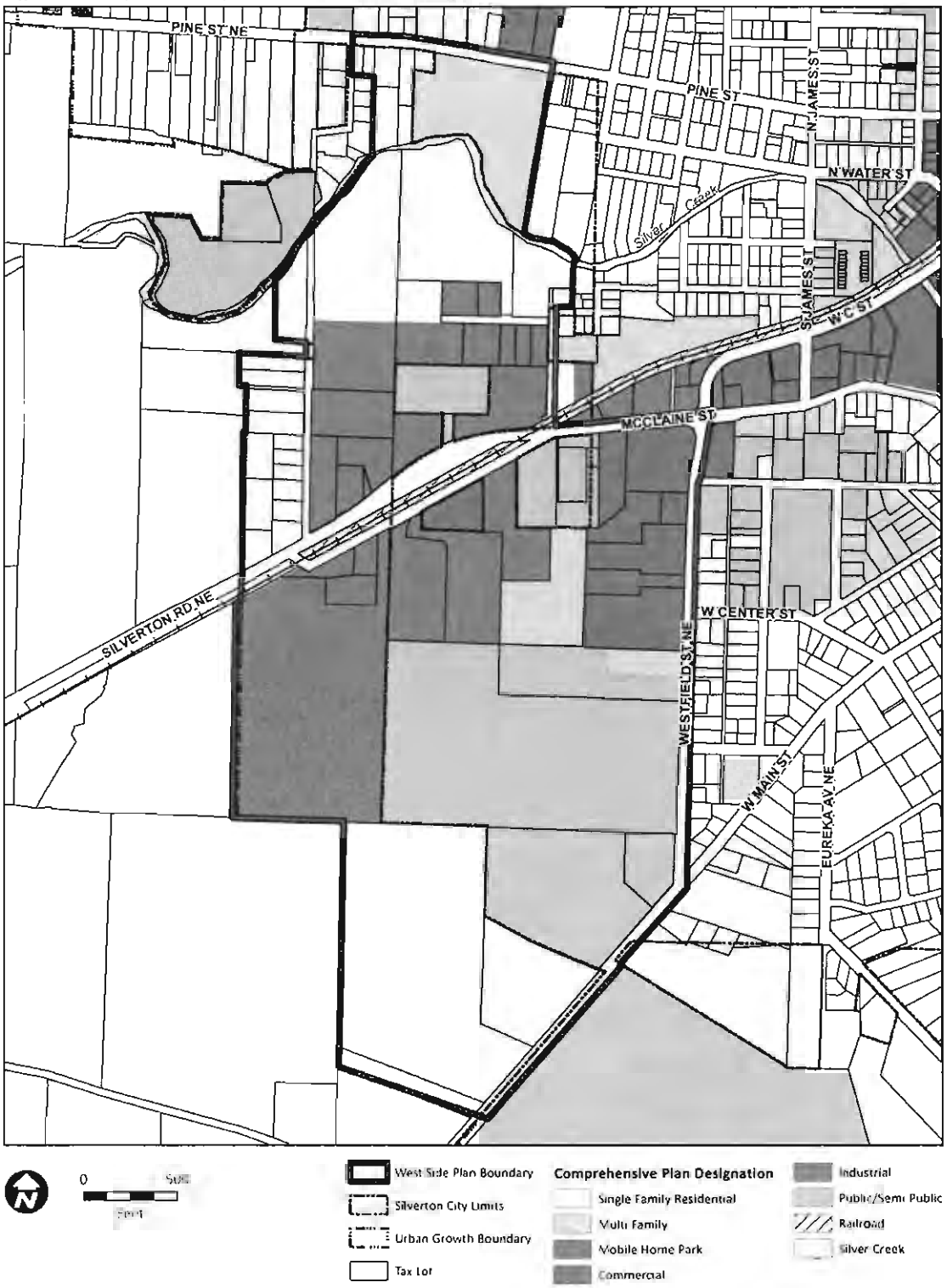
The Single family-designated lands are primarily in the north end of the study area and the south end of the study area. The residential area directly north of Highway 213 along the west edge of the study area is the most developed residentially designated properties, whereas the lands on the north and south ends of the study area are currently underdeveloped.

The Multi-family-designated properties are undeveloped or developed with uses that would generally be characterized as institutional including a church and an early childhood pre-school.

Figures 2 illustrates the existing land uses and Figure 3 shows the Comprehensive Plan designations.

Figure 2: Study Area Existing Land Use

Figure 3: Study Area Comprehensive Land Use Designations



Silverton Land Use Code

Those properties located within the City of Silverton City limits are designated one of the following zoning classifications.

- General Commercial (commercial properties on the west side of Westfield Street NE)
- Light Industrial and Industrial Park (Industrial properties on Highway 213)
- Single-family Residential (properties south of Pine Street and west of Westfield Street NE)
- Public/Semi Public/Government (properties including Robert Frost Elementary, The Silverton Cemetery, and a public facilities yard north of Highway 213.

Although the majority of land within the study area is located outside of the city limits, and subsequently not zoned, it should be noted that there appear to be some inconsistencies with a few of the zoning designations as compared to the Comprehensive Plan designations. The large property located on the northern edge of the site and a parcel south of Highway 213 both have a Multi-Family designation in the comprehensive plan, but are zoned for single-family. Another instance is the two properties south of the Robert Frost Elementary School that are designated for single-family in the comprehensive plan map, but are zoned Public/Semi-Public/Government.

The zoning code is developed from the Oregon Model Development Code for Small Cities, and appears to be a standard performance based code.

Marion County Comprehensive Plan

The Marion County Comprehensive Plan also contains a number of policies that are directly relevant to this project. These include:

Urbanization Policies

- Establish Urban Growth Boundaries to identify and separate urbanizable land from rural land and contain urban land uses within those areas most capable of supporting such uses.
- To provide for an orderly transition from rural to urban land use.
- Development of commercial areas and employment centers that favor being located in relation to the urban transportation system.
- Development of industrial land use within urbanized areas unless an industry specifically is best suited to a rural site.

Urban Growth Policies

- The type and manner of development of the urbanizable land shall be based upon each community's land use proposals and development standards that are jointly agreed upon by each city and Marion County and are consistent with the LCDC Goals.
- The annexation of rural lands into the legal boundary of any city shall be limited to the area contained within the mutually adopted Urban Growth Boundary. Exceptions to this prohibition may be allowed consistent with Special District Policies 6, 7 and 8. The annexation of lands outside of an Urban Growth Boundary shall be limited to lands having a prior exception to Statewide Goal 3 (Agricultural Lands) and Goal 4 (Forest Lands). Annexation procedures shall be consistent with the requirements of state law and the local coordination policies contained in the Urban Growth Boundary and Policy Agreement or Urban Growth Boundary Coordination Agreement.

Growth Management Framework Goals

Foster the use of creativity and innovation in planned growth and development projects to maintain the unique character of all cities.

Figure 4: Study Area Zoning Designations

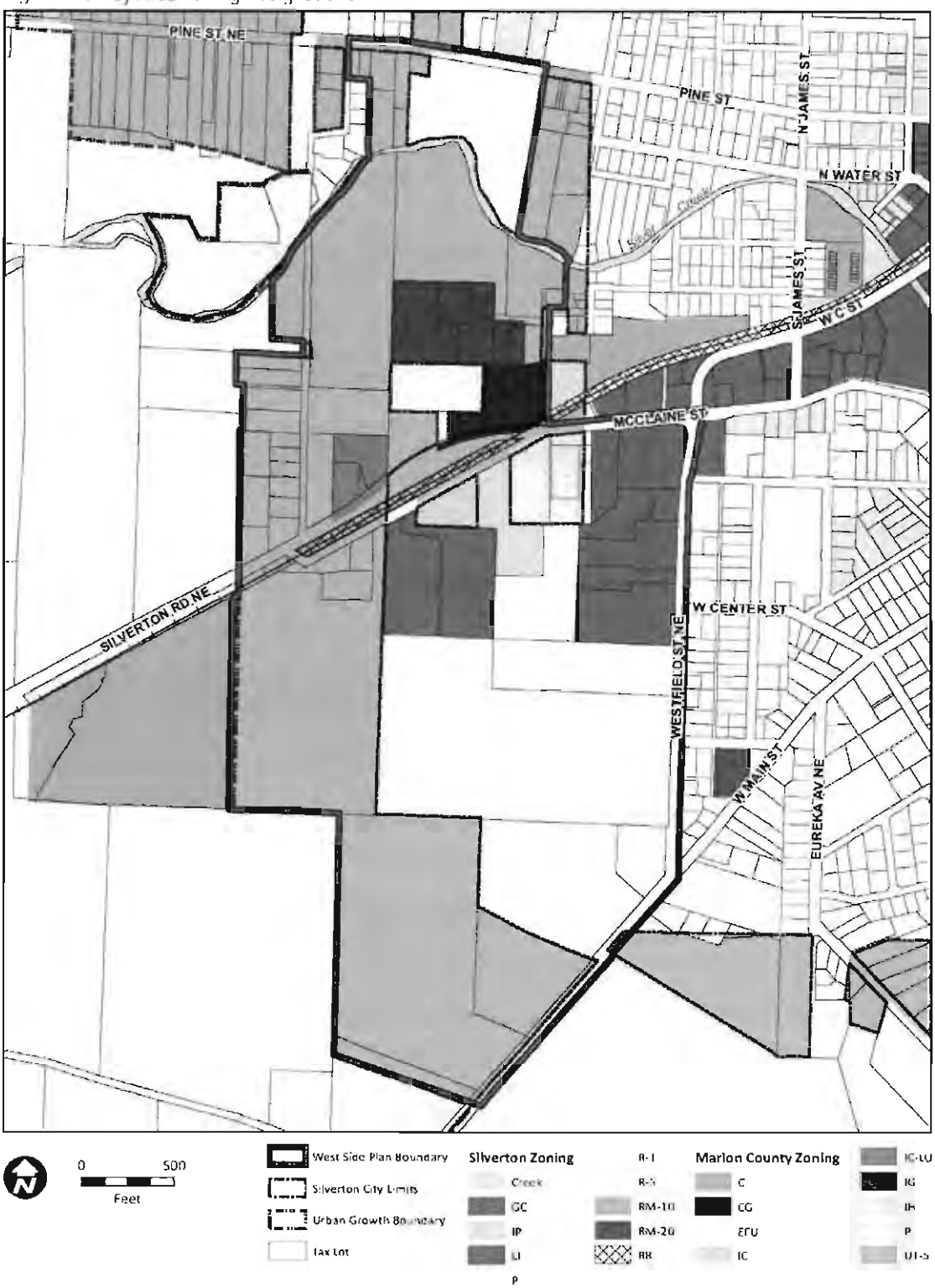


Figure 5: Study Area Property Ownership Patterns (also refer to Table 1 on next page)

Table 1: Project Area Ownership (refer also to Figure 5)

OwnerID	OWNERNAME	OWNERCITY	OWNERSTATE
1	BAYER,DAVID P &	SILVERTON	OR
2	BECKER LT &	NEWBERG	OR
3	BURBAGE,RICKY J &	SILVERTON	OR
4	CAROL E STORKE RLT &	SILVERTON	OR
5	CARTER,DARLENE &	SILVERTON	OR
6	CASCADE EQUITIES LLC	SILVERTON	OR
7	CITY OF SILVERTON	SILVERTON	OR
8	DINSMORE,MICHAEL F & KATHERINE E	SILVERTON	OR
9	ELAINE HANSON LT &	SILVERTON	OR
10	ELLIS,BENJI L &	SILVERTON	OR
11	ERP FAM TR	MOLALLA	OR
12	FAITH LUTHERAN BIBLE CHURCH	SILVERTON	OR
13	FIRST BAPTIST CHURCH	SILVERTON	OR
14	FOX,JANICE A &	SILVERTON	OR
15	GOSSACK,GREG &	SILVERTON	OR
16	GRACE,JOHN P &	SILVERTON	OR
17	HARDING,DOUGLAS A	SILVERTON	OR
18	HARDING,GERALD G & VIVIAN-TRUST	SILVERTON	OR
19	HBF CASCADE LLC	KEIZER	OR
20	HERBERT A SPADY SURV TR 50% &	SILVERTON	OR
21	KENNARD,ALAN &	SILVERTON	OR
22	KING,DAVID G &	SILVERTON	OR
23	KRIDEL O & G	SALEM	OR
24	M HASHEM LIMITED PARTNERSHIP,THE	CLACKAMAS	OR
25	MARTIN,SAMUEL C & WENDY K	LA MIRADA	CA
26	MEYER INDUSTRIAL PROPERTY	SILVERTON	OR
27	MORANCHEL-MORANCHEL,EMILIO	SILVERTON	OR
28	MORRISON,JOSEPH A &	SILVERTON	OR
29	MOSS,THOMAS W	SILVERTON	OR
30	OREGON CHILD DEVELOPMENT COALITI	WILSONVILLE	OR
31	PARK,ILL WOO &	LINCOLN CITY	OR
32	POWELL,RUTH A	MT ANGEL	OR
33	RAILWAY AVENUE LLC	MCMINNVILLE	OR
34	ROBERTS,BETTY & FRANKIE B	SILVERTON	OR
35	ROGER A & KAREN D SEIFER JRT &	SILVERTON	OR
36	ROSENBERGER,KIMBERLY &	SILVERTON	OR
37	SCHMITZ,NORBERT J &	SILVERTON	OR
38	SEIFER,ROGER A & SEIFER,JACK B	SILVERTON	OR
39	SILVER FALLS SCHOOL DIST 4J	SILVERTON	OR
40	SILVERTON CEMETERY ASSOC INC	SILVERTON	OR
41	SILVERTON RURAL FIRE	SILVERTON	OR
42	SKIDMORE LIMITED PARTNERSHIP	CLACKAMAS	OR
43	SMALL,MATHEW	BEND	OR
44	STEWART,MICHAEL A	SILVERTON	OR
45	STORMO,JAMES O &	SILVERTON	OR
46	WADE,RICHARD E & VIOLA K	SILVERTON	OR
47	WILCO FARMERS	MT ANGEL	OR

Housing Land Needs

The primary area of growth for housing units in Silverton has been in single family detached homes in the east and south east sides of the city. Today, there are approximately 2,627 single family dwelling units and 677 multifamily dwelling units within the city.

The city has designated approximately 556 acres of net buildable land for single family homes, only a third of which is currently located within the city limits (but within the UGB). Designated land for multifamily housing is considerably smaller, amounting to only 1.5 percent of total land designated for future housing development. Table 2 below depicts the designated land by use.

Table 2: Summary of Housing Units and Designated Land

Housing Characteristic	Single Family Dwelling Units	Multifamily Dwelling Units	Manufactured Homes
Total current dwelling units	2,627	677	268
Net buildable land designated in the Comp Plan within city limits (acres)	178	9.5	---
Net buildable land designated in the Comp Plan outside of city limits (acres)	378	0	---

Source: City of Silverton, Leland Consulting Group

The distribution single family to multifamily housing as well as dedicated land for future housing suggests an opportunity to diversify housing products in the market by offering a more diverse mix of affordable and multifamily housing product. This is further supported by the fact that smaller, more urban housing units are gaining favor among aging, downsizing baby boomers and generations X and Y.

According to Marion County's Population Forecast Project, the population of Silverton is expected to grow to 14,418 by 2030, suggesting an annual growth rate of 1.3 percent. Assuming a comparable average household size, the city will need an expected 3,718 dwelling units by 2030.

Industrial and Commercial Land Needs

The most recent analysis of the city's land needs is provided in the City's Economic Opportunities Analysis (EOA) last updated on February 25, 2011. The EOA identifies the existing supply of buildable land in the Silverton urban growth boundary (UGB) as of 2010 and provides a baseline comparison of land supply and demand (by commercial, industrial park, and light industrial/industrial land use classes) in the Silverton UGB for the time period 2010 to 2031.

A summary of key findings pertaining to Silverton's supply and demand of commercial and industrial land is provided below.

Industrial

- According to the EOA, the Silverton UGB currently has a very limited supply of vacant commercial/retail land. By contrast, the city currently has 84.7 acres of vacant industrial land, which is largely distributed over smaller lots of five acres or less.

- The EOA identifies three growth scenarios in industrial development, all of which show low industrial growth relative to the availability of buildable land. Under low, medium, and high growth scenarios, the city will still have a surplus of industrial land over the planning time frame of between 83 acres under a low growth scenario and 73 acres under a high growth scenario.

- This matter is complicated further by the abundant availability of small sized tax lots, the majority of which are five acres in size or smaller. Under an ambitious high growth scenario, the EOA anticipates demand for only one parcel between two to five acres, leaving a surplus of 21 tax lots less than five acres in size.

Commercial

- Commercial and retail supply and demand prove more promising. There is an existing supply of 7.6 acres of developable commercial office and retail land. Under a low growth scenario, the EOA anticipates a surplus of merely one acre of commercial land whereas under both medium and high growth scenarios, there is an anticipated deficit of just under three acres. The highest demand for commercial land under a high growth scenario will be in lots ranging from one to five acres.

- Furthermore, the EOA showed that vacancy rates for commercial retail and office buildings outside of downtown are currently below 10 percent.

- Population growth is one of the factors used to forecast employment growth. Thus, if population growth projections for the Silverton UGB are understated, actual employment may exceed forecasted employment growth between 2010 and 2031.

Environmental and Physical Constraints

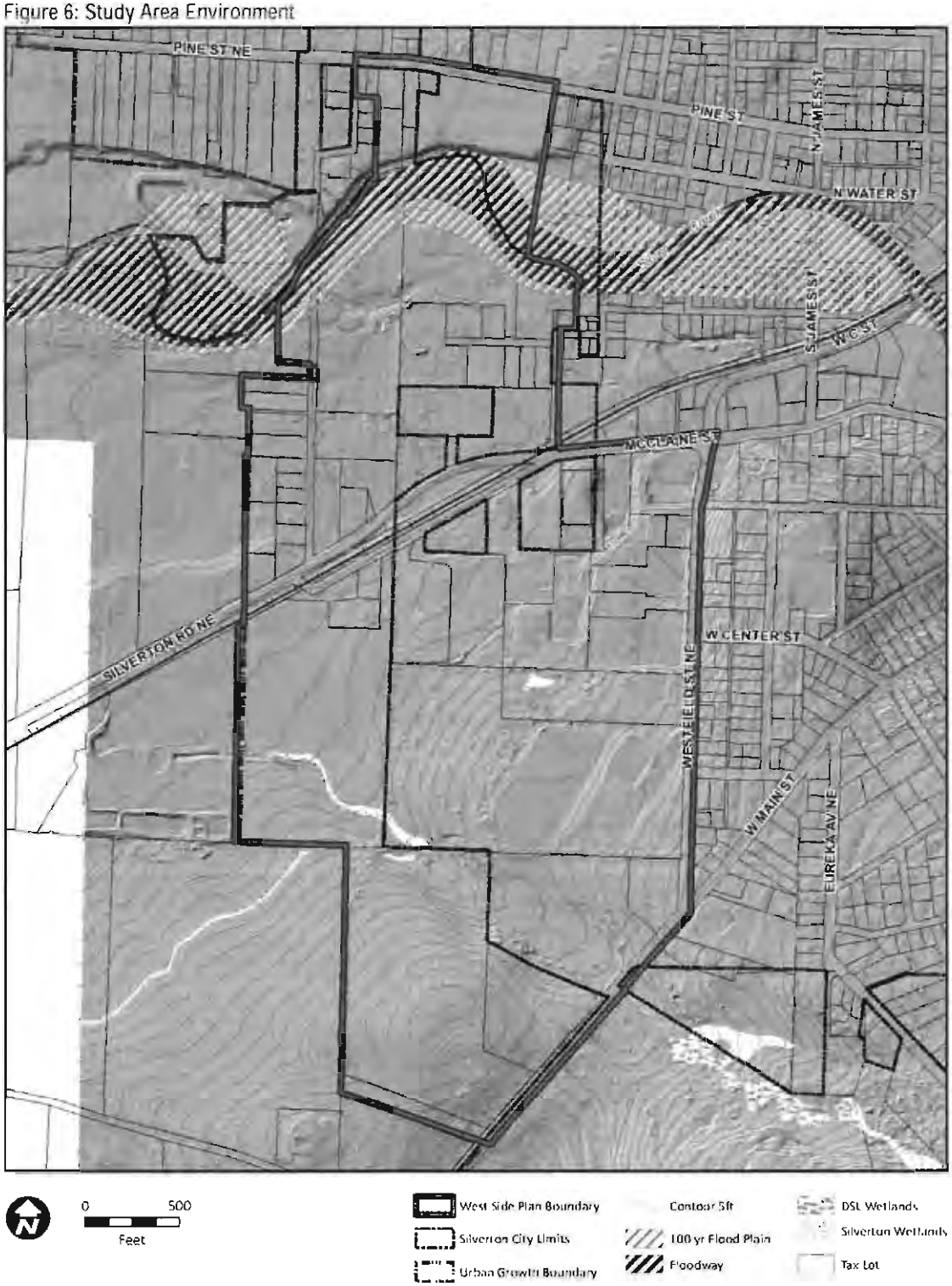
The West-Side study area includes environmental barriers to urbanization and development of transportation facilities to support desired land uses and economic development. This section summarizes these constraints.

Waterways

Silver Creek, which runs through the northern part of the study area, presents a significant barrier to all transportation modes. There are no crossings within the study area, with the nearest bridge being at North James Street, a quarter mile east of the study area's eastern boundary.

There is also an 18-acre undeveloped area just west of the Robert Frost Elementary School campus that is called out in the comprehensive plan. According to the Open Space, Natural and Cultural Resources element of the Plan, which was last updated in 1986, "...This area serves as an educational as well as recreational resource for the community. A nature trail circles the area which has a marsh, pond, and one and one-half acre arboretum featuring natural shrubs and trees of Oregon. Pheasant have been released and a variety of birdhouses constructed." Verification of the status and uses of this area should be undertaken prior to further planning efforts. (NOTE: Inquiries have been made to the School District)

Figure 6: Study Area Environment



Existing Transportation Facilities

The *Silverton Transportation System Plan (TSP)*[1] documents the existing transportation system, including roadway functional classifications and multi-modal elements, for the City of Silverton. Table 3 provides information on facilities within the study area, including roadway cross-section, traffic volumes, and accommodation of pedestrians and cyclists.

Table 3: Study Area Roadway Characteristics and Cross-Sections

Roadway	Jurisdiction and Classification	Posted Speed	Daily Traffic[c]	Cross Section[d]	On-Street Parking	Side-walks	Bike Lanes
Silverton Road	County Arterial	45 mph[a]	10,250	2 Lanes	No	No	No
West Main Street	County Arterial	45 mph[b]	5,460	3 Lanes	No	Partial	Yes
Pine Street	County Arterial	25 mph	4,480	2 Lanes	No	Partial	No
Westfield Street	County Arterial	25 mph	2,290	2 Lanes	No	Partial	Yes
Fossholm Road	County Local	25 mph	-	2 Lanes	No	No	No
Monson Road	County Local	25 mph	-	1 Lane	No	No	No
Rogers Lane	City Local	25 mph	-	1 Lane	No	No	No
Railway Street	County Local	25 mph	-	2 Lanes	No	No	No
Industry Way	County Local	25 mph	-	1 Lane	No	No	No
Schemmel Lane	City Local	25 mph	-	1 Lane	No	No	No

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.
[a] The speed limit on Silverton Road changes from 25 to 45 west of Fossholm Road.
[b] The speed limit on West Main Street changes from 25 to 45 west of Westfield Street.
[c] 24-hour traffic volumes were collected at limited locations during the TSP update.
[d] Lanes on local roads estimated based on paved width.

Silverton Road carries the highest level of vehicular traffic of any road within the study area, with nearly twice the volume of the next busiest road. West Main Street is the only facility with a cross-section wider than two lanes: it carries a center turn lane from Westfield Street to a planted median at the southern corner of the study area. Most streets lack sidewalks, and where they exist sidewalks are on one side of the street only. West Main Street and Westfield Street contain bike lanes, but these only serve the area's perimeter; bicycle facilities are nonexistent in the rest of the study area.

Access Management

Marion County access management standards vary depending on functional class and intersecting access. City of Silverton access spacing standards include minimum as well as maximum spacing in order to avoid landlocked parcels. County and City standards are outlined in Tables 4 and 5.

[1] *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.

Figure 7: Study Area Existing Street Network

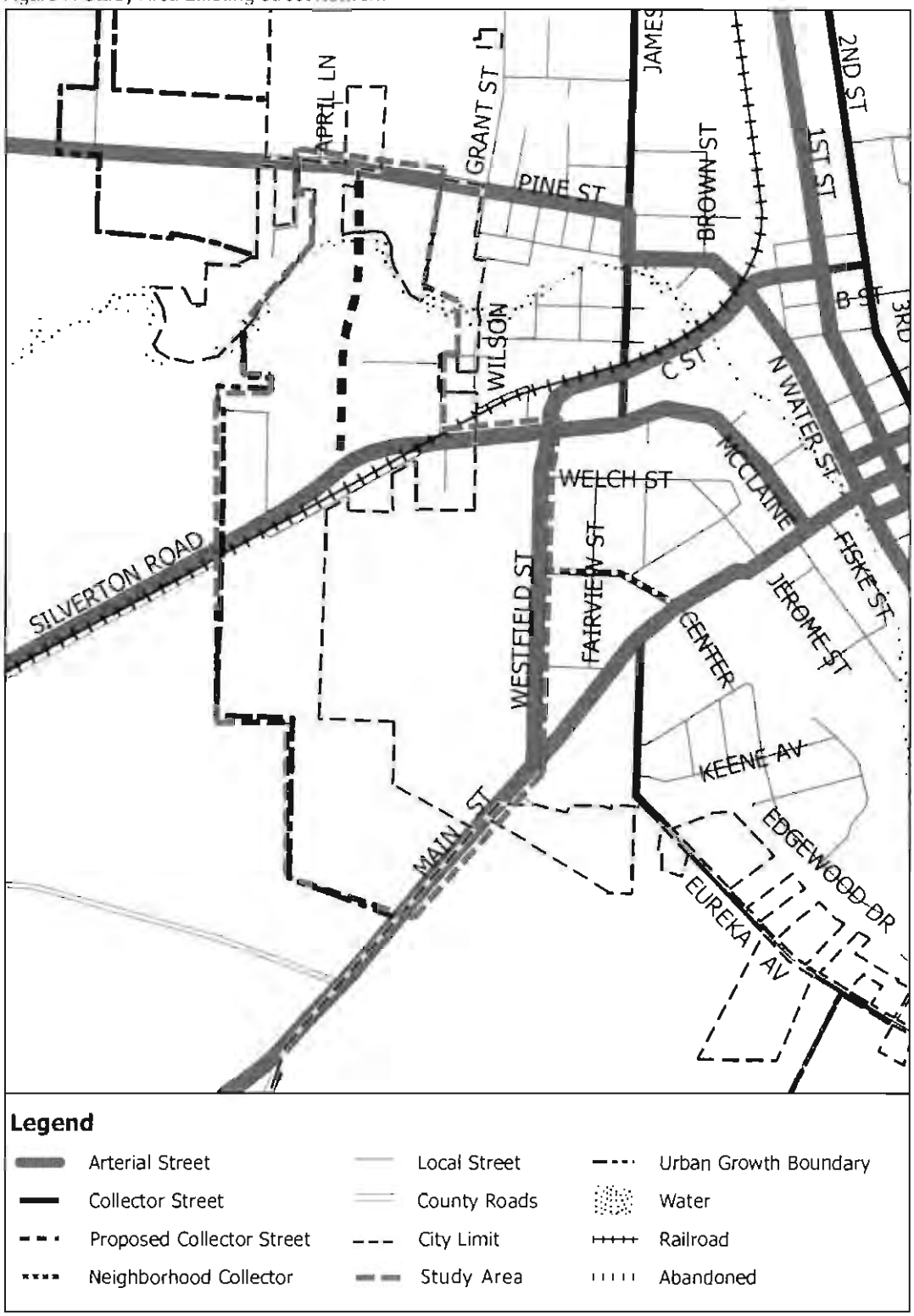


Table 4: Marion County Access Management Standards

Functional Class	Access Spacing Requirements
Arterial	500 feet from any intersection with a state highway, arterial, or major collector 400 feet from any other intersection (including private access)
Major Collector	400 feet from any intersection with an arterial or state highway 300 feet from any other intersection (including private access)
Minor Collector	300 feet from any intersection with an arterial or state highway 150 feet from any other intersection (including private access)
Local Street	200 feet from any intersection with an arterial or state highway 100 feet from any intersection with a major or minor collector, or local road 50 feet from any intersection with a private access

Source: *Marion County RTSP*, 2005

Table 5: City of Silverton Access Spacing Standards

Street Facility	Maximum spacing[1] of roadways	Minimum spacing[1] of roadways	Minimum spacing[2] of roadway to driveway	Minimum spacing[1] of driveway to driveway[3]
Arterial	1000 feet	500 feet	250 feet	250 feet or combine
Collector	500 feet	250 feet	150 feet	150 feet or combine
Neighborhood/Local	500 feet	250 feet	10 feet	10 feet

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.
[1] Measured centerline to centerline
[2] Measured near street curb to near driveway edge
[3] Private access to arterial roadways shall only be granted through a requested variance of access spacing policies (which shall include an access management plan evaluation)

The benefits of access management standards typically include improved traffic flow, fewer vehicle conflicts, and reduced collisions. Current access spacing on arterials within the study area is outlined in Table 6.

Table 6: Access Spacing within Study Area

Roadway	Segment Length within Study Area	Accesses	Avg Spacing per Access	Accesses within 500 feet of Arterial intersection
Silverton Road	2280 feet	19	120 feet	6 (Westfield Street)
West Main Street	1650 feet	4	410 feet	3 (Westfield Street)
Pine Street	1160 feet	13	90 feet	-
Westfield Street	2480 feet	19	130 feet	1 (Silverton Road) 5 (West Main Street)

Source: DKS Associates, 2011

Access spacing generally does not meet standards within the study area. Pine Street in particular features closely spaced driveways along its northern frontage, and Westfield Street has a similar density of residential accesses in the southern section of the project area. The west leg of the Silverton Road/Westfield Street intersection features multiple accesses for retail uses within 500 feet of one of the city's busiest intersections.

Bicycle and Pedestrian Activity

This section documents multi-modal activity within and around the study area. Table 7 shows bike and pedestrian volumes at select intersections.

Table 7: Bike and Pedestrian Volumes within Study Area, PM Peak Hour

Intersection	Pedestrian Crossing Volume	East/West Bike Volume	North/South Bike Volume
Westfield Street/Main Street	0	0	0
Silverton Road/Westfield Street	23	2	0
Pine Street/James Street[1]	44	6	5

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.
[1] James Street is ¼ mile east of the study area along Pine.

No bike or pedestrian activity was recorded at the southern end of the study area, but activity is evident at the northern and western periphery of the area, which features established residential uses.

Transit

Checmeketa Area Regional Transportation System (CARTS) provides weekday fixed-route transit service on Route 20, which connects Salem, Silverton, and Mt. Angel. This route has three stops in Silverton, including one within the study area at the Rite-Aid on Westfield Street. Route 20 operates on weekdays, making four trips in each direction.

Intersection Operations

Level of Service (LOS) is used to measure the effectiveness of intersection operations. It is similar to a report card rating based on average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where demand has exceeded capacity. This condition is typically evident in long queues and delays.

The volume to capacity ratio (v/c) is used as a measure of effectiveness for signalized and unsignalized intersection operation. The v/c calculated by dividing the volume entering the intersection by the total capacity (maximum volume the intersection could serve). The v/c describes the amount of intersection capacity that is utilized by the volume. A v/c of 1.0 suggests there is no available capacity at that intersection and not one more vehicle could be accommodated.

The Marion County performance standard for signalized intersections is level of service D with v/c ratio 0.85.[2] The City of Silverton has adopted this performance standard for signalized intersections as well. The City's performance standard for unsignalized intersections is level of service D with v/c ratio 0.90.[3] Table 8 shows existing level of service for select intersections.

Table 8: Existing Weekday Intersection Level of Service, PM Peak Hour

Intersection	LOS	Delay (sec)[2]	V/C	Jurisdiction	Standard Met
Silverton Road/Westfield Street (signalized)	B	21.0	0.75	Marion County	Yes
Westfield Street/Main Street (unsignalized)	A/A[1]	9.6	0.12	Marion County	Yes

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.
[1] A/A = major street LOS/minor street LOS
[2] Signalized delay = average vehicle delay in seconds for entire intersection, unsignalized delay = highest minor street approach delay

Intersections within the study area that were analyzed for the 2008 TSP are within County operating standards.

Traffic Safety

Collision data was collected for the TSP study intersections within the present study area, classified by fatal, non-fatal, and property damage only incidents. The accident rate was also calculated to standardize the existing data. The equivalent accident rates per million entering vehicles (MEV) are shown in Table 9. A collision rate greater than 1.0 generally indicates a safety-related problem that should be evaluated further.

Table 9: Intersection Collision Classification

Intersection	Fatal	Non-Fatal	PDO[1]	Total	Accident Rate[2]
Silverton Road/Westfield Street	0	3	4	7	0.38
Westfield Street/Main Street	0	0	1	1	0.19

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008, Oregon Department of Transportation collision data, 2003-2006.
[1] Property damage only
[2] Collisions per million entering vehicles (MEV)

Collision rates at the study area intersections were relatively low over the analysis period, with no fatalities.

[2] *Marion County RTSP*, 2005.
[3] *Silverton Transportation System Plan*, 2008.

Rail

The Willamette Valley Railroad provides branch line rail service for the shipment of commodities between Salem and Woodburn. This freight line operates two trains per day through the study area at speeds of 10 miles per hour or less.[4] Within the study area, rail crossing s exist in three locations:

- On Silverton Road, about 150 feet west of Fossholm Road
- On Fossholm Road, about 50 feet north of Silverton Road
- On Railway Street (western egress), about 50 feet south of Silverton Road

Gates and flashers are provided at the rail crossing on Silverton Road, while the other two crossings at Fossholm Road and Railway Street are only controlled by stop signs. General state policy is that new at-grade rail crossings are not permitted. However, ODOT Rail may permit one new crossing if two existing crossings are closed.

Transportation Policy Framework

The following section summarizes policy and planning information relevant to development of a transportation network for the West-Side planning area.

Relevant Policies

The Silverton Transportation System Plan contains a number of policies that are directly relevant to this project. These include:

- 1a: Streets and highways shall be designed to respect the characteristics of the surrounding land uses, natural features, and other community amenities.
- 2b: The City shall strive to provide or ensure connectivity to each area of Silverton for all modes of travel (pedestrian, bicycle, and vehicles) focusing on access to schools, parks, employment and recreational areas.
- 2c: The City shall promote neighborhood and local connections for all modes of travel to provide adequate circulation to, through, and between neighborhoods.
- 2h: The City shall continue to support efforts to expand transit services within the City of Silverton and to maintain and expand regional transit services to surrounding communities.
- 3e: The City shall work with area schools and the community to ensure that there are safe pedestrian, bicycle and bus routes to schools and work to communicate these routes to the community.
- 3i: The City shall meet federal and state safety standards for rail crossings.
- 4d: The City shall encourage development that effectively mixes land uses to reduce reliance on vehicles.
- 5a: The City shall require all new transportation facilities be constructed to meet the requirements of the Americans with Disabilities Act (ADA).
- 5b: Existing transportation facilities that do not meet the ADA standards shall be retrofitted when improvements are being made to that facility or through City transportation improvement projects.

[4] *Silverton Transportation System Plan*, 2008.

Planned Transportation System

The Silverton Transportation System Plan includes a list of projects for each travel mode that address identified deficiencies. Projects in the TSP were ranked high, medium, and low, with the rankings used to create an Action Plan for that mode, with Action Plan projects being reasonably likely to be funded by 2030. Table 10 summarizes the reasonably likely projects within the West-Side study area that are included in the Silverton TSP.

Table 10: Silverton TSP Action Plan Projects

Mode	Project	Location	From	To	Cost (x $1,000)
Pedestrian	Pine Street sidewalks (gap infill)	Both sides	Grant St.	City limits	$164
Pedestrian	Westfield Street sidewalks	Both sides	Main St.	Existing	$21
Bicycle	Pine Street bike lanes	Both sides	West city limits	James St.	$345
Bicycle	Silverton Road bike lanes	Both sides	West city limits	Westfield St.	$262
Transit	Park-and-Ride Lot	West Side			$350
Motor Vehicle	Construct southbound right turn lane	Silverton Rd./ Westfield St.			$420

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008

In addition, a key motor vehicle master plan project is Westside North-South Connector #1. This project's general alignment is shown in Figure 7, and includes construction of a roundabout on Silverton Road. The project's estimated cost is $7,800,000.

Transportation Related Implications of Existing Plans

Future performance of the existing transportation system in the West-Side planning area depends not only on planned projects, but also on increased vehicle volumes generated by future development. As part of evaluating future performance in the *Silverton Transportation System Plan*, growth in households and employment were estimated for transportation analysis zones (TAZs) in the Silverton travel demand model. Figure 8 shows the location of TAZs around the West-Side study area.

The study area includes all of TAZ 9, and portions of TAZs 4, 5 and 6. Table 11 shows the projected increase in the number of households and jobs within these TAZs in the planning horizon year (2030) over the TSP's base year (2006).

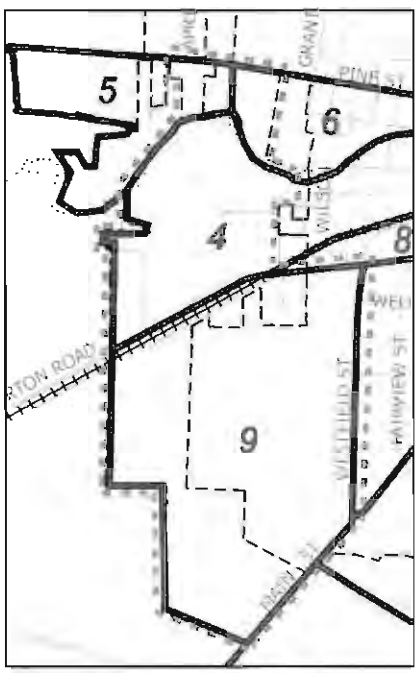


Figure 8 Study Area Transportation Analysis Zones

Table 11: Projected New Households and Jobs by TAZ, 2006-2030

TAZ	New Households	New Retail Jobs	New Non-Retail Jobs
4	127	0	196
5	0	0	0
6	41	0	0
9	156	124	250

Source: *Silverton Transportation System Plan Technical Memorandum 3: Land Use Forecasting*, prepared by Otak, Inc., 2008

TAZ 9, the only TAZ fully within the study area, is projected for the heaviest growth of the four zones. With the projected local and regional growth, traffic operations in the area were evaluated. Table 12 shows future year level of service with the TSP Action Plan projects.

Table 12: 2030 Weekday Intersection Level of Service, PM Peak Hour (Action Plan)

Intersection	LOS	V/C	Jurisdiction	Standard Met
Silverton Road/Westfield Street (signalized)	B	0.75	Marion County	Yes
Westfield Street/Main Street (unsignalized)	A/B[1]	0.30	Marion County	Yes

Source: *Silverton Transportation System Plan*, prepared by DKS Associates, 2008.

[1] A/A = major street LOS/minor street LOS

[2] Signalized delay = average vehicle delay in seconds for entire intersection, unsignalized delay = highest minor street approach delay

Under the Action Plan scenario, study intersections may be able to accommodate additional housing and/or employment growth in the study area without significant off-site improvements. However, large increases in density may have off-site impacts that could extend beyond the immediate study area.

Public Facilities and Infrastructure

The city of Silverton was established over 100 years ago, with records of public infrastructure in place to serve the population dating back to 1910. Much of the underground piping has been replaced, upgraded, and repaired over that time period. The major public infrastructure highlighted in this report consists of the sanitary sewer, stormwater treatment, and water service, each covered in a separate master plan document. These include *Wastewater System Facility Master Plan* February 2007, *Silverton Water Master Plan* February 2011, and *Silverton Comprehensive Plan*, revised August 2002; additional information of the existing infrastructure was gathered from current GIS data, available from the City. Overall, the three city services received a rating of "good" by 49% or more of the respondents in the recent Silverton Community Survey, conducted in August 2010.

Within the West Side Study Area, the central properties surrounding the railroad are well-served. Properties to the north and south, while still undeveloped, are void of public utility services. Several properties remain on private systems, utilizing domestic water wells and septic tank/drain field systems. The following analysis summarizes the existing utilities within the study area and the opportunities afforded with redevelopment of the West Side Study Area.

Sanitary Sewer

Per the *Wastewater System Facility Master Plan* prepared by HDR in 2007, the city of Silverton is divided into 31 basins for analysis. The West Side Study Area includes portions of basins 2, 3, 4, and 6. The majority of the sanitary system is gravity fed, with relief from nine pump stations, sending effluent to the Silverton Waste Water Treatment Plant (WWTP), located immediately northwest of the study area. Within basin 3, there exists a recently constructed pump station on Monson Road Immediately adjacent to basin 4 is the Oregon Gardens property which also contains a publicly operated pump station draining to basin 3.

Within the study area, the pipe sizes vary. There exists a 30" trunk line running along the north side of Silver Creek directing waste water from the central city to the WWTP. A 15" trunk line collects effluent from the southern portion of the study area and beyond and runs through the Monson Pump Station, before continuing north to the WWTP. The remaining pipes in the study area consist of 6" and 8" lines. Much of the early vitrified clay pipe has been replaced with concrete and PVC. Any upgrades to the wastewater system will largely consist of PVC pipe.

The *Wastewater System Facility Master Plan* analyzed the existing system for conveyance of both sewer flows and larger storm events. The recommended upgrades have been made within the study area in terms of pipe material replacement and upsizing. The majority of the plan recommendations included improvements to the treatment plant system and waste management; none of the priority segments for pipe rehabilitation fall within the study area. In terms of capacity upgrades, a pipeline on Westfield Street has been identified for upsizing. The pump station upgrades at the Oregon Gardens occurred with the recent development of the Oregon Garden Hotel. Additional pipe upsizing and new installations are assumed to take place with development. Planned upgrades to the WWTP will ensure that new development will be adequately served by the plant.

Storm Drainage

The 2011 *Stormwater Master Plan* is in the process of completion after several years without a formal plan in place. The existing system analysis has been completed; however, recommendations and a capital improvement plan have yet to be published. Previously established designs in the 1980's use the rational method as described in the Oregon State Highway Hydraulics Manual and note that storm

drainage projects should handle a 5-storm event. Much of the city drains to Silver Creek, the main water body flowing through Silverton. Within the study area, the topography slopes north toward Silver Creek, with a small portion of the southern boundary sloping south to W Main Street. Two identified wetlands exist within the study area within properties south of the railroad.

The boundaries of Silver Creek are of great importance when it comes to proposed development. Within the study area, it appears that no structures lie within the creek's 100-year flood plain. It is possible that a few, small, ancillary structures are located within the creek's floodway fringe. Any future development near Silver Creek must be located outside the flood plain and/or constructed safely above the flood elevation (if located within the floodway fringe).

The study area is served by a mixture of underground storm piping, open channel ditches, and one detention facility. The majority of the storm piping exists within the property immediately south and east of the railroad. A majority of the south portion of the study area, as well as land beyond W Main Street, drains to an unnamed waterway via overland flow and infiltration, likely into the two wetlands noted previously. Recent comments collected as a part of the *Stormwater Master Plan* research noted problem areas of flooding around the city, none of which were located in the study area. The Comprehensive Plan assumes the majority of storm upgrades within the study area will occur as development occurs.

Water

The *Silverton Water Master Plan* was recently updated with a new document in February 2011. Of note is the deficiency in storage capacity for the city as a whole. Within the study area, water service exists for the properties along Westfield Street and along the majority of Silverton Road and McClaine Street. These are fed via gravity from the Water Treatment Plant on the east side of Silverton. The remaining properties are served by private water wells. The deficiencies observed within the modeling effort center about inadequate fire protection due to lack of pressure and fire hydrant distribution, as well as insufficient system redundancy and pipe capacity. In the West Side study area specifically, the plan noted inadequate transmission and lack of storage. In order to serve the existing development, the plan recommended installation of an 8" water main to improve fire flow, pressure, and overall circulation near the Silverton public works property. As further development occurs within the study area, the plan assumes upsizing efforts will be completed by the city at that time.

Electrical Power

Silverton is currently served by the Unity Service Area of Portland General Electric (PGE). Services are fed from aerial infrastructure on wood poles; a portion of the system is fed through underground services. Electrical transmission lines run along OR213/Silverton Road, whereas the majority of the study area is fed through smaller, distribution lines. Cellular telephone towers are also sprinkled within the study area, but not operated by PGE.

Infrastructure Key Findings

The West Side Study Area contains services in a concentrated area near the railroad, central to the boundaries. Properties north and south of the railroad are underserved, particularly due to the lack of development proposed. However, such growth will be adequately handled upon completion of treatment plant upgrades at both the wastewater facility and water treatment facility. Moderate upgrades to pipes are noted in the Water Master Plan, while further upgrades will occur with future development.

Figure 9: Study Area Sanitary Sewer Lines

Figure 10: Study Area Storm Drainage

Figure 11: Study Area Water Lines

Silverton West-Side Land Use and Transportation Plan
Project Memorandum #2

otak
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In association with
DKS Associates
Leland Consulting Group

To:	City of Silverton Steve Kay, AICP – Community Development Director
From:	Otak Team Jennifer Mannhard, AICP, LEED AP – Project Manager
Date:	July 24, 2011
Deliverable:	2F. Revised Project Memorandum #2
Subject:	Market Analysis

Introduction

The attached memorandum prepared by Leland Consulting Group addresses market conditions of the Study Area. The Market Analysis report summarizes important demographic, economic, and real estate market conditions citywide, assesses the comparative advantages of the project study area, and addresses the amount, mix, and type of development the market is likely to support. The memorandum has been revised to incorporate input received from the City and the Project Advisory Committee.

LELAND CONSULTING GROUP

Project Memorandum

Date	18 July 2011
To	Jennifer Mannhard, Otak, Inc.
From	Fatima Al-Dahwi, Leland Consulting Group Chris Zahas, Leland Consulting Group
Subject	2.F Revised Market Analysis
Project No.	5139

Introduction

This Market Analysis report summarizes important demographic, economic, and real estate market conditions citywide, assesses the comparative advantages of the project study area, and addresses the amount, mix, and type of development the market is likely to support. The information described here will reconcile the amount of planned growth in Project Memorandum #1 with market conditions and will help identify planned growth elements, policies, and incentives that may be needed.

KEY TAKEAWAYS

A snapshot of the study's key findings is as follows:

- Silverton's population is growing. Between 2000 and 2010, the city's population increased at an average annual rate of 2.7 percent. During the next 20 years, this trend of steady population growth is projected to continue.
- Silverton is known to be a small, comfortable bedroom community in which people live, then commute to work in Salem, Woodburn, or the Portland metropolitan area. The city has a very close-knit, small-town feel, with a variety of newer and older housing options.
- The city also has many attractive amenities including a new high school, a well-attended senior center, and a recently expanded hospital.
- Silverton is close to many tourist attractions including the Oregon Garden, Silver Falls State Park, and Mt. Angel's Oktoberfest.
- Silverton's downtown offers an attractive mix of local retail and an active downtown organization. Additionally, the city's retail offerings are primarily local with few regional or national food, service, and apparel options. The city's largest retailers are its grocery anchors and pharmacies including Safeway, Roth's, and Hi School Pharmacy.

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- Silverton's proximity to Salem and distance from large, high-traffic freeways make it unlikely that Silverton will attract national or regional apparel retailers or shopping centers, so in the long-term, the city is likely to experience retail growth in the food and convenience retail to serve the local market and visitors.
- Silverton has seen significant housing development in the east and south sections of the city. The supply of housing throughout the city has included primarily single family detached homes. There is only a very small supply of land zoned for multifamily development to accommodate young families, aging baby boomers looking to downsize, and affordable housing.
- There is demand in the market for more workforce/ affordable housing and multifamily housing, which could be appropriate in the study area.
- Silverton's highest concentration of vacant or partially vacant lots range between half an acre to five acres rendering it challenging to attract large industrial users and employment.
- The existing cluster of industrial land, existing food-related manufacturing, and proximity to agriculture help favor food and beverage processing industrial uses in the future.
- The highest amount of job growth in the market is expected to be in health services, professional and business services, leisure and hospitality, as well as retail within the next 20 years, according to the EOA. The low existing surplus of commercial lands coupled with anticipated employment demand in commercial services suggests an opportunity for commercial development in the study area.
- Silverton's new hospital has been a source of substantial employment in the city as well as a valuable resource for its aging seniors. As is reflected nationally, health-related services and employment are expected to grow markedly in the coming years.
- The study area can accommodate expansion of community uses like the Senior Center and Hospital.

Demographics

The type of development that will be in demand over the next 20 years will in part be dependent on the characteristics of Silverton's population and the changes that are expected over this time period. As discussed in this section, there are several trends at the local and national levels that will affect the type of development that is viable in the future. These include:

NATIONAL TRENDS

- The oldest of the baby boomer generation turns 65 this year (2011). Over the next 20 years, America's over-65 population will more than double. As more Americans enter retirement, their needs and preferences for housing will shift as they seek more affordable and easy to maintain lifestyles.

- Generation Y (also known as the echo boomers), which encompasses youth born approximately between 1982 and 2000, is the largest generational group in the United States with approximately 80 million people.
- Both the baby boomers and Generation Y have similar consumer preferences. Generally, they both share a desire for quality over quantity, a sense of community and place, and a desire to live in more urban environments. Combined, these two generations will greatly impact how cities evolve over the next 20 years, driving more demand for infill in urbanized areas and significantly increasing the demand for multifamily housing.
- Livability is an economic development draw where the quality of life of the community is an important factor in business location decisions. Whereas in previous decades employees tended to move to be close to their jobs, a new paradigm is emerging where it is the employers who move in order to be close to the talented workers they need to be successful. More and more, those workers are mobile and choose to live in communities with quality physical environments, outdoor recreation opportunities, cultural amenities, accessible transportation options, good schools, mixed-use urban centers, and other factors.
- Across the country, growing numbers of people—particularly young professionals, baby boomers and young families—are moving to walkable, mixed-use communities and places that offer an "urban" lifestyle. Convenient access to shopping, amenities, entertainment, services, dining and recreational options within a short walk, bike ride, or drive, reduced commute times to work, and the convenience of living in a smaller home that requires less maintenance are just some of the reasons why such living is appealing to people of varied ages and demographics.
- The growth of the health care industry is rapidly on the rise largely due to a mix of overall population growth and aging baby boomers. Healthcare industry experts estimate that as much as 60 percent of all physician demand is driven by recipients over the age of 65. Senior citizens require approximately three times more physicians compared with younger age groups, in all categories of medicine. This demand is only expected to grow as baby boomers age.

LOCAL TRENDS

In order to evaluate the study area's development potential, the types of uses that will thrive there, and its role within the broader context of the community, it is important to understand local demographic trends. An overview of key population and household characteristics for the study area, the City of Silverton, and Marion County is provided below.

- In 2010, as shown in Table 1, Silverton's population was estimated at 9,222. With an estimated 90 residents, the study area accounts for less than one percent of the city's population. By 2030, the City's population is projected to rise to 14,418 indicating a 56 percent population increase in the coming 20 years.

Table 1. Population and Household Characteristics[1]

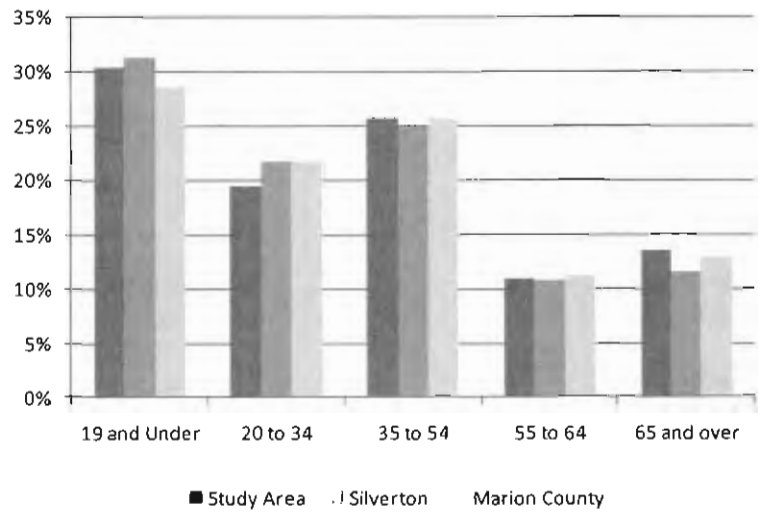
Population/Household Characteristic	Silverton	Marion County
Population, 2000	7,414	284,834
Population, 2010 (est.) 1/	9,222	315,355
Average Annual Population Growth, 2000 to 2010	2.2%	1.0%
Population projection 2030	14,418	410,431
Average Annual Population Growth, 2010 to 2030	2.3%	1.3%
Hispanic Origin 2000	11.6%	17.1%
Hispanic Origin 2010	12.3%	24.3%
Households, 2000	2,707	101,641
Households, 2010 (est.)	3,403	116,367
Average Household Size, 2010 (est.)	2.7	2.7
Percent 1 and 2 Person Households, 2000	56%	58%
Percent Family Households, 2000	70%	69%
Median Age, 2010 (est.)	32.8	34.8

Source: ESRI, Portland State University Population Research Center and Leland Consulting Group
1/ 2010 Silverton and Marion County population estimates from Portland State University Population Research Center.

- During the past decade, with an estimated average annual growth rate of 2.2 percent, the city's population growth outpaced the county's (1.0 percent).
- With a median age of 32.8 and consisting largely of family households (70 percent) in 2010, Silverton is a family town with a relatively young population (see Figure 1). Factors that may attract families are the city's relatively affordable and diverse housing options and good schools.

[1] *Family households can include married couples with children, without children, or single parent families.*

Figure 1. Population by Age (2010 estimate)



Source: ESRI and Leland Consulting Group

- On the whole, as shown in Table 2, households throughout Silverton had a lower median household income than Marion County in 2000, but today the opposite is true. In 2010, Silverton's median household income was estimated at $53,547, just over $2,000 higher than the county's median household income ($51,663). The difference between city and county per capita incomes were negligible at just under $350.
- The city's median household income grew at a fast annual growth rate of 3.3 percent between 2000 and 2010 while incomes in the study area grew at 2.6 percent annually. Both the study area and the city experienced faster annual growth in both median household and per capita incomes than the county (at 2.5 percent and 2.0 percent respectively).

Table 2. Income

	Silverton	Marion County
Median Household Income, 2000	$38,564	$40,294
Median Household Income, 2010 (est.)	$53,547	$51,663
Average Annual Growth, 2000-2010 (est.)	3.3%	2.5%
Per Capita Income, 2000	$18,062	$18,408
Per Capita Income, 2010 (est.)	$22,552	$22,377
Average Annual Growth, 2000-2010 (est.)	2.2%	2.0%

Source: ESRI and Leland Consulting Group

Employment Trends

As described in the discussion of local demographic trends, the study area's residential population is small. However, with a diverse mix of industrial and commercial businesses, the study area is a source of local jobs. This section of the report

summarizes key findings about the types of jobs that are present in the study area and the employment profiles of local residents.

Table 3 summarizes employment trends in the city. Key findings include:

- In 2009, Silverton employed approximately 17 percent of its residents, while Salem and Portland employed 20 percent and eight percent of Silverton's residents, respectively.
- In 2010, approximately 3,155 people2 worked in the within the Silverton Urban Growth Boundary (UGB). This is a small reduction from the city's employment of 3,277 in 2008. The largest job reductions were in manufacturing (primarily in durable goods) between 2003 and 2010.
- The city's largest industries include health services, manufacturing, education, leisure and hospitality. This reflects a diversified employment base, with a broad range of commercial and industrial businesses in the area.
- In 2003, jobs in manufacturing comprised 18.9 percent of employment in the city and has declined markedly to just over 11 percent in 2010.
- By contrast, jobs in construction have grown from as little as 2.6 percent in 2003 to 5.6 percent in 2008. Today, reflecting similar national trends, construction jobs are down to only 4.5 percent of employment in Silverton.
- Other industries with significant employment in the city include retail and other services.
- According to the EOA, much of the new job growth within Silverton has been largely due to start up businesses and self-employed individuals. The number of self employed individuals and startup businesses employing under 10 people has nearly doubled between 2003 and 2008.

[2] *Covered employment only, which typically excludes self-employed and some part-time workers.*

Table 3. Citywide Jobs by Industry, 2003 to 2010

Sector	2003		2008		2010 Est.		2003 to 2010
	Number	Share	Number	Share	Number	Share	Net Change
Natural Resources and Mining	28	0.97%	27	0.82%	20	0.63%	(8)
Construction	75	2.60%	182	5.55%	142	4.50%	67
Manufacturing	545	18.86%	387	11.81%	367	11.63%	(178)
Durable Goods	198	6.85%	99	3.02%	76	2.41%	(122)
Non Durable Goods	347	12.01%	288	8.79%	292	9.26%	(55)
Wholesale	54	1.87%	68	2.08%	58	1.84%	4
Retail	343	11.87%	373	11.38%	325	10.30%	(18)
Transportation, Warehousing & Utilit	46	1.59%	73	2.23%	69	2.19%	23
Information	47	1.63%	34	1.04%	29	0.92%	(18)
Financial Services	94	3.25%	147	4.49%	137	4.34%	43
Professional & Business Services	69	2.39%	110	3.36%	107	3.39%	38
Education	332	11.49%	341	10.41%	352	11.16%	20
Health Services	668	23.12%	852	26.00%	906	28.72%	238
Leisure & Hospitality*	346	11.96%	369	11.87%	352	11.16%	6
Other Services	181	6.27%	212	6.47%	208	6.59%	27
Government	61	2.11%	82	2.50%	81	2.57%	20
Total	2,889	100%	3,277	100%	3,155	100%	266

Source: City of Silverton Economic Opportunities Analysis Draft February25, 2011.
Note: Due to stetistical modeling methods used to protect confidential business information, the job numbers may be approximations for categories with relatively few workers.

Comparative Advantages of the Study Area: Employment

- The study area has good access from Silverton Road, providing future employers quicker access to I-5 without the need for trucks to navigate through the city center.
- Several parcels in the study area could potentially be served by rail, provided that spurs are constructed to provide site access.
- Much of the study area is undeveloped and has large lot sizes, providing flexibility for future users.

Comparative Disadvantages of the Study Area: Employment

- Significant amounts of industrial land already served by infrastructure exists elsewhere in Silverton.
- Slow demand for industrial land is projected over the next 20 years according to the EOA.

Housing

Much of the study area is not currently within city limits and therefore has not been zoned for urban development. Parts of the study area that are within city limits are

zoned for a mix of land uses including commercial development, light industrial, single family housing, and public use.

In order to evaluate the area's potential to accommodate new housing development and to determine if housing is a suitable use for the area, it is important to understand local housing trends. An overview of local housing market characteristics and trends is provided below.

- In 2010, as shown in Table 4, the average annual growth rate for housing units between 2000 and 2010 was approximately 1.7 percent, higher than that of the larger county. Since 2002, the city has added 636 single family housing units, 64 multifamily units and 126 manufactured homes.
- The city's residential neighborhoods include a mix of older, established neighborhoods and newer neighborhoods built recently and under construction on the south and east sides of the city. The median year in which structures were built was 1968.
- Although a portion of the study area is designated for single family detached homes, much of the property has yet to be developed.
- As mentioned above, adjacent to the study area north of Silverton Road and east of Fosholm Rd., a multifamily housing project known as Silverton Station was slated to be built. It is understood that the project is no longer moving forward, but the site remains zoned for multifamily development and some site work has been completed. It would be advisable to incorporate this parcel into the study area for further examination of the development potential for multifamily housing.
- Pioneer Village and Premiere Vista Ridge are two residential subdivisions under construction southeast of the city. Pioneer Village includes approximately 160 residential lots developed in three phases. Premiere Vista Ridge includes 34 lots for single family detached housing.
- As currently defined, the study area does not include any planned residential developments. However, as mentioned previously, the study area may be expanded to include the planned Silverton Station housing project area.
- The median home sales price in Silverton as of April 2011 was $184,900. Property values had been on the rise between 2001 and 2008, peaking at a median sales price of $254,000 in early 2008, reflecting similar trends in the region. Throughout the last 10 years, median sales prices in Silverton trended comparably to those in Salem, though slightly higher. Greater disparities between median sales price in Salem and Silverton began in 2005 and today, Silverton's median sales price is $23,300 higher than in Salem ($161,600).[3]

[3] *Source: Zillow and Leland Consulting Group*

Table 4. Housing Characteristics

Housing Characteristic	Silverton	Marion County
Housing Units, 2000	2,865	108,174
Housing Units, 2010 (est.)	3,677	120,948
Owner Occupied Housing Units (est.)	56%	58%
Renter Occupied Housing Units (est.)	37%	34%
Vacant Housing Units (est.)	7%	7%
Average Annual Growth in Housing Units, 2000 to 2010	2.5%	1.1%
Median Year Structure Built, 2000	1968	1974

Source: ESRI and Leland Consulting Group

Comparative Advantages of the Study Area: Housing

- The study area includes and is close to a mix of amenities that would complement residential development including a school, Silverton Plaza, and Silverton Hospital.
- The study area's location on the west side of the city along Silverton Road offers a convenient commute to employment in Salem without requiring residents to drive through town.
- The market analysis indicates a demand for multifamily housing, a use for which there is a very limited supply of vacant land in Silverton.

Comparative Disadvantages of the Study Area: Housing

- Given that the study area is largely undeveloped and at the very edge of town, it may not yet have an established sense of place that helps attract residents and creates a comfortable neighborhood.
- While relatively close to downtown Silverton, the study area is not necessarily within walking distance to the shopping and dining amenities that downtown provides.
- Significant buildable housing inventory already exists elsewhere in Silverton.
- A possible challenge for residential development includes railroad access. Today, the railroad operates relatively infrequently, reportedly only twice per week. However, if additional rail activity were to increase operating frequency, residential development adjacent to rail access might experience challenges with noise.

Retail

In recent years, retail has evolved such that, today, retail is about more than shopping—it's an experience. With many big box retailers having gone out of business in 2009 and 2010, "power center" development saw a sharp decline, while walkable outdoor lifestyle centers and freestanding retail development grew. Retail has evolved beyond the mere purchasing of goods and services to a business where success is

centered on experiences and lifestyle choices. Small format grocery stores and neighborhood markets that provide a more intimate and sensory-oriented experience are examples of the type of smaller retail formats that are on the rise. An overview of key local retail trends is provided below.

- Since Silverton is a relatively small market outside of a major metro area, data on local retail trends and listings is limited.
- There are three primary grocery or pharmacy anchored shopping centers in the city depicted in Figure 2 below. Their characteristics are defined below:
    - The Safeway shopping center (Silverton Plaza) is a 20-year old development with a recent addition of nearly 20,000 square feet. It is the only retail center within the study area. The center's management has been actively leasing both the lower and upper centers for five years and still sustains 30 percent vacancy (approximately). Other uses within the center include local restaurants, athletic facilities, and banks. There are two additional pad sites at 4,000 square feet and 10,000 square feet that are available for future development. The project has ample parking.
    - Roth's is Silverton's other primary grocery store, managed by an owner-operator.
    - Finally, between both shopping centers is the HiSchool Pharmacy shopping center, an older, deteriorating shopping center between McClaine Street and West "C" Street. This center offers a mix of food and services, though the facilities are aged.
- Historic downtown Silverton is also a prominent retail destination with an eclectic mix of restaurants, boutique retail and antiques shops as well as city and commercial services. As with most downtown retail markets, the majority of retailers in downtown Silverton are small independently owned and operated local businesses.
- The average lease rate for retail space in the Silverton market is challenging to assess given the size of the market and relatively small amount of available commercial space. Retail lease rates are listed for between $16 and $22/SF/year triple net[4]. Comparable rents in Salem, for example, range between $8.50 and $20/SF depending on location, access, visibility, and age of the center. Given its distance from I-5 and a comparably smaller population than the Salem metro area, Silverton is more likely to see smaller local or regional tenants at lease rates between $9 and $16/SF/ year.

Comparative Advantages of the Study Area: Retail

- The study area is located along Silverton Road, which serves as the western gateway to the city. This ensures convenience, visibility, and easy access—important elements to retail success for visitors entering Silverton from Salem or I-5.

[4] *A triple-net lease (NNN) passes through all taxes, insurance, and maintenance costs to the tenant, and is the dominant structure for retail leases.*

- The study area's proximity to the Oregon Garden is a strong advantage for retail tenants, as it offers visitors to the garden and its hotel nearby access to convenience shopping, restaurants, and cafes.

Comparative Disadvantages of the Study Area: Retail

- The study area's topography, though not an explicit disadvantage, may challenge access and visibility to new retail development.
- Existing vacancies and developable retail space elsewhere in Silverton means that short-term demand for retail space is limited.

Figure 2: Retail Centers in Silverton Oregon Relative to the Study Area

Source: Google Earth and Leland Consulting Group

Industrial and Commercial Land Needs

The most recent analysis of the city's land needs is provided in the City's Economic Opportunities Analysis (EOA) last updated on February 25, 2011. The EOA identifies the existing supply of buildable land in the Silverton urban growth boundary (UGB) as of 2010 and provides a baseline comparison of land supply and demand (by commercial, industrial park, and light industrial/industrial land use classes) in the Silverton UGB for the time period 2010 to 2031.

A summary of key findings pertaining to Silverton's supply and demand of commercial and industrial land is provided below.

INDUSTRIAL

- According to the EOA, the Silverton UGB currently has a very limited supply of vacant commercial/retail land. By contrast, the city currently has 84.7 acres of vacant industrial land, which is largely distributed over smaller lots of five acres or less.

- The EOA identifies three growth scenarios in industrial development, all of which show low industrial growth relative to the availability of buildable land. Under low, medium, and high growth scenarios, the city will still have a surplus of industrial land over the planning time frame of between 83 acres under a low growth scenario and 73 acres under a high growth scenario.
- This matter is complicated further by the abundant availability of small sized tax lots, the majority of which are five acres in size or smaller. Under an ambitious high growth scenario, the EOA anticipates demand for only one parcel between two to five acres, leaving a surplus of 21 tax lots less than five acres in size.

Comparative Advantages of the Study Area: Industrial

- Rail traffic currently passes through the study area on the way to and from Stayton. Although trains do not currently stop in Silverton, a rail spur could be added within the site area to enable rail access for customers in Silverton.
- The study area is located along the western boundary of the city, which makes truck access to and from I-5 along Silverton Road convenient and accessible and helps prevent challenges brought on by frequent truck access through the city center.

Comparative Disadvantages of the Study Area: Industrial

- The study area's hilly topography may present challenges for industrial users.
- There is an ample supply of existing industrial space in the market.
- Currently, traffic access along Silverton Road can be challenging near the railroad crossings.

COMMERCIAL

- Commercial and retail supply and demand prove more promising. There is an existing supply of 7.6 acres of developable commercial office and retail land. Under a low growth scenario, the EOA anticipates a surplus of merely one acre of commercial land whereas under both medium and high growth scenarios, there is an anticipated deficit of just under three acres. The highest demand for commercial land under a high growth scenario will be in lots ranging from one to five acres.
- Furthermore, the EOA showed that vacancy rates for commercial retail and office buildings outside of downtown are currently below 10 percent.
- Population growth is one of the factors used to forecast employment growth. Thus, if population growth projections for the Silverton UGB are understated,

actual employment may exceed forecasted employment growth between 2010 and 2031.

Comparative Advantages of the Study Area: Commercial

- Office development is most likely to comprise local service businesses that support neighboring industrial and agricultural businesses or the larger community. The site's proximity to downtown allows easy access to civic services while allowing offering sufficient land for parking that is typically scarce in a downtown setting.
- The study area is in close proximity to Silverton Hospital, which, in its current location physically constrains additional growth. The study area could offer an opportunity for nearby expansion.
- The Senior Center located within the study area has already exceeded its capacity and is exploring additional growth opportunities. The study area offers ample vacant land for growth of an existing user.

Mixed-Use Development

Vertical mixed-use developments often couple residential and commercial uses that simultaneously build a critical mass of people within an urban neighborhood and create vibrant ambiance. Although mixed-use developments have unique and intricate challenges to be successful, each element, whether retail, office, or residential must still respond to the market forces and needs of its unique land use. Mixed-use developments are most often successful in a downtown setting, which typically capitalizes on an existing mix of civic, commercial, and public activity.

The study area's location at the western boundary of the city—rather than at the center of activity— as well as its abundance of vacant land will make vertically mixed-use development (multiple uses in a single building) very difficult to achieve. This type of development is better suited for Silverton's downtown. Horizontally mixed-use development, on the other hand, where multiple uses are placed adjacent to and in proximity to each other, but in single-use buildings, is much more likely and appropriate in the study area. Horizontally mixed uses allow for each building to be built on its own schedule and according to its own market demand, while still creating an environment where uses can benefit from the activity generated by adjacent uses.

Tourism

In addition to providing housing and employment opportunities for local residents, the study area can serve as a destination unto itself for tourists and other types of visitors. Serving the tourist and business visitor markets can provide an important additional market base to support retail, restaurants, and other commercial services and amenities in the study area and the nearby historic downtown. Further, increased tourism activity in the study area will have a positive economic impact on the city, county and the region.

LOCAL AND REGIONAL TOURIST ATTRACTIONS

Marion County and the Willamette Valley region are home to a variety of tourist and visitor attractions. A summary of the most popular local and regional tourist attractions and activities is provided below.

- **The Oregon Garden.** The Oregon Garden, the state's largest botanical garden, enjoys approximately 40,000 visitors per year. The 80-acre garden is located adjacent to the study area and features one of the largest collections of dwarf and miniature confiers, various rose and water gardens, and the only Frank Lloyd Wright house in Oregon. The property also features a 103-room villa-style hotel on approximately 11-acres of land. This hotel enjoys little competition in the market, as there are no other hotels within close proximity to the garden.
- **Silver Falls State Park.** Located approximately thirty minutes southeast of Silverton, the Silverton Falls State Park is a very popular tourist attraction to the region. One key route of access to the state park is via highway 214 which passes through Silverton. Home to picturesque hiking trails and ten waterfalls, the park enjoys nearly one million visitors annually.5

VISITOR SPENDING

Visitor spending in Marion County accounted for just over $209 million in 2010. Of this spending, nearly $95 million was spent on hotel or motel lodging, while just over $85 million was spent on food and beverage service. Silverton currently has very few visitor accommodations, the primary being the hotel at the Oregon Garden, and the Silverton Inn, which has been known to accommodate longer term residents. There is an opportunity between visitors at the Gardens and the Silver Falls State Park to capitalize on visitor spending within the county through accommodations, convenience retail, and restaurants to appeal to visitors.

Conclusions

In conclusion, the market strategy and development program for the study area will be shaped by the following conditions and trends:

- The aging of America and, more specifically, the retirement of the baby boom generation will greatly affect housing demand and housing preferences.
- The consumer and lifestyle preferences of the two largest demographic groups in the United States, Generation Y and baby boomers, will continue to increase demand for walkable, urban centers.
- Steady population growth. Over the past decade, the city has experienced steady population growth, a trend that is projected to continue during the next 20 years.

[5] *Source: http://www.friendsofsilverfalls.net/*

- Along with population, employment in Silverton, particularly in health services, retail services, education, leisure and hospitality are expected to continue to grow.
- Silverton's location at the center of tourist activity is an asset upon which additional leisure, hospitality, and restaurant services can continue to grow.
- Long-term forecasts indicate a likely shortage commercial land while forecasts also indicate a large surplus in industrial land.
- The size of industrial lots and distance from I-5 will likely preclude attracting large industrial employers. Therefore the bulk of industrial growth will occur primarily in smaller, light industrial use. The existence of food related manufacturing and agriculture in the market will support addition growth in food and beverage processing.

STUDY AREA

Based on the trends indicated above, several development types are likely to be viable in the study area:

- **Multifamily housing.** Apartments of all types will be viable, even during the short term when the larger housing market is still in recovery mode. Multifamily housing types may include market-rate apartments, workforce apartments (affordable market-rate or subsidized), senior housing, and townhomes. Condominiums and other vertically attached ownership housing types are not likely to be viable in the short term, but may return to favor in five to seven years after the economy has fully recovered.
- **Restaurants and food-related employment.** The study area is conveniently located for restaurants and cafes that could accommodate visitors to the Oregon Garden, although existing vacancy in Silverton Plaza suggests growth over the long term rather than in the short term.
- **Lodging.** Silverton has relatively few lodging facilities. The study area's proximity to the historic downtown and the Oregon Garden make it a convenient location for visitors to stay. Furthermore, given that the study area serves as a western gateway to the city, a hotel would conveniently attract customers entering along Silverton Road.
- **Services Employment.** Several non-industrial employment types could be supported based on the EOA and nearby uses. Health care uses, financial services, and miscellaneous other services are all forecast to grow significantly in Silverton.

Silverton West-Side Land Use and Transportation Plan
Project Memorandum #3

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In association with
DKS Associates
Leland Consulting Group

To:	City of Silverton Steve Kay, AICP – Community Development Director
From:	Otak Team Jennifer Mannhard, AICP, LEED AP – Project Manager
Date:	September 22, 2011
Deliverable:	3C. Community Meeting Summary
Subject:	Summary of Community Meeting #1 and recommended next steps for public involvement

General Information

Community Meeting #1 was held on August 25, 2011 from 7:00-9:00 p.m. at the Silverton Community Center (421 S. Water Street). The purpose of the meeting was to seek public input on existing conditions, planned growth, and market conditions in the Project Study Area.

The agenda was as follows:

7:00 – 7:10 p.m.	Welcome and brief introductions
7:10 – 7:40 p.m.	Presentation of existing land use, transportation, and market conditions
7:45 – 8:30 p.m.	Small group exercises
8:30 – 8:50 p.m.	Report back
8:50 – 9:00 p.m.	Thank you and next steps

Summary of Presentation

Community Development Director Steve Kay welcomed everyone to the meeting and provided an overview of the project. He described the project's purpose and objectives and the planning process and schedule. Director Kay explained the purpose of the meeting and answered a series of "frequently asked questions" about the project, which included a review of the project area's location, boundary, size, the project's purpose, schedule, and funding, and how public input is being sought for the project.

The consultant team then presented the highlights of their existing conditions analysis. Jennifer Mannhard again reviewed the project purpose, process and schedule as well as the overall agenda for the evening. Martin Glastra van Loon described the landscape and urban form of the city and how the project area could evolve in the future. He reviewed current land uses, buildings, infrastructure, and topography. Chris Maciejewski then reviewed the existing conditions related to transportation, including policies that are currently in place through the City's adopted Transportation System Plan. The relationship of the existing transportation conditions that Chris was presenting to our currently planning process was not clear to the participants. Many questions were raised, and are summarized below. Following the transportation discussion, Chris Zahas presented the findings of the existing market conditions report, which included a

summary of broader economic trends as well as housing, job, retail, and tourism data for the city of Silverton. To wrap up the presentation, Joe Dills provided an overview of smart growth/quality growth principles for the West-Side planning area. The principles provided a foundation on which to begin a visioning discussion about the project area with the participants.

Participants' Questions and Concerns

For many participants, the meeting was their first exposure to the West-Side project. There was a perception that the project was about building a bridge and road, not a long range vision for the area and how it fits into Silverton's comprehensive plan. Concerns included: the north-south collector route shown on the City's TSP (Why there? Why is it needed? What are other options? Is it a done deal?); general distrust of city government; could the City not do planning and just let property owners do what is zoned now? The presentation of the Transportation System Plan confused many into mistakenly thinking specific decisions had already been made for the West-Side planning project.

Citizens also expressed their sincere concern about the lack of advertisement and attendance for the meeting. They felt the city did not do enough to get the word out about the public meeting. The dozen people in attendance were mostly residents of Pine Street and they felt their opinions were not representative of the entire study area.

The role and purpose of the Project Advisory Committee was not clear. PAC members were not in attendance. Questions were raised about a potential citizens' panel, which should be covered by the PAC.

The agenda had called for small group discussions about the vision for the West Side. Instead, the group agreed to focus on a process discussion and how the next steps could be crafted to address concerns and involve the community. There was a productive discussion and agreement to:

- Forego specific adoption dates for the West Side Plan. The intent is to let the process continue and not be pressure by scheduled hearings.
- Craft a public involvement plan to broaden participation.
- Report to the City Council in September.

Meeting Conclusion

The city's grant manager (ODOT's Transportation & Growth Management Program) agreed we could revise our schedule and contract to redo the community meeting at a later date. It was decided that we would continue with the previously scheduled date of October 20, 2011, which was originally intended to be the second community meeting. Director Kay agreed to brief City Council at their October 3rd, 2011 meeting and return a subsequent meeting with further information on a public involvement plan for the project.

Recommendations to Move Forward

We propose the city should make a sincere effort to make personal connections as well as broader connections regarding the project. Prior to the community meeting on October 20, 2011, we recommend the city should take the following actions that are directed at getting a good diversity of community members at the next meeting:

- Send a flyer describing the project and upcoming meeting to all residents and businesses within and adjacent to the project area.

- Reach out directly to large property owners in the project area to discuss the project, get a better understanding of their intentions for their property, and invite them to the community meeting.
- Outreach to specific groups such as users of the Senior Center and local churches and youth.
- Place flyers in public places and place newspaper advertisements as early as possible.

We propose the October 20, 2011 meeting should have the same purpose as was intended previously: to engage the community in a discussion about their vision for the West Side. The discussion questions would be same, but the format would be different. Presentations would be minimized (perhaps done mostly through advanced notice and the web site). We would present some information on "planning 101" to set the stage and help people understand the context in which we are working. We will not go into the details of our existing conditions analysis. We will just provide enough information to help participants understand why we are doing the project and focus most of the meeting on the small group exercises. Those exercises will be geared to getting everyone's opinion and vision for the future of the area. It is imperative that enough time remains at the end of the visioning exercise to have each small group report back to the entire meeting, so that everyone hears each other's ideas.

The agenda would be as follows:

7:00 – 7:05 p.m.	Welcome and brief introductions
7:05 – 7:30 p.m.	Presentation or open house of planning and project context
7:30 – 8:15 p.m.	Small group visioning exercises
8:15 – 8:50 p.m.	Report back and discussion
8:50 – 9:00 p.m.	Thank you and next steps

West-Side Land Use and Transportation Plan



Community Meeting
January 12, 2012
Summary

Otak, Inc.
DKS Associates
Leland Consulting Group
January 21, 2012
Deliverable: C1

The City of Silverton is conducting a community visioning process to help establish a strategic plan to shape how the west side of Silverton could develop in the future. The identified project area contains large undeveloped properties that have the potential to be developed in the future. This is an opportunity to guide the future development in the area in a more focused manner, influenced by citizen desires, rather than relying on broad zoning categories such as "Residential" and "Industrial".

Development in this area is going to follow its own timeline. This project is not intended to spur development or use public money to finance it. The purpose of this project is to gather citizen input and create a vision for development that is reflective of the community's values.

As one of the first steps in the West-Side Land Use and Transportation Plan, the first of two scheduled community meetings for the project was held on January 12, 2012 at 7:00 p.m. in the gym at the Community Center in Silverton located at 421 South Water Street. The community meeting was open to all members of the public. The City of Silverton widely advertised the meeting by sending notices directly to property owners, posting flyers in store windows, and placing a notice in the newspaper.

The community meeting was a visioning workshop to help develop several alternative land use and transportation plans for the west side of Silverton. The consultant team gave a brief presentation covering the background for this project, describing the project area and the planning context for the plan, including the City's Comprehensive Plan, Transportation System Plan, and zoning. The presentation also provided planning principles for participants to consider during the visioning exercise.

The attendees then broke up into small groups for a facilitated discussion to get citizens' ideas on paper. Community members were asked to imagine that they had returned to Silverton twenty years in the future, the West-Side Plan had been fully implemented, and that they really liked what they saw. The discussion focused on what is was they envisioned for the successful future of the west side.

The meeting wrapped up with each group reporting the highlights of their visioning discussion back to rhe larger audience. Following is a summary from each group.

Group 1: Chris and Brian, facilitators

- Creek is important – protect and enhance it. Create a trail and/or enhance public access.
- Protect downtown – don't let commercial uses take away from downtown. Facilitate access to downtown so people will patronize businesses.
- Move industrial away from the creek – move to south of Silverton Road
- Use cottage housing – good design with density. Multifamily designation on north side of the creek is OK. Won't be developed for a while, but eventually.
- Gateway on Silverton Road – monument, trees
- Housing would look better as an entry than industrial. Senior housing, too.
- Trails below the school would be good.
- Maybe a ped bridge across the creek, but a road is not necessary. If one had to go in, move it down by the sewage treatment plant.

Group 2: Gerald and Martin, facilitators

- The Garden City sign is a good gateway
- Side road access is an issue
- South of Silverton Road: commercial and residential with pathways
  - Residential and commercial with a landscape buffer between Silverton Road and commercial uses
  - Variety of housing and building types
  - Potential for trails throughout the development
  - More ball fields at the school
  - Small scale infill – fill in the current shopping center
  - Include bike and pedestrian infrastructure at the beginning
  - To connect to other parts of town – a collector road from Silverton Road to Cascades Highway
- North of Silverton Road: residential and industrial with a greenway
  - Industrial and residential - more residential as you approach the creek
  - Greenway along the creek for walking, biking
  - Mixed multi-family housing north of the creek
  - Keep industrial uses
  - No shopping on the north side
- Access to all properties is key

Group 3: Naomi, facilitator

- Infill existing sites within the city prior to expanding into the West Side
- Like to see more jobs
- Like the natural farming component of the area
- Senior housing and cottages
- Maintain the small town, rural, historic feel of the area
- Build on the natural amenities of the area, including the Oregon Garden and the large oak trees.
- A landscape feature on Silverton Road would work well to let people know they have entered Silverton.
- South of Silverton Road:
  - Industrial uses as shown on the City's comprehensive plan map.
  - The current comprehensive plan map designations are fine but want existing vacant or underutilized land in other parts of the City to be utilized first.
  - Commercial uses such as a veterinary clinic, grocery store or hardware store to buy small

items. A big box store would work.
    - Senior housing – cottages and assisted living – would be a great type of housing in the south side of the project area as it would fit well with the existing senior center.
    - Concerned about the subdivision of the land in the area because there are existing single family lots and new residential developments in other parts of the City that still need to be filled, such as a large residential subdivision located on Hobart Road on the north end of the City near Highway 214.
    - More walkable natural areas
- North Silverton Road:
    - City shop uses, industrial uses, and a veterinary clinic. No residential subdivisions should be in the north side of the project area until existing residential subdivisions are filled in other parts of the City.
    - People would walk to the high school and other natural areas to enjoy the beauty of the area.
    - Maintain Oak ttees, waterway and parks.
    - No new commercial in this area

Group 4: Steve, facilitator

- Keep the character of Silverton
- Enhance the gateway through landscaping – make it more attractive and natural – buffer new development that may occur
- South of Silverton Road:
    - current designations are ok
    - single family housing around the school
    - recreational uses for Westfield properties – build on current uses
    - like the industrial designation
    - do not add any more commercial
- North of Silverton Road:
    - Existing plans ok, but clean up the area
    - Keep designations for job creation
    - Creek – keep it natural and open space
    - Roisen property: the area in the flood plain should be open space, but could have multi-family on the rest of the property in the very long term
- Multi-family housing style should be cottages with common open areas
- No bridge across the creek in this location
- Allow for slow development

Group 5: Joe, facilitator

- Silverton Road – sense of agricultural history
- Encourage light green industrial or business park uses in the area designated for industrial
- South of Silverton Road:
    - On the extreme southern end, create a neighborhood
    - Include multi-family and senior housing because it is close to amenities
    - Network of trails (maybe roads) throughout
- North of Silverton Road:
    - Green along the creek – a greenway trail
    - Connect school and Pine street to Silverton Road via Monson Road

Group 6: Jason and Jennifer, facilitators

- Beautify Silverton Road
- Hotel or other commercial along Silverton Road as a gateway
- Have an area for community gardens.
- Don't want industrial users that create a lot of waste water to be treated.
- Have condo housing with amenities such as tennis courts, swimming pools, etc.
- Hotel use next to RV Park appropriate as gateway to town with ped/bike connection to Garden.
- Improve intersections along Silverton Road, install traffic light.
- Improve drainage in the area, reduce flooding Improve landscape area between Silverton Rd and Railway Ave, make it look like you are entering the "Garden City".
- Have neighborhood/pocket parks in new residential developments.
- North of Silverton Road:
  - Residential north of Silverton Road – transition from less dense to more dense mult-family as you move further into town
  - Residential north of Silverton Rd, don't surround/strand existing residences with industrial.
  - Improve biking and walking to downtown for existing residents
  - Improve roadway connectivity (behind City Shops).
  - Worried about truck traffic if new collector road / bridge built.
  - Allow higher density away from creek to retain open area/easement around creek as open space.
  - Possible pedestrian bridge over Silver Creek if the roadway bridge is not constructed.
  - Possible alignment of the collector bridge to run down Fosshlom/Short/Wilson St to Grant St.
- South of Silverton Road:
  - Allow for neighborhood services/commercial on large residential property across street from Gardens, uses that would not compete with downtown but would only serve nearby residents.
  - Build a Rodeo Grounds opposite the Garden, with stables and indoor or outdoor riding arena.
  - Build a ped/bike way along the natural drainage way and vegetation from Garden throughout the project area heading north with the pathway running along Silver Creek.
  - Develop park with ball fields behind Robert Frost Elementary.
  - Trail through the south side
  - Possible Cemetery expansion.

Group 7: Victor and Chris, facilitators

- Multi-family should be mixed in as opposed to large apartment complexes
- Industrial park should be maintained and expanded (to Monson) on the north side. It needs good access (e.g., the new collector), but does not need to be visible from Silverton Road
- Traffic signal would be preferred at new collector intersection (Rail Way) and Silverton Road
- Gateway coming into town should reflect the historic/natural character of Silverton – tree lined Silverton Road would be a nice feature
- North of Silverton Road:
  - Greenway along creek – a linear park with a good trail system
  - North of Silverton Creek – housing including a mix of single family and small multi-family
  - Monsoon Road is the preferred alignment if we need a creek crossing (aligns w/ High School access and Rail Way). No new railroad crossing.
  - The existing homes north of Silverton Road and west of Monson Road probably won't change in the future...not sure what to do with this area
  - The area north of the industrial park and south of Silver Creek is a big question mark. A lot of this could be in the floodplain. What development works there? Transition between park and industrial land?
- South of Silverton Road:
  - Keep a lot of open space south of Silverton Road (maybe a golf course). There could be development in pockets mixed with open space.
  - Possible ball fields expansion behind Robert Frost (connecting the existing soccer fields with the senior center and skate park - make a major recreational center here)
  - Mix of residential behind the shopping center (near cemetery). Consider a small neighborhood park with a playground as part of this.
  - No additional commercial development to maintain existing shopping and to protect downtown. Provide good multi-modal access to existing shopping center (Safeway)
  - Walking trail – good sidewalk connectivity
  - No collector road, just a network of local roads that may work their way towards Main Street

IN SUMMARY

General consensus:

- Many groups endorsed basic land use designations on Comprehensive Plan
- Trails and interior connections are important
- Small town feel should prevail
- Multi-family in cottage building types and mixed in with other housing types
- Silverton Road: Green gateway with natural elements and nod to agricultural heritage
- South: mix of housing including senior housing, connections over to retail center
- South: school-senior center-dog park area as activity centers
- North: Silver Creek Greenway and trail, open space on Roisen family property

Alternatives and different opinions:

- School site: public facility and residential
- Industrial: where to located and what is considered industrial?
- Silverton Road to Pine St collector: Whether to do it or not do it
- Silverton Road to Pine St collector: If done, west alignment from Monson north, or a more eastern alignment

PRESENTATION

Welcome!

to the

West Silverton Land Use and Transportation Plan

Community Forum

January 12, 2012

Purpose of Tonight's Forum

Capture your vision for Silverton's West Side

Agenda

7:00 p.m. Welcome
7:05 p.m. Presentation
7:20 p.m. Visioning Exercise in Small Groups
8:20 p.m. Report Back to the Larger Group
8:55 p.m. Wrap Up
9:00 p.m. Adjourn

Why is Silverton looking at this area?

- A gateway to the city
- A wealth of community amenities
- Within the Urban Growth Boundary
- Large undeveloped lands that could be developed
- Prevent piecemeal development
- Ensure it develops in character with Silverton

What is the "Plan"?

- A community dialogue *before* development
- Based on state policies and previous city planning efforts
- A process that culminates in a Plan document:

1. vision
2. alternatives
3. preferred alternative
4. details
5. strategies

What are the state policies and city plans?

- Statewide Planning Goals
  - To achieve Oregon's statewide goals, State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect.
  - Extent of the Comprehensive Plan is the Urban Growth Boundary (required by Goal 14)
- Oregon Transportation Planning Rule (TPR)
  - Requires local Transportation System Plans (TSP)
- Silverton Zoning and Development Code
  - Implements the Comprehensive Plan and provides design and development standards for the city

Comprehensive Plan

- Adopted in 1979
- Revised 4 times
- Last updated in 2002

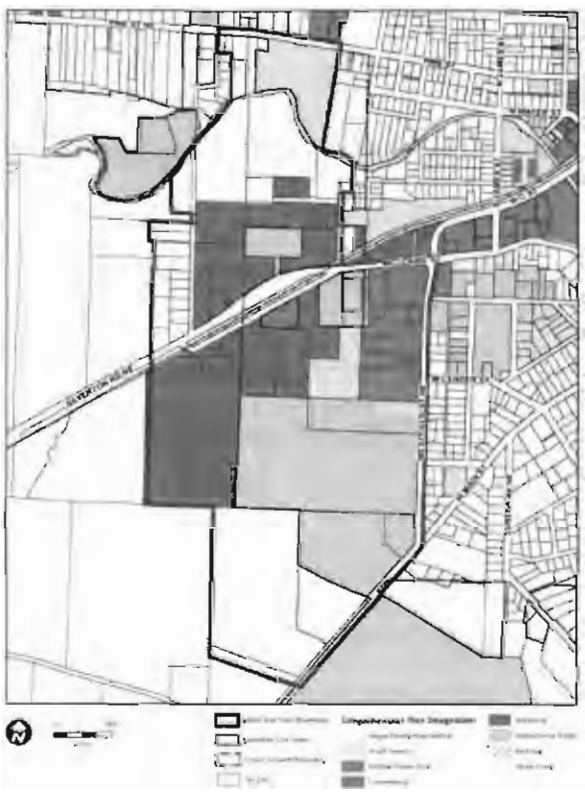
Single Family Residential

Multiple Family Residential

Industrial

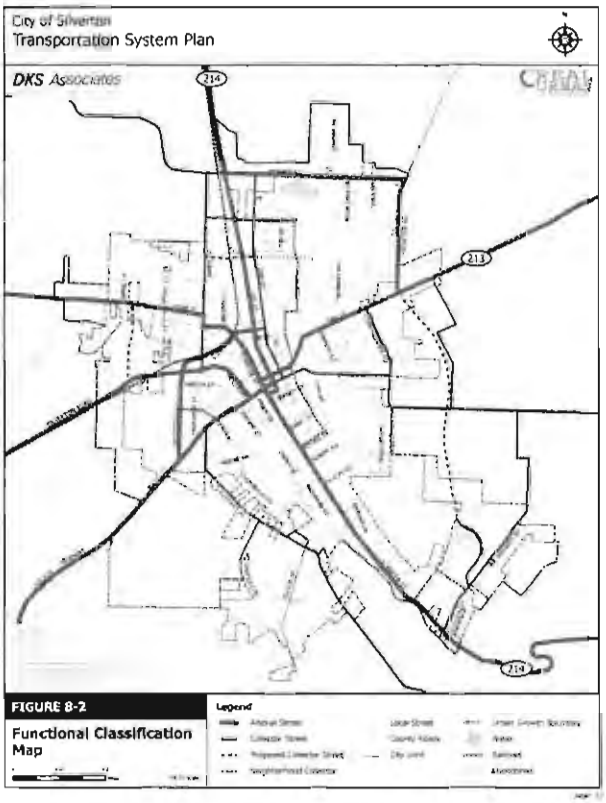
Commercial

Public/Semi Public



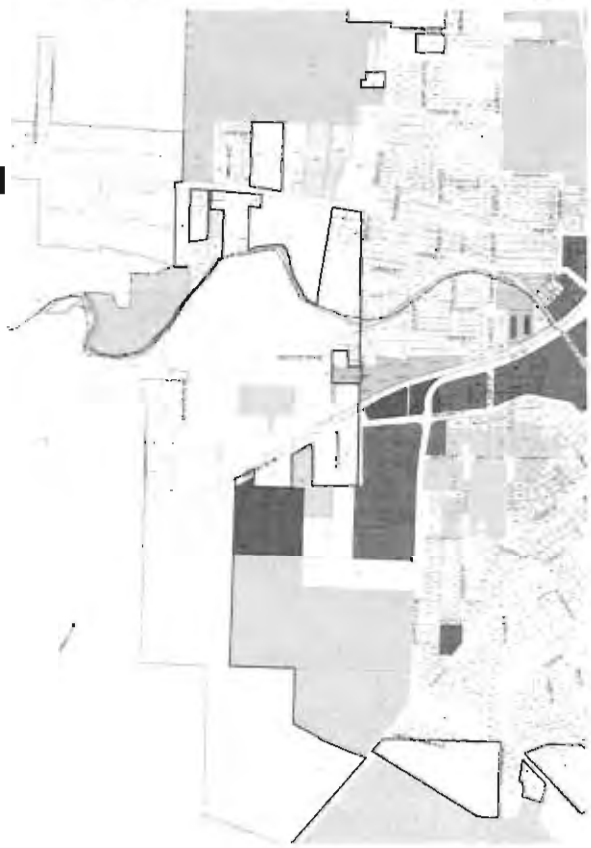
TSP

- Provides access options for the adopted Comprehensive Plan
- Last updated in January 2008



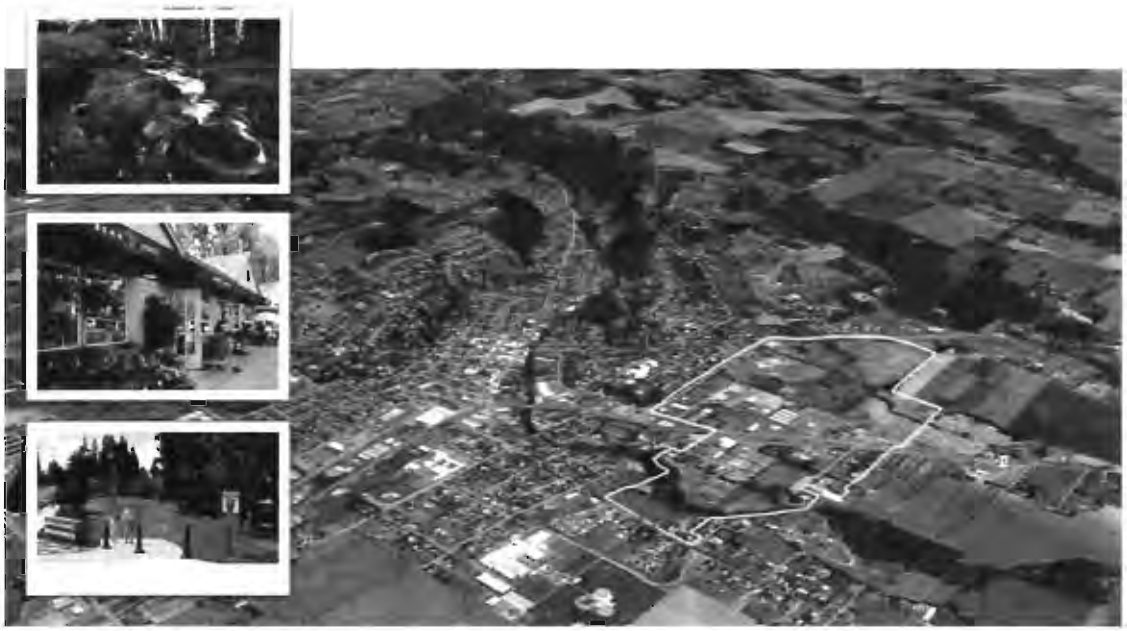
Zoning

- Within the city limits



- Single Family Residential
- Multiple Family Residential
- Light Industrial
- Heavy Industrial
- Commercial
- Public/Semi Public

Planning Principles to Consider



Integrate with Greater Silverton

Create a Complete Community

Daily destinations all within a short walk

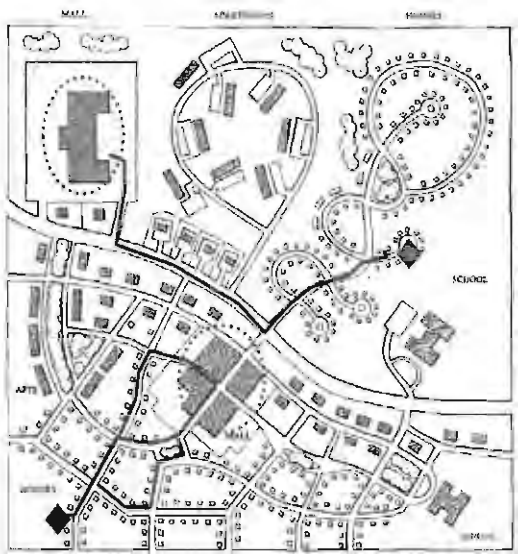
- Schools, Parks, Senior Center
- Homes
- Limited, local shops *(do not compete with downtown)*
- Jobs

Plan for All Modes of Travel

Make pedestrian routes and streets connected, safe, convenient, attractive

Connect Streets to Connect the Community

SUBURBAN SPRAWL



TRADITIONAL NEIGHBORHOOD

Integrate Nature Features

Provide Parks and Greenways




Integrate Neighborhood Civic Centers




Mix Uses

Create Complete Streets

The streets are the public realm

What is your vision?

What is your vision?

Hop in your time machine and set it 20 years ahead.

The City's vision for the West-Side has been fully realized. You really like what you see.

What do you see?

West-Side Land Use and Transportation Plan

Draft Project Memorandum #4
Land Use & Transportation System Alternatives

Otak, Inc.
DKS Associates
Leland Consulting Group
March 9, 2012
Deliverable: 4B

Background

The City of Silverton is conducting a community visioning process to help establish a strategic plan to shape how the west side of Silverton could develop in the future. The identified project area contains large undeveloped properties that have the potential to be developed in the future. This is an opportunity to guide the future development in the area in a more focused manner, influenced by citizen desires, rather than relying on broad zoning categories such as "Residential" and "Industrial" and to integrate land use, transportation and open space planning.

Development in this area is going to follow its own time line. This project is not intended to spur development or use public money to finance it. The purpose of this project is to gather citizen input and create a vision for development that is reflective of the community's values.

Visioning

As one of the first steps in the West-Side Land Use and Transportation Plan, the first of two scheduled community meetings for the project was held on January 12, 2012 at the Community Center in Silverton. The community meeting was open to all members of the public. The City of Silverton widely advertised the meeting by sending notices directly to property owners, posting flyers in store windows, and placing a notice in the newspaper.

The community meeting was a visioning workshop to help develop several alternative land use and transportation options for the west side of Silverton. Community members were asked to imagine that they had returned to Silverton twenty years in the future, the West-Side Plan had been fully implemented, and that they really liked what they saw. The discussion focused on what it was they envisioned for the successful future of the west side.

The project team compiled the feedback from the community meeting and identified the ideas that had the general support of the participants. These points of consensus were derived into vision concepts for the West-Side. Elements in which the community expressed differing opinions were also gathered to form the basis for land use and transportation options.

The Project Advisory Committee reviewed the draft vision concepts created by the project team to ensure they were consistent with what was expressed at the community meeting. The group offered a few recommended changes and corrections based on their observations at the meeting.

Vision Concepts for West Silverton

- Continue to contribute to the small town character of Silverton.
- Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
- Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
- Fill out the existing shopping center at the corner of Westfield and Silverton Road.
- Provide local employment opportunities through light-industrial uses that are attractive and well designed.
- Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
- Provide strong connectivity throughout the area for all modes of transportation.

Creating the Alternatives

The alternatives are a series of diagrams that show how the vision concepts can be implemented over time. The diagrams are based on an analysis of existing policy, land use, transportation, environmental, and market conditions, as well as the direction received from the community and Project Advisory Committee.

The following sections of this memorandum describe this basis and resulting framework and options.

- "Constraints and Commitments" discusses the existing conditions of the area that are not likely to change.
- "Planned Conditions" presents the current planning designations in the area to accommodate projected growth.
- "The Framework" illustrates the vision concepts for the area as developed with the community and creates a framework for the land uses and transportation options.
- "Development Program" describes how the area could develop over time based on the vision and market analysis.
- "Transportation Alternatives" show various ways of making connections to and through the area.

There are a number of constraints and commitments in the area that inform the development of land use and transportation options. They include:

Silver Creek and Foodplain

The creek not only provides a beautiful opportunity to create a linear park or greenway along its banks, it also presents challenges for connectivity and crossings as well as the placement of development due to periodic flooding.

Topography and Natural Resources

The project area slopes from Westfield Road down to Silverton Road with natural dips and valleys between higher points. This creates opportunities for views and open space. The local wetlands in the low lying areas would need to be protected or mitigated in development.

Development Pattern

The area is made up of large parcels, some of which are nearly or completely landlocked. Current land uses are diverse and include residential, commercial, industrial, institutional, and vacant.

Committed Land

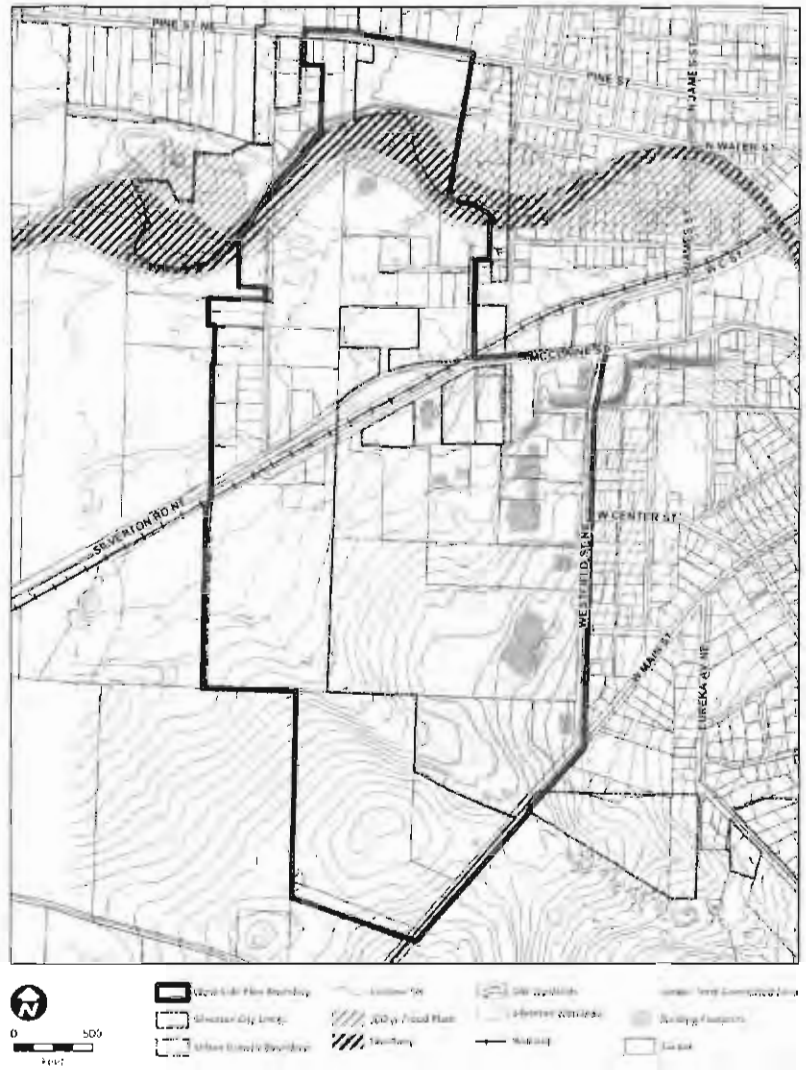
Several buildings or parcels in the area are considered committed for the longer-term, including the elementary school, senior center, churches, the shopping center, as well as the cemetery, a large portion of the Roisen property along the creek as open space, and the city skate park, dog park, and community garden.

Lack of Connectivity

There are very few roads or trails in the study area, particularly south of Silverton Road. The roads that exist north of Silverton Road are not connected and dead end into private property.

Railroad

The Willamette Valley Railroad provides branch line rail service for the shipment of commodities between Salem and Woodburn. While this freight line operates only two trains per day through the study area at speeds of 10 miles per hour or less, the presence of an active rail line presents constraints for railroad crossings and land uses that can feasibly be placed near the line.



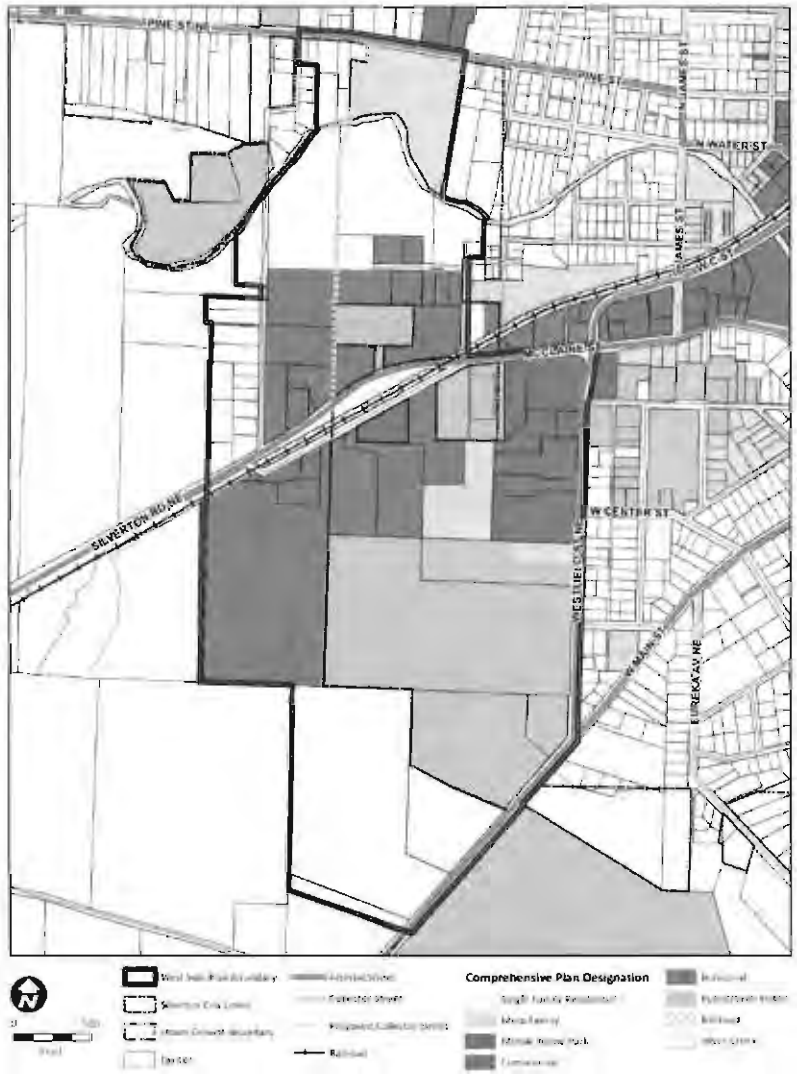
The Silverton Comprehensive Plan and Transportation System Plan (TSP) show what is currently planned for the study area to accommodate Silverton's projected growth.

Comprehensive Plan

Properties within the study area consist of lands that are currently designated Single-Family, Industrial, Multi-Family, Commercial, and Public/Semi Public within the City of Silverton Comprehensive Plan.

Transportation System Plan

Within the study area, the Silverton TSP designates Pine Street, Silverton Road, Maio Street, and Westfield Road as arterials and calls for a new collector road connecting Pine Street and Silverton Road.



The framework illustrates the vision concepts for the area as developed with the community and creates a framework for the land uses and transportation options.

Contribute to the Small Town Character

Continue to contribute to the small town character of Silverton. Transition from less dense development along the edge of town to more dense development within the study area. Emphasize the natural topographic features of the land.

Create a Gateway

Provide a beautifully landscaped entrance to town that recalls Silverton's agrarian heritage and "Garden City" culture.

Provide Places to Live, Work and Shop

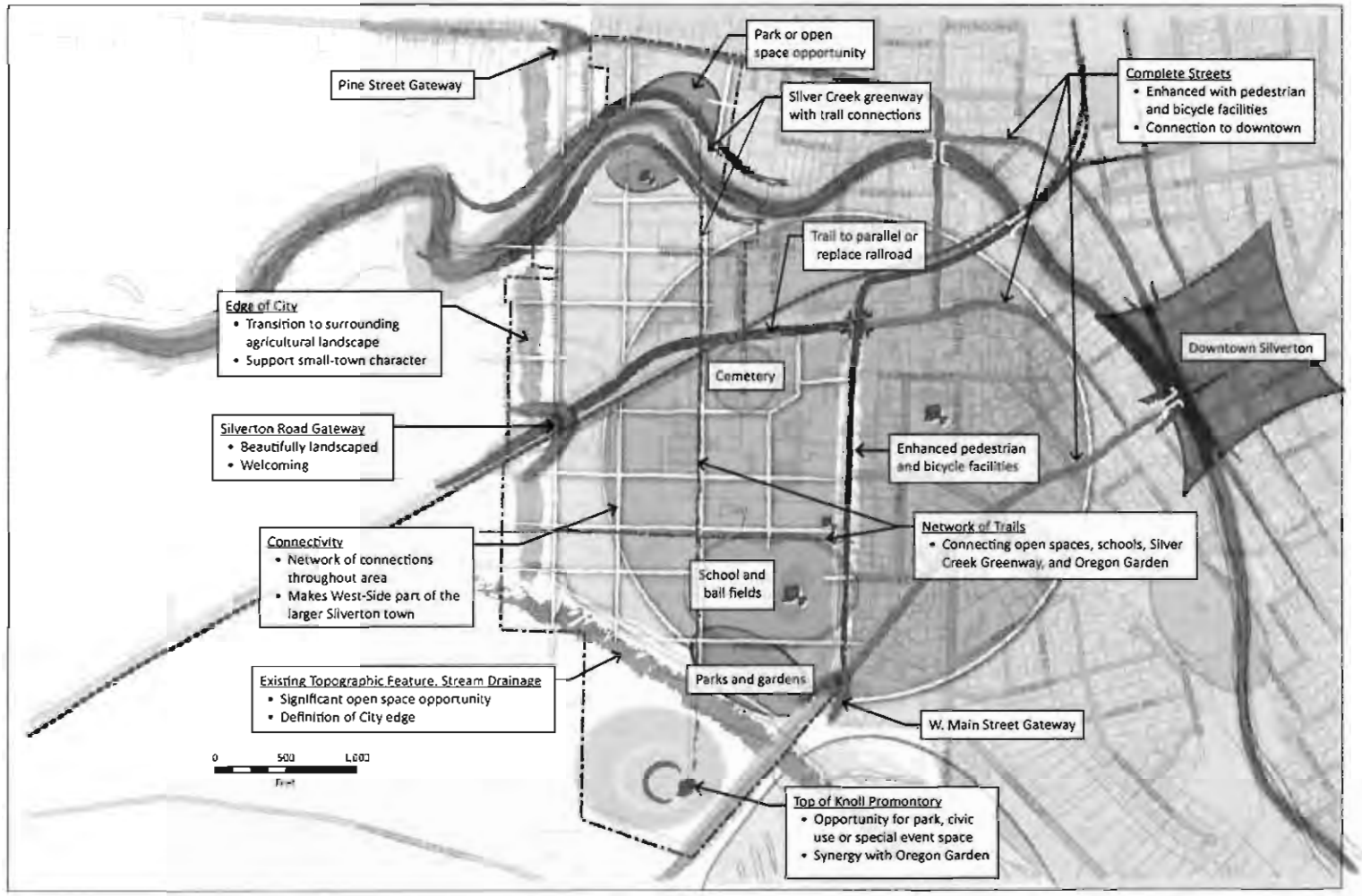
Include a mixture of single family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities. Focus retail uses in the existing shopping center at the corner of Westfield and Silverton Road. Provide local employment opportunities through light industrial uses that are attractive and well designed.

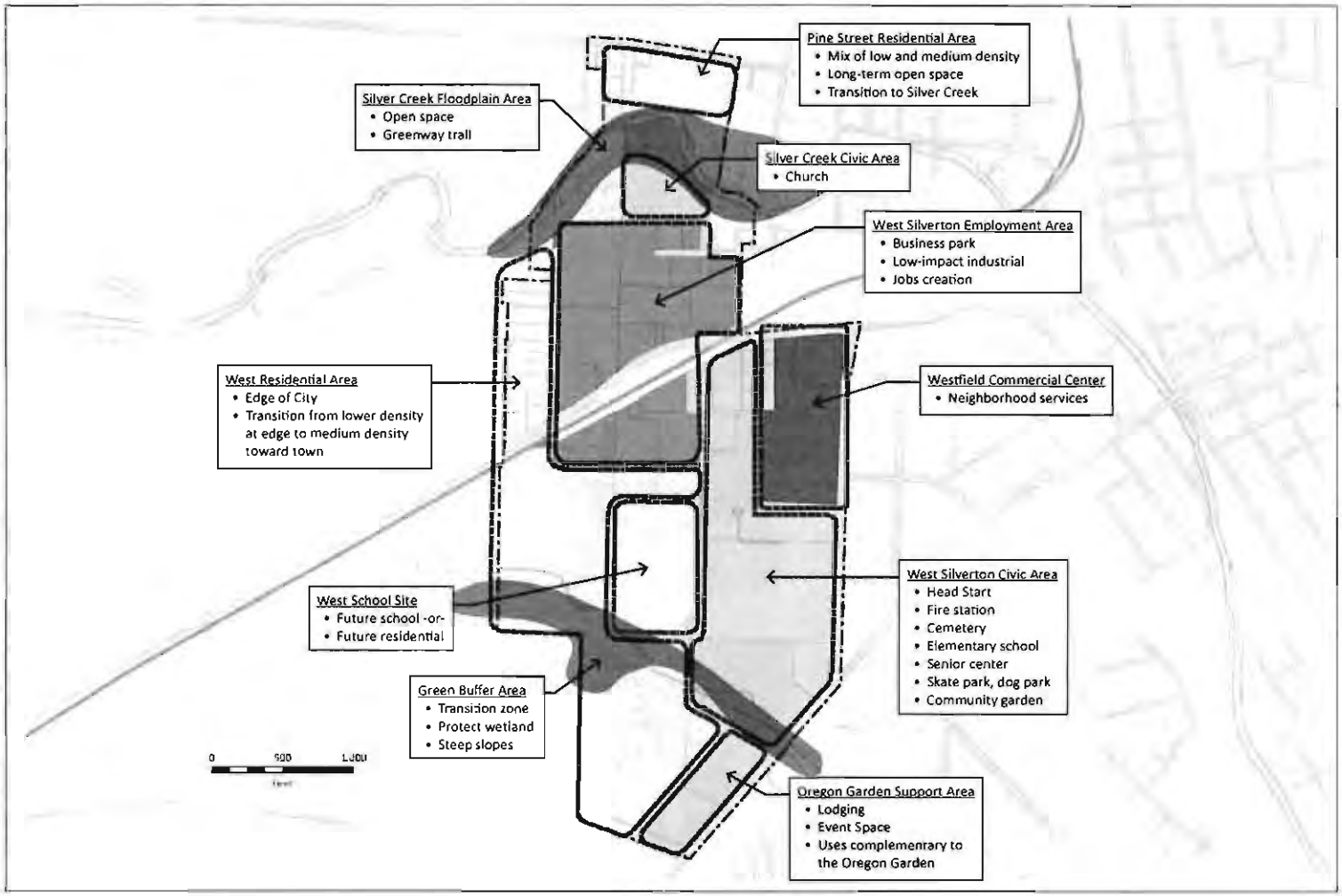
Create a Green Network

Create a network of open space, parks, and trails, including a greenway along Silver Creek, to build upon and enhance the natural beauty in the area.

Provide Connections

Provide strong connectivity throughout the area for all modes of transportation. This includes non-vehicular pathways for pedestrians and bicyclists in addition to well placed roads.




Pine Street Residential Area
• Mix of low and medium density
• Long-term open space
• Transition to Silver Creek
Silver Creek Floodplain Area
• Open space
• Greenway trail
Silver Creek Civic Area
• Church
West Silverton Employment Area
• Business park
• Low-impact industrial
• Jobs creation
West Residential Area
• Edge of City
• Transition from lower density at edge to medium density toward town
Westfield Commercial Center
• Neighborhood services
West School Site
• Future school -or-
• Future residential
West Silverton Civic Area
• Head Start
• Fire station
• Cemetery
• Elementary school
• Senior center
• Skate park, dog park
• Community garden
Green Buffer Area
• Transition zone
• Protect wetland
• Steep slopes
0
500
1,000
Oregon Garden Support Area
• Lodging
• Event Space
• Uses complementary to the Oregon Garden

The total study area is 227 acres; however, many acres are constrained or committed as discussed in the existing condition section. These include areas or uses that will likely not change during the planning horizon, such as the cemetery, or uses that are planned and accepted by the community, such as the new skate and dog park. After consideration of theses constraints and commitments, the land uses on the remaining acres could be distributed as follows to meet the vision.

Land Use	Acres	Density	Amount	Notes
Gross Developable Area	142.0			
less 20% for ROW	-28.4			
less 20% for Open Space	-28.4			
Net Developable Area	85.2			
Housing				
Apartments	5.2	25/acre	130	2-3 apartment sites
Townhomes	8.0	16/acre	128	2-3 townhome neighborhoods
Senior Housing	5.0	30/acre	150	1-2 senior housing developments
Cottage Housing	15.0	12/acre	180	Several cottage communities
Housing subtotal			588	
Light Industrial	25.0	FAR 0.30	326,700	Small manufacturers, food processors
Commercial/Retail	20.0	FAR 0.35	304,920	Hotel, restaurants, services
Civic	7.0	FAR 0.30	91,476	Education, library, cultural
Total	85.2			

Source: Leland Consulting Group

Residential

Cottage Housing
- 8 - 14 du/acre
- 1 to 2 stories
- On-street parking, clustered in shared lot, or garages at alley

Townhouse
- 12 - 20 du/acre
- 2 to 3 stories
- Surface parking or parking within each unit

Wood Frame Apartments
- 20 - 35 du/acre
- 2 to 3 stories
- Surface, garage, or tuck-under parking

Senior Housing
- 25 - 35 du/acre
- 3 to 4 stories
- Surface, garage, or tuck-under parking

Commercial

Hotel
- 75 to 100 units

Restaurant
- 2,000 to 4,000 SF

Services
- 1,000 to 5,000 SF

Civic

Library

Cultural Center or School

Community Classes

Employment

Flexible Open Space
- 3,000 to 15,000 SF

Office/Warehouse
- Showroom

Production

NORTH OF SILVERTON ROAD

No creek crossing

- Reduces on-site roadway costs by $5 to $6M
- Eliminates a planned network improvement (from the City's TSP) that reduced future traffic demand on James Street. Could require mitigations at the intersections of James Street/Pine Street and James Street/Water Street.
- Impacts Emergency Services response time to Silverton High School
- Impacts multi-modal access across Silver Creek

Options for creek crossing

Kromminga Drive

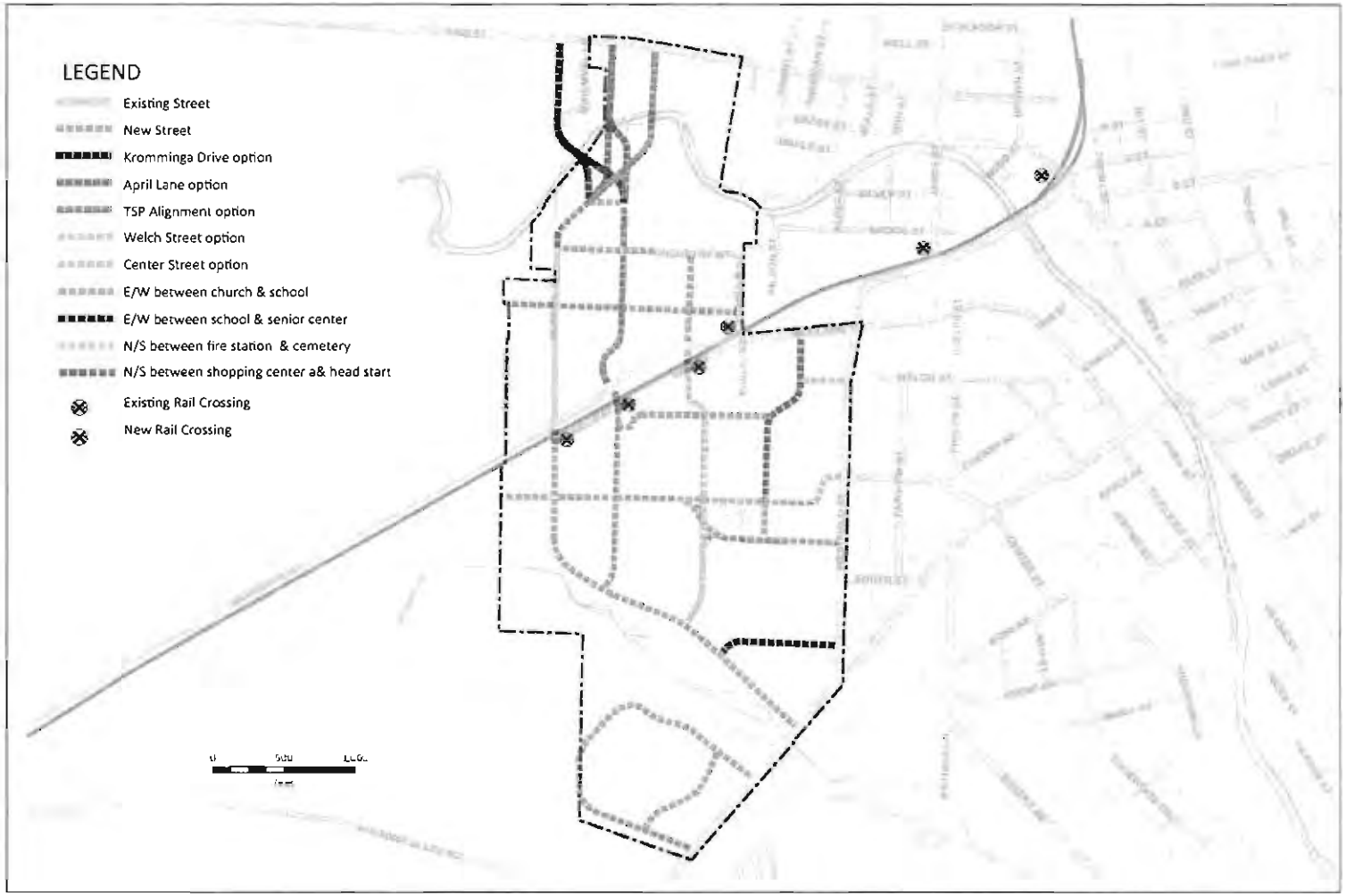
- Utilizes an existing local street alignment north of Silver Creek, which reduces right of way need.
- Would likely require one or two property takes (existing residential units)
- Would intersect Pine Street just east of the high school access (Kromminga Drive), which would not meet access spacing standards and would not be compatible with the turn lanes provided at the high school access
- Consider shifting the alignment west to align with Kromminga Drive, which could be a good location for a roundabout if needed for traffic control
- Provides the most direct north/south connection to the high school for pedestrian and bicycle traffic

April Lane

- Would likely require two property takes (existing residential units)
- Would intersect Pine Street at an exisung T-intersection, which would be preferable for access-spacing
- Would be far enough east from the high school access (Kromminga Drive) that it could be compatible with the turn lanes on Pine Street

TSP alignment

- Would not require acquisition of residential properties
- Would be far enough east from the high school access (Kromminga Drive) that it should be compatible with the turn lanes on Pine Street
- Could be surrounded by open space, which would limit the ability for fronting development to have access to, and help fund, the improvement



NORTH OF SILVERTON ROAD CON'T

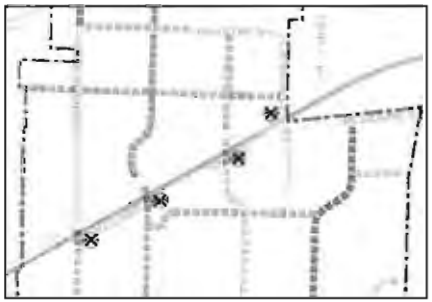
Options for connecting to Silverton Road

Existing Monson right-of-way

- Installing a signal at Monson and realigning the rail crossing of Rail Way to provide a 4-leg intersection at Silverton Road
- Preferred collector alignment from ODOT Rail perspective (furthest west from the Silverton Road crossing)
- May be easier location to obtain ODOT Rail approval for a new/improved crossing, as it is a modest realignment of an existing crossing
- Utilizes an existing street alignment to the north, which reduces right of way need
- Could be controlled by a traffic signal that is integrated with the railroad crossing
- Would require Rail Way to be disconnected from the north/south route (the intersection would be too close to the railroad crossing)

TSP alignment

- Installing a signal at Silverton Road, and continue south across the rail tracks into the south portion of the study area. This creates a new rail crossing location – must include a "realignment" of the Rail Way crossing
- Locates the major collector roadway in the center of the Concept Plan area, which tends to optimize traffic loading (i.e., more traffic on the higher functional class street)



SILVERTON ROAD

Options for Fossholm Rd/Rail Way intersection with Silverton Road and the rail crossing

Realign Fossholm to Rail Way and create a 4-leg intersection with the rail crossing in the middle of it

- Would reduce the number of conflict points in the area (by consolidating off-set intersections into one location.
- Would eliminate the ability for egress from Rail Way during a rail road gate-down event
- Would provide a location to facilitate controlled pedestrian and bicycle crossings of Silverton Road
- ODOT Rail does not consider the safety benefit of this improvement worth the cost it would take to construct

Limit Rail Way to right out

- Would reduce the number of conflict points in the area
- Would increase the use of the railroad crossing further to the west, which is ODOT Rail's preference

Close Fossholm and reconnect via Industrial Way to the new north/south road

- Eliminates an intersection in the area of the rail road crossing, which is consistent with ODOT Rail's recommendation
- Elimiates the easternmost access to Silverton Road for the North Area, which would have been the most likely utilized pedestrian and bicycle route for trips to/from the east (downtown)
- Replace Rail Way with a new east-west street directly south of the cemetery/Rail Way properties.
- Eliminates skewed intersection in rail road crossing area, which is consistent with ODOT Rail's recommendation
- Consolidates access to Silverton Road, which should improve conformance with access spacing standards and improve safety

Options for Silverton Road

Split the flow of traffic to create a mini-couplet

- ODOT Rail does not believe this option is feasible to operate due to conflict with the at-grade rail road crossings
- Would provide a significant gateway treatment into Silverton

SOUTH OF SILVERTON ROAD

Options for connecting from Westfield into the West Silverton

Driveway conversion at Welch Street

- Does not comply with access spacing criteria, but would utilize an existing private access for local street function

Extension of Center Street

- Provides a direct connection from the Concept Plan area to the Hospital area, which would benefit pedestrian and bicycle traffic
- Would require redevelopment or site plan modifications to the existing Safeway Shopping Center

Between Church and School

- Does not comply with access spacing criteria, but is a feasible location for a connection point based on existing development constraints
- Provides a direct access to future school site

Between School and Senior Center

- Does not comply with access spacing criteria, but would utilize an existing private access for local street function

Options for connecting within the project area

Additional north-south street between fire station and cemetery

- If the rail road is abandoned in the future, would provide a new primary north/south corridor for access and circulation for all modes

Extension of the driveway access east of Wilco between the shopping center and Head Start

- Provides pedestrian and bicycle access to the existing shopping center
- Utilizes and existing access to Silverton Road as a major access location for the Concept Plan Area, which reduces the demand on Rail Way

Connection to W Main Street directly north of steep slope/stream drainage area

- Complies with access spacing criteria

ROUGH COST ESTIMATES

Creek crossing - $5 to $6M depending on alignment

North of Silverton Road - $11.4M for local streets, $3.6M for the North/South collector street

South of Silverton Road - $26.1M for local streets, $6.9M for the North/South collector street

Intersection improvements (signals or roundabout)- $1M to $2M depending on results of traffic analysis

These numbers include right-of-way for all streets.

Cost Basis for Estimates

Collector Street - $2,300 per lf
Local Street - $2,100 per lf
Right of Way (included in the street costs) - $10 per sf
Bridge - $11,200 per lf

West-Side Land Use and Transportation Plan

Community Meeting
March 22, 2012
Summary

Otak, Inc.
DKS Associates
Leland Consulting Group
April 2, 2012
Deliverable: 5C

Project Background and Objectives

The City of Silverton is conducting a community visioning process to help esrablish a strategic plan to shape how the west side of Silverton could develop in the future. The identified project area contains large undeveloped properties that have the potential to be developed in the future. This is an opportunity to guide the future development in the area in a more focused manner, influenced by citizen desires, rather than relying on broad zoning categories such as "Residential" and "Industrial" and to integrate land use, transportation and open space planning.

Development in this area is going to follow its own time line. This project is not intended to spur development or use public money to finance it. The purpose of this project is to gather citizen input and create a vision for development that is reflective of the community's values.

1st Community Meeting - Visioning

As one of the first steps in the West-Side Land Use and Transportation Plan, the first of two scheduled community meetings for the project was held on January 12, 2012. The meeting was a visioning workshop to help develop several alternative land use and transportation plans for the west side of Silverton. Community members were asked to imagine that they had returned to Silverton twenty years in the future, the West-Side Plan had been fully implemented, and that they really liked what they saw. The discussion focused on what is was they envisioned for the successful future of the west side.

2nd Community Meeting - Concepts & Options

The second community meeting was held on March 22, 2012 to report back to the community on the vision results of the first community meeting and to gather input on ideas generated for the West Side. The consultant team gave a presentation to review the project background and objectives as well as present new material generated as a result of that meeting. To help the community understand how Silverton has grown over time and the likelihood that it will continue to grow, the team presented a graphic depiction of how Silverton has grown over the last century and how that has shaped its urban form.

The team presented the vision concepts, design framework, land use concept, and transportation system options for the West-Side project area. The vision concepts were derived from the input received at the first community meeting and vetted with the Project Advisory Committee. The design framework illustrates the vision concepts for the area and creates a framework for the land uses and transportation options.

The land use concept depicts areas of eharaeter rather than speeific zoning. It shows the location of residential, employment, commercial, and civic land uses as well as the two overlay-type features of the Silver Creek floodplain and the drainage area designated a "green buffer." The layout of the uses considers current uses and longer term redevelopment potential. The development program presented shows one potential development scenario for the build-out of the depicted land uses indicating housing units and square footage of employment areas.

The transportation system options show how a network of streets and paths could provide connectivity throughout the West-Side as well as to the rest of Silverton. Alternatives to the TSP-designared collecror alignment and bridge in the northern part of the project area were explained, including other alignment options as well as improvements to current intersections.

Small Group Exercises

The participants divided into smaller discussion groups to review the eoncepts and options in greater detail and provide their feedback. A facilitator from the project team walked the groups through each of the land use and transportation options to discuss them individually. Notes from the small-group discussions are provided below. Note, not every group had a comment for every element.

Concept	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Silver Creek Floodplain Area Open space Greenway trail	The creek used to go through the church property	The integrity of the creek should be maintained There was general support for this idea	No comment	Yes – awesome place – beautiful along creek	Looks good, no more mistakes by residential building – Project	Fenced private property – keep it as it is Keep it green
Pine Street Residential Area Mix of low and medium density Long-term open space Transition to Silver Creek	No comment	Would prefer lower density to ease traffic impacts Least impact if bridge need to be constructed Could be a park, extension of creek green space	No multi-family - Too close to high school, adds to traffic	Yes	No tall apartment buildings – look good	Keep low-density Not needed as multi-family Traffic impacts
Silver Creek Civic Area Church	Wetlands, careful with housing - floodplain	Would not recommend a change	No change	Yes	No comment	Yes, keep it as it is
Westfield Commercial Center Neighborhood services	No comment	In support of filling the existing shopping center out	No comment	No comment	Okay, encourage it to build out	Like keeping it as is – got it right
West School Site Future school -or- Future residential	Senior housing due to its proximity to the senior center and shopping center	Could be developed as a school, which would be an appropriate use If not a school then mix of residential, low and medium densities Area is close to a mix of uses Should have a variety of housing options	Split opinions – SF, School, MF	Yes	Good to keep options Open/maybe ball fields if no school	Not residential Natural fit would be ball fields

Concept	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
West Silverton Employment Area Business park Low-impact industrial Jobs creation	Concern that there will be a truck problem/ traffic impacts if there is not a collector road through the area – how to service the employment Proximity of narrow strip of residential properties is of concern – expand the residential to both sides of the street Extend residential along top near creek. Will develop sooner.	No heavy industrial, would prefer uses that would have low impact on surrounding area Zoning design standards should promote a design that has minimal visual impact on the area to blend the employment development with residential development. Would not want to see high truck traffic.	North of Silverton Road -- "phase out" area south of Silverton Road – revert to residential over time	Yes, makes sense Perfect use? Agricultural industry support, food processing	Like the idea of more land for jobs – keep what we got	Right spot for it, right size Close to retail Needed in town
West Residential Area Edge of City Transition from lower density at edge to medium density toward town	Expand the residential area north of Silverton Road Buffering against industrial uses is an issue Lots of home for sale Extend housing area eastward more Things for children and families to do – scattered development Consider MF almost everywhere in the area.	Prefer residential as the first thing you see when entering town then blend into industrial. Residential better impression for entrance into town Embrace subdivision design for the large parcel adjacent to RV park. Open space (public or private) in NW corner would be a good design treatment.	Concerned about residential next to light industrial Split around Silverton Road – south = residential and north = employment Existing uses south of Silverton Road are ok Nobody wants a strip mall but how can you avoid it Hard to imagine	Not convinced we need a lot of new housing in the short-term, but residential makes sense as a use concept	Single family on north side of Silverton Road and mix on south side	Yes – good to see as you come into town

Concept	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Green Buffer Area Transition zone Protect wetland Steep slopes	No comment	Trail are good idea, ensure pedestrian connections work with the topography of the area so there are not steep trail Allow access to people of all walking abilities	Agreed – challenge to protect Like to keep wetland Trails, well lit	Ok	Make it into a city park or trails	Respect that green buffers are private land and are not necessarily accessible Understand walking/biking are important
West Silverton Civic Area Head Start Fire station Cemetery Elementary school Senior center Skate park, dog park Community garden	Provide parking so people can go walking on the trails	Good as is, not much need to change anything	Restrictions – block grant – 5 years on Senior Center – 2017 expires Community pool was suggested	Fire station site is pretty tight. If the fire station grows, it could be NW of it.	Head start surplus land? Private park behind church	Great idea – fits what is already there
Oregon Garden Support Area Lodging Event Space Uses complementary to the Oregon Garden	Don't dilute the additional competition to the Garden – just make it residential – a hotel should go downtown A playground	Did not support this idea, did not feel the need for another hotel in this area, did not like the commercial aspect, worried about a national chain being built at this location Not appropriate as entrance, would prefer residential as entrance.	Hotel would compete with downtown and Oregon Garden – event space also. Don't do it Good = nursery and bad = commercial	Yes, makes sense, but for Silverton as a whole as opposed to for the Garden – don't be competition with the Gardens, be complementary Garden has lodging already Maybe part of it for a park Knoll – yes to residential on the knoll	Yes, should support the Garden, event center, complementary to the Senior Center	Not really needed South of buffer should not be built out – better used as park space connectivity to the gardens

Option	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Creek Crossing No crossing - improve James Street intersections	Really need to cross the creek if the development comes Re-route the alignment so you only have to upgrade one intersection – Water to Pine connection	Worried about traffic safety with increased use Would be too much impact on existing residential if no bridge were constructed In support of constructing a bridge when traffic impact warrant it. In support of increasing capacity of intersections even with bridge construction. Not in support of roundabouts	Preferred Idea of roundabout – perhaps as an option Can we develop a connection via brown street Don't divert traffic through water street Don't build it until the whole area has developed and the need is clear. Hard to imagine.	Very tight in the James Street area, so crossing the creek is preferred Some improvements to James 5treet area are needed even if a creek crossing is done On outer edge of area is part of the reason to do a bridge	50 % roundabout Lights okay Any improvement better than bridge if segment of James Street closed	Like this idea: close North water approach to James (UB) – reroute to Brown Roundabout at James/Pine – low value homes and rentals
Creek Crossing TSP Alignment option	Any bridge will be expensive.	Least impact on existing residential area Least amount of cost is a benefit of this alignment Preferred alignment	No	No comment	Not favored	Not this one!
Creek Crossing Kromminga Drive option	No comment	Good alignment with school entry Not in support of impacts on Schemmel Lane.	If there is to be a creek crossing, here is preferred From Monson = preferred Connection to high school is logical choice	This option is best To high school make sense	Best bridge option, to line up with school – still need to improve James 5treet intersections	Makes sense to align with the high school Property impacts 2nd choice
Creek Crossing April Lane option	No comment	Not in favor due to the residential impacts	No	No comment	Not favored	Preferred

Option	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Connections to Westfield & West Main Driveway conversion at Welch Street	Staircase - like	No need to upgrade to city street, should remain private	No comment	Too steep – not feasible for street Stairs needed for pedestrian connection	Looks good, not important	Ok
Connections to Westfield & West Main Extension of Center St - pedestrian and bicycle only	Good idea – already done informally – people already make their own paths here	Pedestrian connection only a good idea	Would be good to have. Can you do it – could follow boundary Why not make a street? What if we fill it in?	Pedestrian connection makes sense, route carefully	Needs crosswalk improvement at Center/Westfield	Yes, connects to hospital
Connections to Westfield & West Main Between church and school	Widest – has the best shot and is the most logical place to put a road through MF – church was planning for them? Low, slow traffic, speed bumps.	Seems like a natural place for a roadway	Okay, but do we need all these streets?	Seems logical, workable	Good Idea. Lots of grading to do though to get to Safeway parking lot	Ok
Connections to Westfield & West Main Between school and senior center	Concern about safety due to the proximity of the Westfield and Main intersection	Existing connection, should be used in the future	2017 – restrictions on access on senior center – after that, it's a good idea	Yes	okay if on school property and not on church property	Ok, but be aware it can't be used as a public street for 5 years due to terms of the grant funding
Connections to Westfield & West Main Just north of drainage feature	Too many connections to West Main	Makes sense for a roadway connection	Should be south Too close? Intersection spacing? Collector from Silverton Road to West Main should hook up at Oregon Garden and get signal – so cross the drainage	No comment	Looks good	Ok

Option	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
North/South Collector Monson Rd option	Cut off Monson and make access at new collector	Prefer Monson Road alignment, make sense to utilize the existing roadway	Preferred – utilize existing right of way	Preferred – intersection exists – is better	Better N/S collector option	Yes – use exiting
North/South Collector TSP alignment option	Best location for collector but doesn't need to go across creek.	No comment	Not preferred	Nope	No comment	No

Other comments:

- The whole study area should be more dense
- What is the location of the trail that goes from the Oregon Garden to downtown?
- Confusion about what makes a "collector" versus an "arterial" – if it goes over the creek, it is no longer just collecting neighborhood traffic out to an arterial
- Fix fire hydrant on Pine
- We need infrastructure upgrades now – storm water/sewer system
- MF: distribute around, mixed density. Avoid concentrations of any one density
- Discussion of emergency access at east RR crossing – like Trade Street in Salem

Land Use Conclusions

1. There was general acceptance for the land use concept as presented.
2. Slightly adjust the amount of residential and employment where they meet in the northern patt of the study area so that it shows residential north of an extended Industry Way. This connects the residential on the west side of Monson Road and the residential area near the creek.
3. There was mixed feedback regarding the type of housing for the "Pine Street Residential Area." To address this, the area should remain a multi-family area and have a mix of housing types, but have single-family housing on either end adjacent to existing single-family housing.
4. The "Oregon Garden Support Area" was not accepted by the community. Participants felt any commercial enterprises in this location would compete with the Oregon Gardens, downtown, or both. The area should be residential.
5. Multi-family housing types should be located throughout the project area and mixed in with single-family housing. Multi-family should not be placed in a single location.

Transportation System Conclusions

1. The density of the area, combined with the cost of a bridge, does not seem to justify crossing the drainage feature in the southern part of the project area. The use and density of the area is important for the transportation system. If thete is commercial in this atea, it could increase traffic and the need for more capacity. As it is currently shown in concept, the lower density doesn't require a through connection from Silverton Road.
2. Upgrading the Pine Street to Brown Street connection in lieu of a creek crossing is a viable option. It was looked at during the TSP process, but was determined not to be as ideal due to the property impacts along Pine near the Brown intersection. This connection would need to be analyzed in addition to a creek crossing to determine which alternative better serves the transportation system. Improvement to the Pine/Brown corridor and intersection may alleviate the intersection of James and Water Streets.
3. If there is to be a creek crossing, Kromminga Drive is the option most preferred by the community members. It also makes sense in terms of a transportation system since it lines up with the drive to the high school, which would create a single intersection as opposed to two offset intersections on Pine Street.
4. At a minimum, a pedestrian/bicycle bridge across the creek should be planned in order to provide connectivity from the neighborhoods to the schools north of the creek.

PRESENTATION

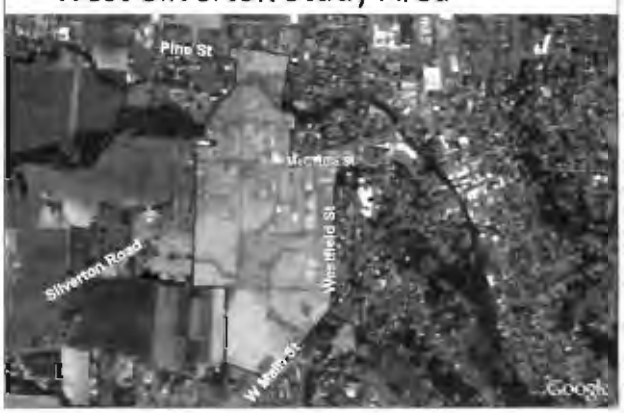
West Side Land Use and Transportation Plan

Community Forum #2
March 22, 2012

Agenda

7:00 p.m. Welcome
7:05 p.m. Presentation
7:35 p.m. Review Alternatives in Groups
8:30 p.m. Report Back to the Larger Group
8:55 p.m. Wrap Up
9:00 p.m. Adjourn

West-Silverton Study Area



Community Forum #1 Recap

Why is Silverton looking at this area?

- A gateway to the city
- A wealth of community amenities
- Within the Urban Growth Boundary
- Large undeveloped lands that could be developed
- Prevent piecemeal development
- Ensure it develops in character with Silverton

Community Forum #1 Recap

What is the "Plan"?

- A community dialogue *before* development
- Based on state policies and previous city planning efforts
- A process that culminates in a Plan document:
  1. vision
  2. alternatives
  3. preferred alternative
  4. details
  5. strategies

Community Forum #1 Recap

What are the state policies and city plans?

- Statewide Planning Goals
  - To achieve Oregon's statewide goals, State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect.
  - Extent of the Comprehensive Plan is the Urban Growth Boundary (required by Goal 14)
- Oregon Transportation Planning Rule (TPR)
  - Requires local Transportation System Plans (TSP)
- Silverton Zoning and Development Code
  - Implements the Comprehensive Plan and provides design and development standards for the city

Community Forum #1 Recap

Comprehensive Plan

- Adopted in 1979
- Revised 4 times
- Last updated in 2002

Community Forum #1 Recap

TSP

- Provides access options for the adopted Comprehensive Plan
- Adopted in 2000 & 2008
- Provides circulation and improved emergency access for West Silverton

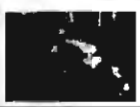
Community Forum #1 Recap

Zoning

- Within city limits

Community Forum #1 Recap

Planning Principles to Consider



- Integrate with Greater Silverton
- Create a Complete Community
- Plan for All Modes of Travel
- Connect Streets to Connect the Community
- Integrate Nature Features
- Provide Parks and Greenways
- Require Good Design for Multi-Family Dwellings
- Integrate Neighborhood Activity Centers
- Mix Uses
- Create Complete Streets

Community Forum #1 Recap

What is your vision?

- Hop in your time machine and set it 20 years ahead.
- The City's vision for the West-Side has been fully realized. You really like what you see.
- What do you see?

Vision Concepts

Continue to contribute to the small town character of Silverton.

Vision Concepts

Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.

Vision Concepts

Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.

Vision Concepts

Fill out the existing shopping center at the corner of Westfield and Silverton Road.

Vision Concepts

Provide local employment opportunities through light-industrial uses that are attractive and well designed.

Vision Concepts

Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.

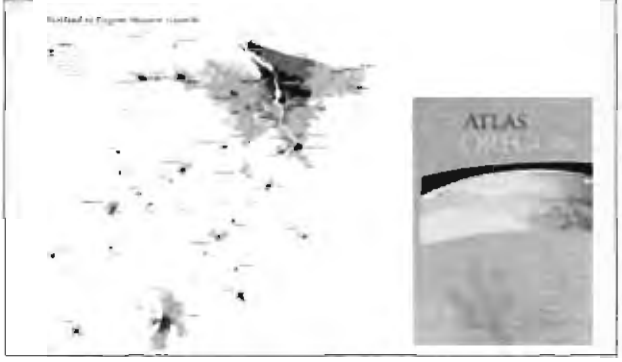
Vision Concepts

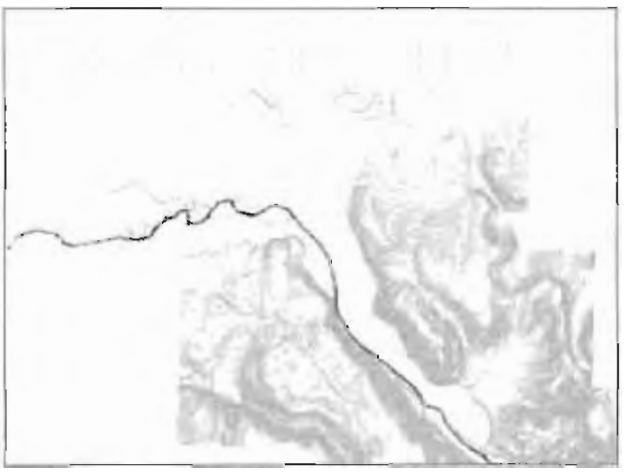
Provide strong connectivity throughout the area for all modes of transportation.

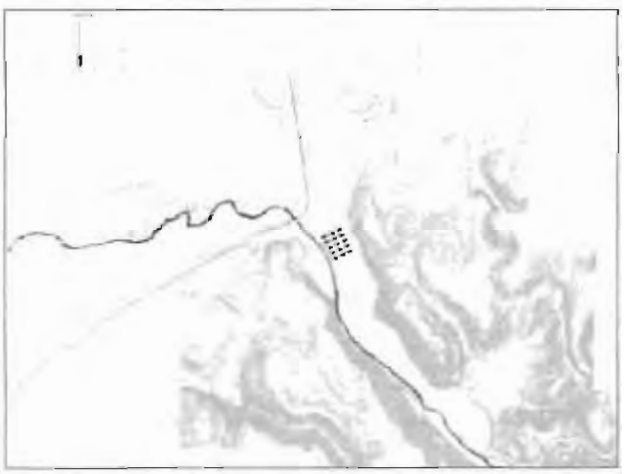
Building on the Vision

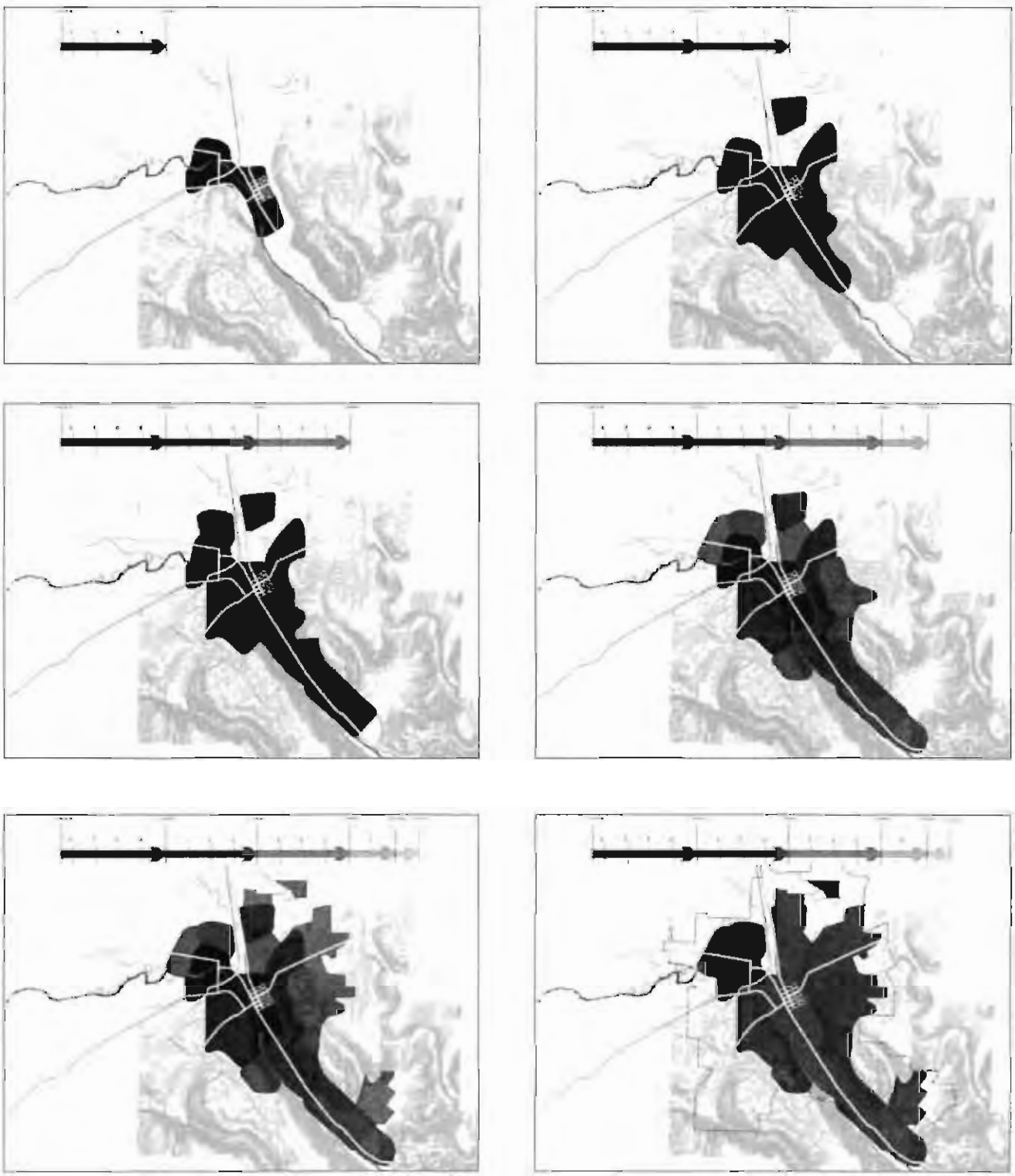
- Framework of "big ideas"
- Land use concept
- Transportation system options

Silverton's Growth Over Time

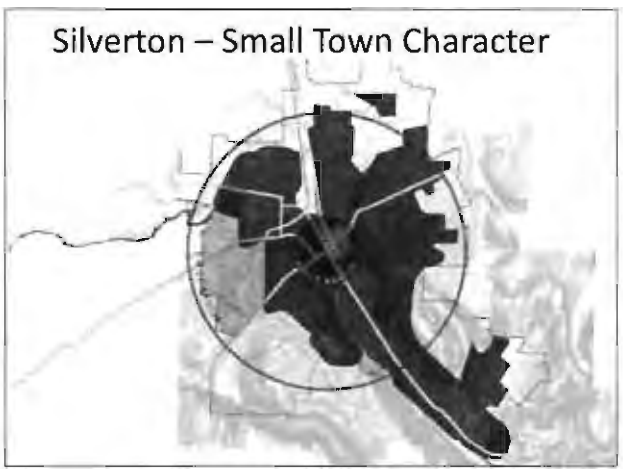


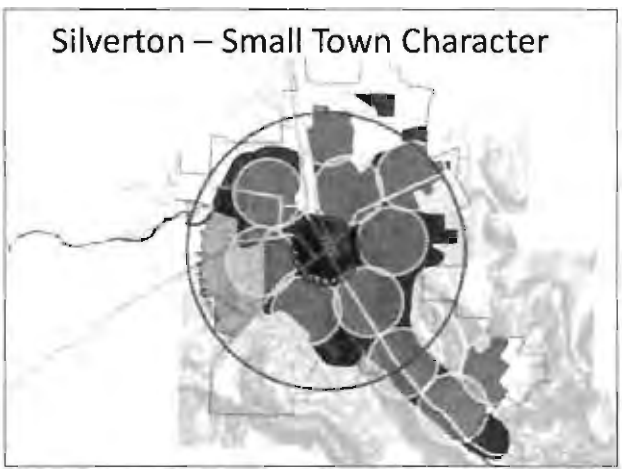


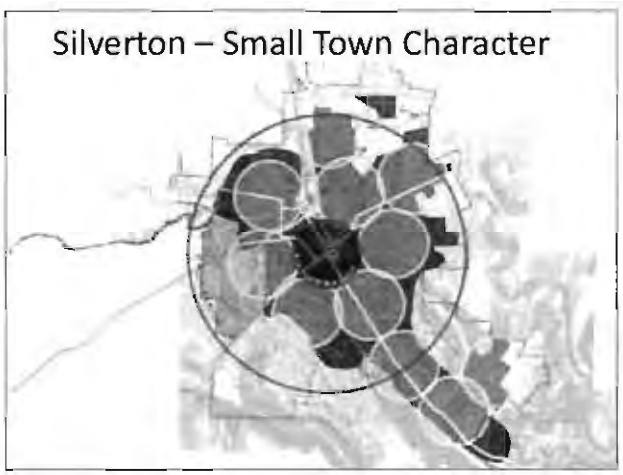





Then and now: 160 years of change


Silverton – Small Town Character


Silverton – Small Town Character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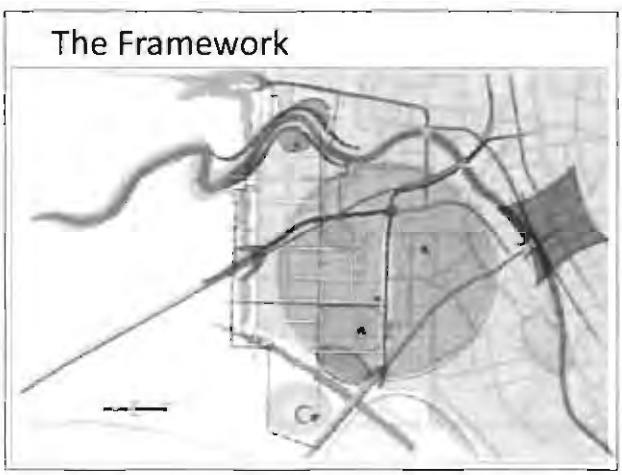

The Framework

Land Use Concept

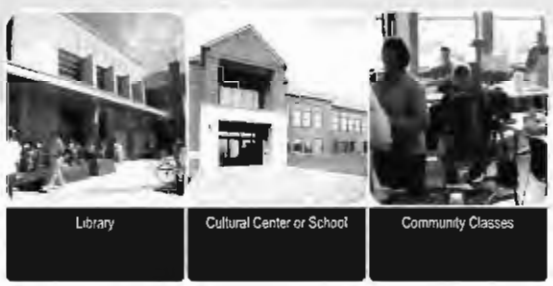
Development Program

Land Use	Acres	Amount	Notes
Gross Developable Area	142.0		
less 20% for ROW	-28.4		
less 20% for Open Space	-28.4		
Net Developable Area	85.2		
Housing			
Apartments	5.2	130	2-3 apartment sites
Townhomes	8.0	128	2-3 townhome neighborhoods
Senior Housing	5.0	150	1-2 senior housing developments
Cottage Housing	15.0	180	Several cottage communities
Single Family Housing	8.0	64	Traditional single family homes
Housing subtotal	*41.2*	*652*	
Light Industrial	25.0	327,000	Small manufacturers, food processors
Commercial/Retail	12.0	183,000	Hotel, restaurants, services
Civic	7.0	91,000	Education, library, cultural
Total	126.4		

Housing Types

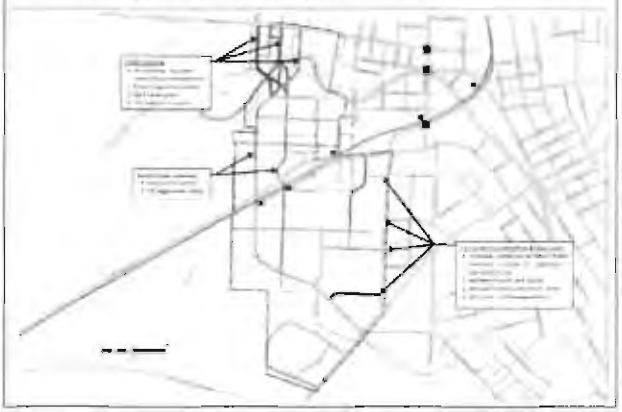
Commercial/Retail

Civic



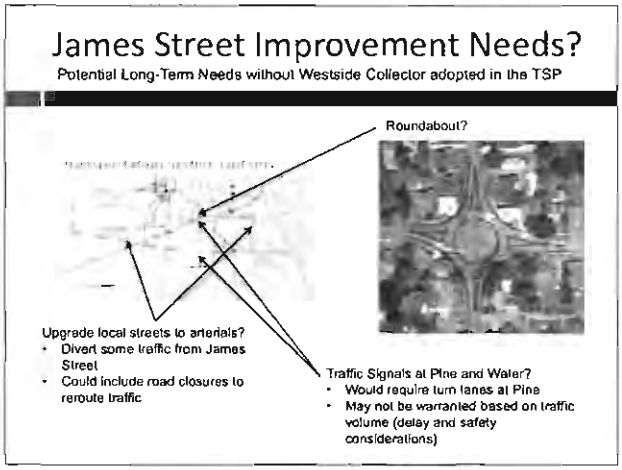
Light Industrial

Transportation System Options



James Street Improvement Needs?

Potential Long-Term Needs without Westside Collector adopted in the TSP



Small Group Exercises

- Review and provide input
  - Land Use Concept
  - Transportation Options
- Report back to the larger group

What's next?

- Record the input received tonight
- Prepare the preferred alternative
- PAC will review the preferred alternative in May
- Prepare the Draft Plan

Thank you for participating!

Silverton West-Side Land Use and Transportation Plan
Project Memorandum #6

otak
HanmiGlobal Partner

17355 SW Boones Ferry Rd.
Lake Oswego, OR 97035
Phone (503) 635-3618

In association with
DKS Associates
Leland Consulting Group

To:	Steve Kay, AICP, City of Silverton Naomi Zwerdling, ODOT
From:	Jennifer Mannhard, AICP, LEED AP, Otak
Date:	October 8, 2012
Deliverable:	6C. Revised Project Memorandum #6
Subject:	Transportation Analysis Methodology

Attached is the Revised Project Memorandum #6 prepared by DKS Associates regarding the transportation analysis methodology for the West-Side Land Use and Transportation Plan.

Per our scope of work, this memorandum is an update of the Draft Transportation Analysis Methodology memorandum. It incorporates the comments we received from you as well as ODOT's Transportation Planning Analysis Unit (TPAU).

Thank you.

PROJECT MEMORANDUM #6

TO: Jennifer Mannhard, AICP, Otak

FROM: Chris Maciejewski, P.E., PTOE, DKS Associates
Ray Delahanty, DKS Associates

DATE: September 28, 2012

SUBJECT: **Transportation Analysis Methodology** P11059-000-006

The purpose of this memorandum is to present the methodology proposed for evaluating the transportation impacts of refining comprehensive plan and zoning designations for approximately 227 acres in Silverton. The resulting Transportation Planning Rule (TPR) analysis, which will be conducted in a later task, will estimate the magnitude of impacts and recommend transportation improvements needed to support the proposed rezoning and future development of the site.

Project Background

The City of Silverton is conducting a process to help shape how the west side of the city, which is largely undeveloped today, may develop in the future. The outcome of this process will include changes to the City's comprehensive plan, transportation system plan (TSP), and development code. This will ensure that urbanization of the West-Side area will occur in an integrated, connected manner that facilitates multimodal travel and provides certainty about planned transportation investments to encourage economic development.

Planning Context

The adopted Transportation System Plan (TSP) for Silverton assumed urban development in the West-Side area based on the existing comprehensive plan, including designated residential, commercial, and industrial land uses. The transportation analysis methodology proposed for the West-Side area uses the same analysis period, the 2030 p.m. peak hour, as the adopted TSP. Therefore, the general approach is to compare the land use being proposed under the current West-Side effort (reasonable worst-case of proposed zoning) with the land use that would be allowed under the current Comprehensive Plan designations (reasonable worst-case existing zoning). The difference between the two scenarios will then be used to estimate trip generation changes to apply to the travel forecasts completed for the City's TSP to determine if TPR requirements are satisfied.

Land Use Assumptions

The West-Side planning area is within Silverton's Urban Growth Boundary. Generally, the planning area is south of Pine Street, west of Fossholm Road and Westfield Street, north of West Main Street, and east of Rogers Lane. Figure 1 illustrates the precise study area, which provides the context for comparing land uses proposed under the current planning effort to those in the City's adopted comprehensive plan.

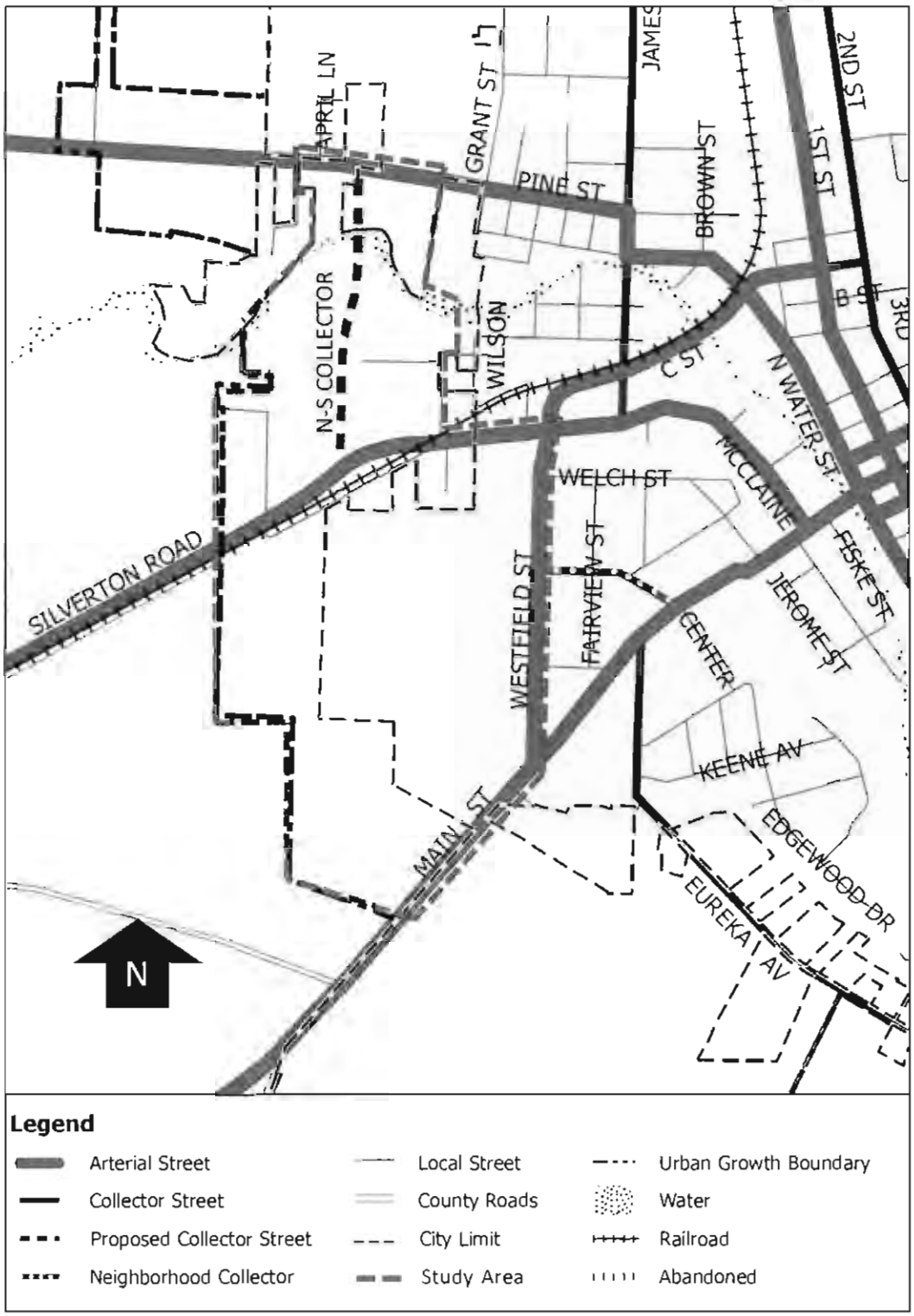


Figure 1: Silverton West-Side Study Area

The current planning effort proposes to change some of the uses for the West-Side area compared to the adopted Comprehensive Plan designations. Table 1 shows the proposed changes in land use for the West-Side plan.

Table 1: Changes in Land Use (Proposed - Current TSP)

Land Use	Current Zoning Acreage	Proposed Zoning Acreage	Change in Acreage
Housing			
Apartments	5.2	5.2	0
Townhomes	8	8	0
Senior	5	5	0
Cottage	15	27.4	12.4
Single Family	8	20.4	12.4
Other			
Light Industrial	25	0.2	-24.8
Commercial/Retail	20	20	0
Civic	7	7	0
Total			**0**

Source: DKS Associates, 2012

Trip Generation

Initial trip generation analysis shows that the proposed change in the mix of uses may decrease total p.m. peak hour trip generation by 64 trips. Because the net change in use is from industrial to residential, there would be a significant increase in the number of inbound trips (generally, trips home from work in the p.m.) to the West-Side area, and a decrease in the number of outbound trips (generally, trips leaving work). Table 2 shows the trip generation results for the land uses assumed in the current TSP, Table 3 shows the trip generation with proposed changes in land use, and Table 4 shows the net change in trip generation due to the proposed changes.

Table 2: Current Zoning Trip Generation

Land Use	Acres	Density	Amount	Inbound Trips	Outbound Trips	Total Trips
Housing		*DU/Acre*	*Dwelling Units*			
Apartments	5.2	25	130	52	28	81
Townhomes	8	16	128	45	22	67
Senior	5	30	150	25	16	41
Cottage	15	12	180	115	67	182
Single Family	8	8	64	41	24	65
Subtotal			*652*	*277*	*157*	*434*
Other		*FAR*	*Square Feet*			
Light Industrial	25	0.3	326,700	38	279	317
Commercial/Retail	20	0.35	304,920	364	463	826
Civic	7	0.3	91,476	321	347	668
Subtotal			*723,096*	*722*	*1089*	*1811*
Total				**999**	**1246**	**2245**

Source: DKS Associates, 2012
Note: Floor-Area Ratio (FAR)

Table 3: Proposed Zoning Trip Generation

Land Use	Acres	Density	Amount	Inbound Trips	Outbound Trips	Total Trips
Housing		*DU/Acre*	*Dwelling Units*			
Apartments	5.2	25	130	52	28	81
Townhomes	8	16	128	45	22	67
Senior	5	30	150	25	16	41
Cottage	27.4	12	329	209	123	332
Single Family	20.4	8	163	104	61	165
Subtotal			*900*	*435*	*250*	*685*
Other		*FAR*	*Square Feet*			
Light Industrial	0.2	0.3	2,614	0	2	3
Commercial/Retail	20	0.35	304,920	364	463	826
Civic	7	0.3	91,476	321	347	668
Subtotal			*399,010*	*684*	*812*	*1497*
Total				**1119**	**1062**	**2181**

Source: DKS Associates, 2012
Note: Floor-Area Ratio (FAR)

Table 4: Changes in Trip Generation (Proposed - Current TSP)

Land Use	Acres	Density	Amount	Inbound Trips	Outbound Trips	Total Trips
Housing		*DU/Acre*	*Dwelling Units*			
Apartments	0	25	0	0	0	0
Townhomes	0	16	0	0	0	0
Senior	0	30	0	0	0	0
Cottage	12.4	12	149	95	56	150
Single Family	12.4	8	99	63	37	100
Subtotal			*248*	*158*	*93*	*250*
Other		*FAR*	*Square Feet*			
Light Industrial	-24.8	0.3	-324,086	-38	-277	-314
Commercial/Retail	0	0.35	0	0	0	0
Civic	0	0.3	0	0	0	0
Subtotal			*-324,086*	*-38*	*-277*	*-314*
Total				**120**	**-184**	**-64**

Source: DKS Associates, 2012
Note: Floor-Area Ratio (FAR)

The trip generation described here is intended to identify locations on the roadway network that are likely to be impacted by the change in land use. Although the overall trip generation for the proposed Silverton West-Side plan is lower than what could occur under current zoning, the significant change in inflow/outflow patterns means that operations at key intersections may need to be reassessed.

Roadway Network Assumptions

The roadway network that will be evaluated for the TPR analysis may only include the future projects that are determined to be reasonable likely to be funded by the horizon year. Based on the funding evaluation provided in the Silverton TSP, the projects that will be included as reasonably likely for this analysis are shown in Table 5.

Table 5: Transportation Projects Assumed to be Funded by 2030

Project Location	Description	Silverton TSP Action Plan?
C Street/McClaine Street	Construct southbound right turn lane	Yes
James Street/C Street	Restrict northbound and southbound left turns	Yes

Source: Silverton TSP, 2008

Trip Distribution

Forecasting work done for the Silverton TSP (via a cumulative analysis approach) reveals the trip distribution patterns for vehicles going to and from the West-Side area in the p.m. peak hour. Based on the trip generation changes shown above and the distribution pattern, estimates of changes to roadway volumes near the West-Side area are shown in Figure 2.

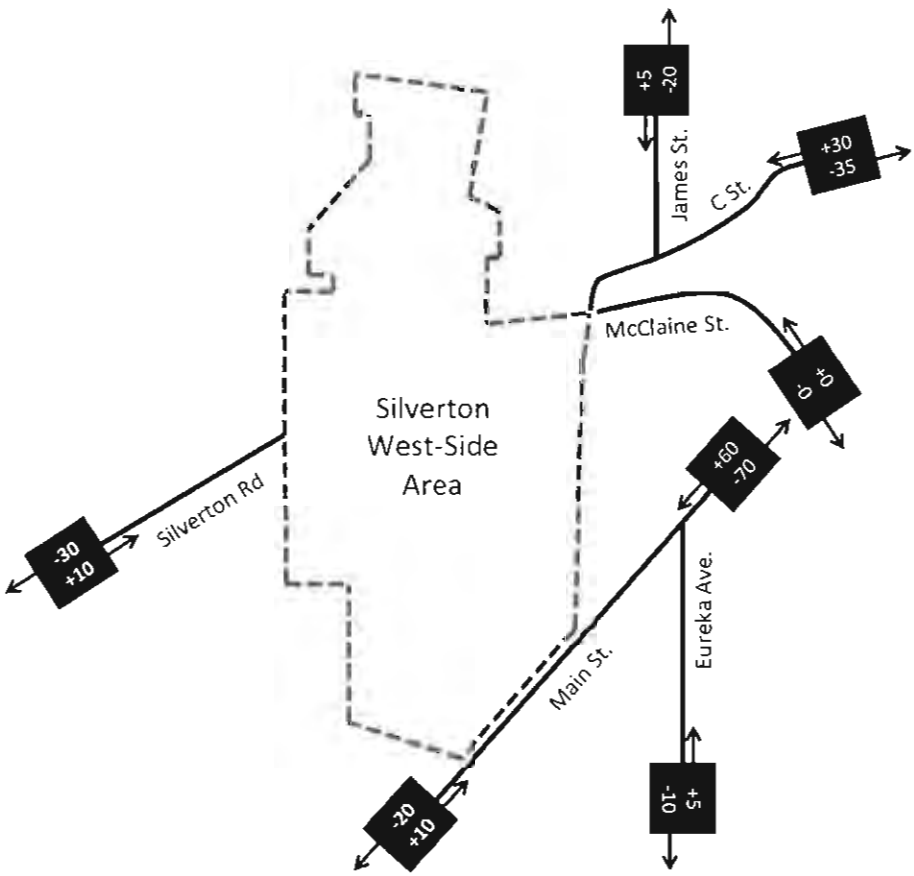


Figure 2: Estimated Change in Trip Distribution (2030 p.m. peak hour)

Study Intersections

This project will analyze scenarios that include the new north-south collector street shown in Figure 1. Study intersections for operational analysis will include three intersections with the proposed north-south collector street, as well as the two most critical existing intersections based on preliminary trip generation estimates provided above as well as intersection operations under the 2030 TSP:

- Pine Street/North-South Collector
- Silverton Road/ North-South Collector
- McClaine Street/C Street
- James Street/C Street
- McClaine Street/James Street

In addition, this project will evaluate operations in the area of Pine, James, Water, and Brown Streets to determine if improvements and potential rerouting through this area preclude the need for the north-south collector. Future year traffic volume changes at the Water Street/C Street intersection due to land use changes and rerouting scenarios are not expected to significantly affect the Water Street/C Street intersection, so it has not been included as a study intersection.

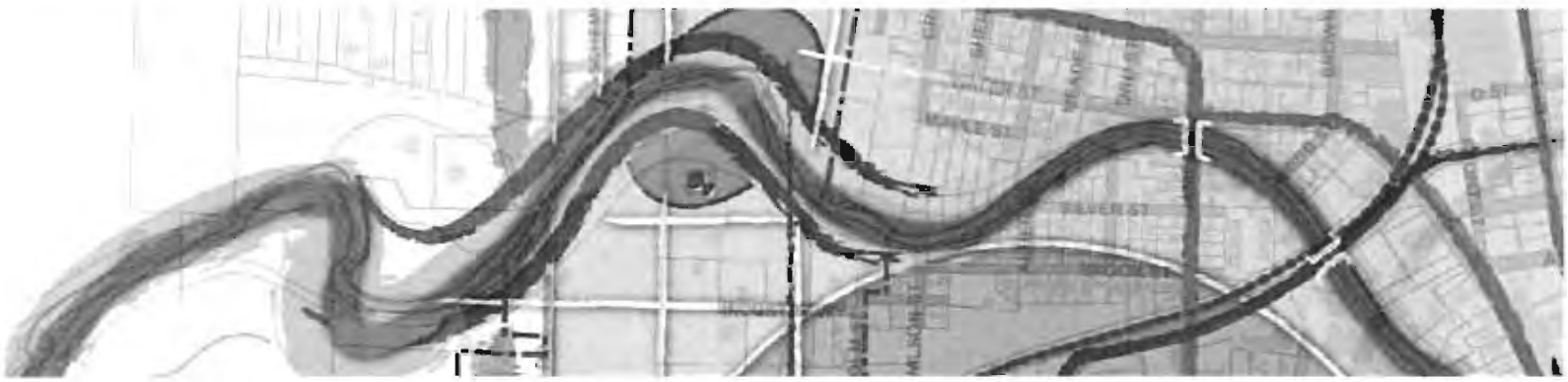
Traffic Forecasting

The impact at each study intersection will be identified using the "Level 2/Cumulative Analysis" method from ODOT's Analysis Procedures Manual, which was also used for the Silverton TSP. The year 2030 volumes forecast for the TSP will be used as a baseline, and no new traffic counts will be used to refine the future volume post-processing, as a sample of nearby counts from 2011 showed similar volumes or small decreases from the counts collected at the same locations in 2006.

Operational Analysis

TRAFFIX, which includes HCM 2000 operational analysis, will be used to evaluate operations at study intersections.

West-Side Land Use and Transportation Plan



Project Memorandum #7
Preferred Land Use & Transportation System Alternative
Part 1 - Land Use

Otak, Inc.
DKS Associates
Leland Consulting Group
November 21, 2012
Deliverable: 7D


City of Silverton - West-Side
Study Area
City Limits
UGB

Introduction

This memorandum presents the Preferred Land Use Alternative for the West Side Plan. The Preferred Transportation System Alternative is presented as a separate document, Memorandum #7: Part 2. The Preferred Land Use Alternative evolved through two community workshops, meetings with the Project Advisory Committee (PAC), and discussions with city staff. The first community meeting was held in January 2012 and focused on the community's vision for the West Side. The second community meeting was held in March 2012 and focused on alternative land use and transportation scenarios that could fulfill the vision. Since the second community meeting, the Silverton City Council and Planning Commission directed the project team to provide more in-depth analysis on the transportation system, focusing specifically on at what point the bridge across Silver Creek may be necessary.

This memorandum includes a description of the vision, design framework, and land use concept as agreed upon through consensus at the last community meeting and endorsed by the city. It also describes necessary public utilities and changes that will need to be made to the Silverton Comprehensive Plan and Development Code to implement the Plan. The transportation system analysis, including the bridge analysis, is presented in Part 2 of this memorandum.

West Side Vision

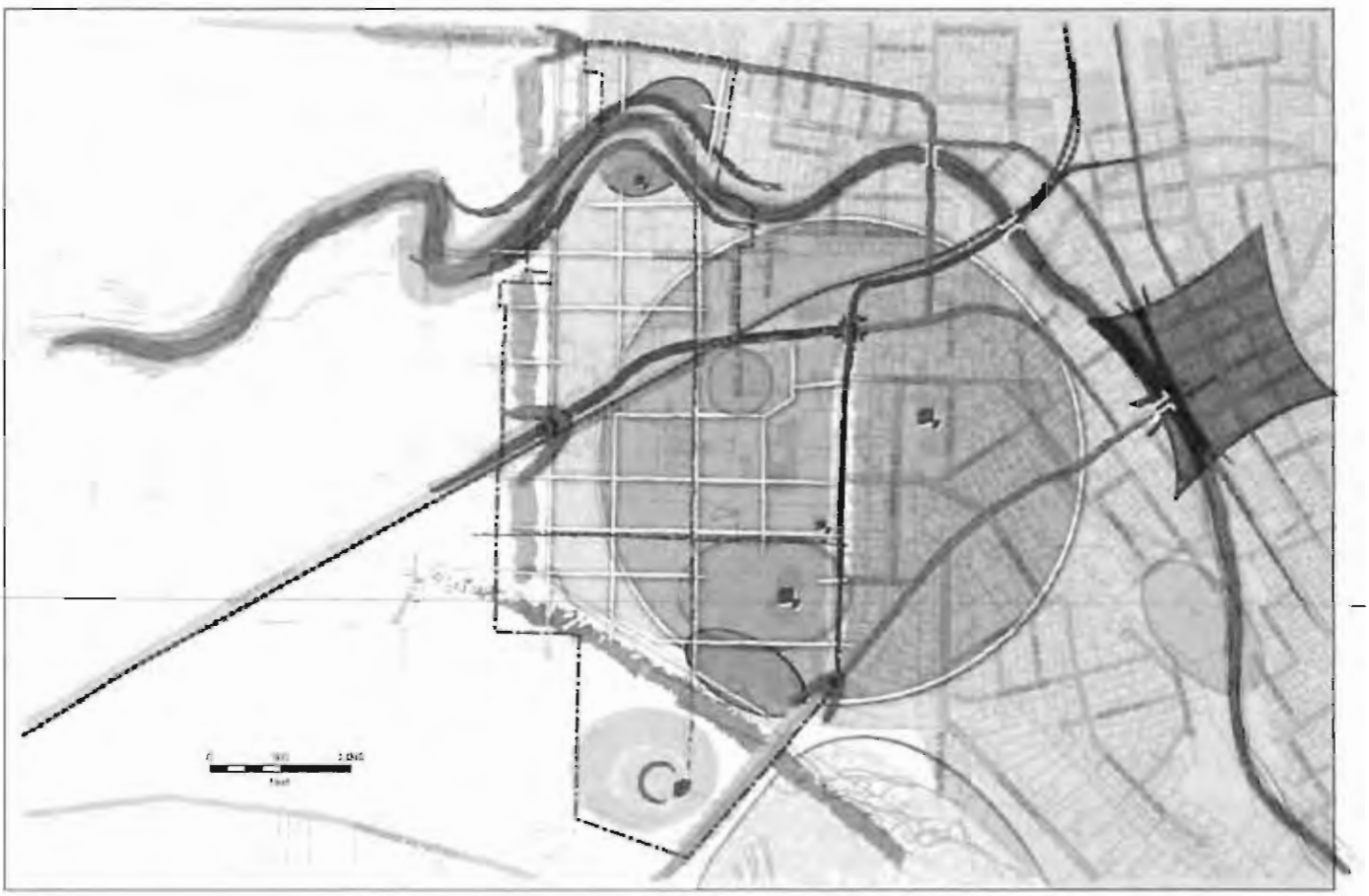
The vision concepts were derived from the input received at the first community meeting, vetted with the Project Advisory Committee, and confirmed at the second community meeting.

As West Silverton develops in the future, it should:

- Continue to contribute to the small town character of Silverton.
- Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
- Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
- Fill out the existing shopping center at the corner of Westfield and Silverton Road.
- Provide local employment opportunities through light-industrial uses that are attractive and well designed.
- Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
- Provide strong connectivity throughout the area for all modes of transportation.

Preferred Design Framework

The diagram illustrates the vision for the area and creates a framework for the land uses and transportation options.



Gateways

- Silverton Road Gateway
- Pine Street Gateway
- W. Main Street Gateway
- Downtown Gateway

Connectivity

- Network of connections throughout area
- Makes West-Side part of the larger Silverton town

West Edge of City

- Transition to agricultural landscape
- Support small-town character

Complete Streets

- Enhanced with pedestrian and bicycle facilities
- Connection to downtown
- Enhanced pedestrian and bicycle facilities

Open Space and Parks

- Cemetery
- School and ball fields
- Parks and gardens

Network of Trails

- Connecting open spaces, schools, Silver Creek Greenway, and Oregon Garden
- Trail to parallel or replace railroad

Special Features

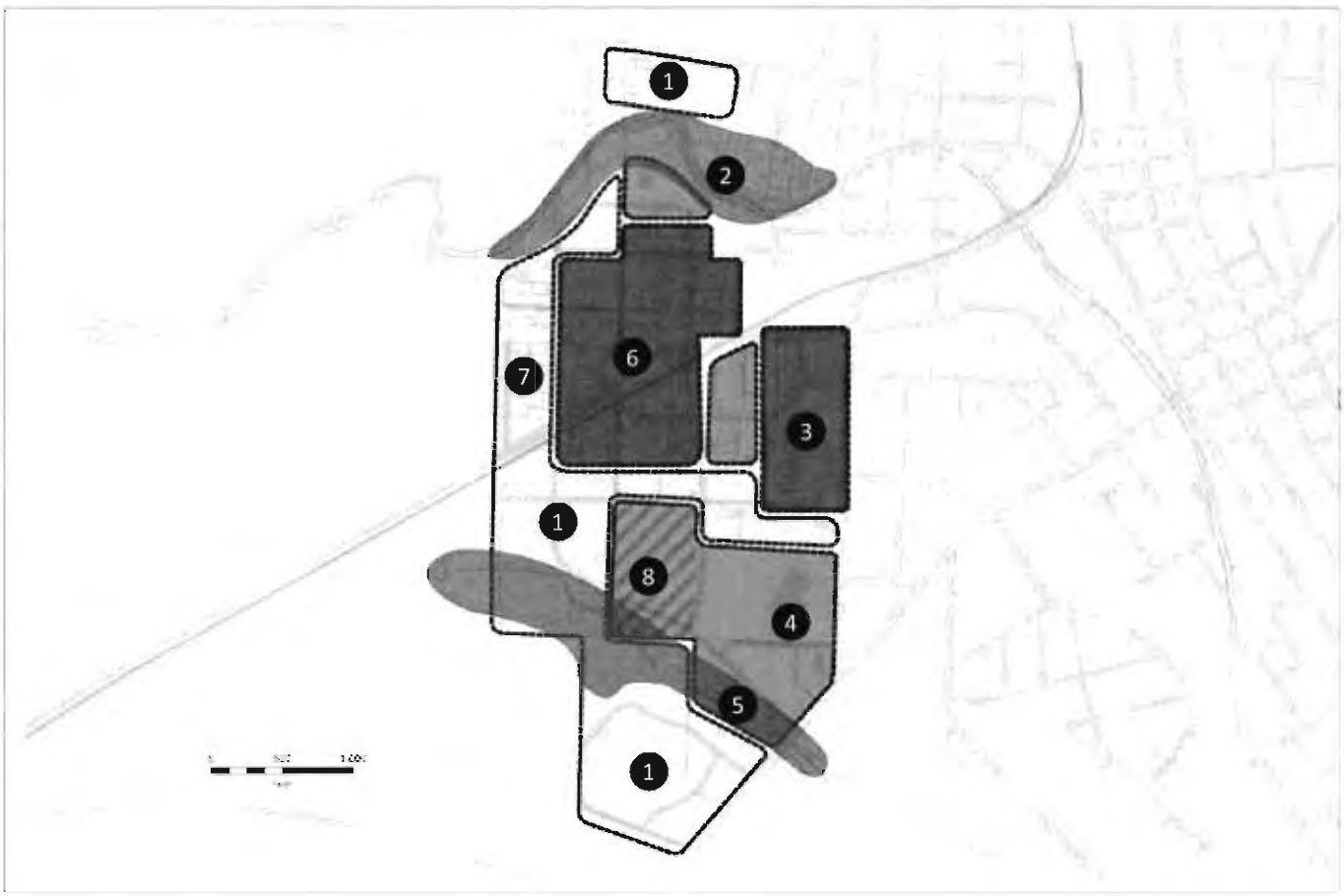
Top of knoll promontory (park or civic use)

Existing stream drainage as open space and trails

Silver Creek greenway with trail connections

Preferred Land Use Concept

The land use concept shows the location of residential, employment, commercial, and civic land uses as well as the two overlay-type features of the Silver Creek floodplain and the drainage area designated a "green buffer." The layout of the uses considers current uses and longer-term redevelopment potential.



1. Future mixed single and multi-family housing
2. Pathways and protected riparian area along creek and floodplain
3. Neighborhood services
4. Existing civic uses
5. Pathways protected open space along drainageway and steep slopes
6. Business park and light industrial employment area
7. Low density housing north of Silverton Road
8. West school site should become mixed residential if no longer needed by the school district

Market Analysis Summary

The development program for the West Side Land Use and Transportation Plan was developed based on an assessment of existing market conditions and forecasted growth for Silverton. In July 2011, a market analysis was completed for the study area that summarizes important demographic, economic, and real estate market conditions citywide, assesses the comparative advantages of the project study area, and addresses the amount, mix, and type of development the market is likely to support. The market analysis drew on recent analysis completed as part of the city's Economic Opportunities Analysis, stakeholder interviews, physical site assessments, and adopted forecasts from the city's 2006 Transportation Systems Plan. The key findings from the market analysis are as follows:

Overall Market Conditions

- Silverton's population is growing. Between 2000 and 2010, the city's population increased at an average annual rate of 2.7 percent, resulting in a 2010 population of 9,222 according to the U.S. Census. During the next 20 years, this trend of steady population growth is projected to continue, with a forecast population of 14,418 in 2030 in the Silverton Transportation Systems Plan.
- Silverton is known to be a small, comfortable bedroom community in which people live, then commute to work in Salem, Woodburn, or the Portland metropolitan area. The city has a very close-knit, small-town feel, with a variety of newer and older housing options.
- The city also has many attractive amenities including a new high school, a well-attended senior center, and a recently expanded hospital.
- Silverton is close to many tourist attractions including the Oregon Garden, Silver Falls State Park, and Mt. Angel's Oktoberfest.
- Silverton's downtown offers an attractive mix of local retail and an active downtown organization. Additionally, the city's retail offerings are primarily local with few regional or national food, service, and apparel options. The city's largest retailers are its grocery anchors and pharmacies including Safeway, Roth's, and Hi School Pharmacy.
- Silverton's proximity to Salem and distance from large, high-traffic freeways make it unlikely that Silverton will attract national or regional apparel retailers or shopping centers, so in the long-term, the city is likely to experience retail growth in the food and convenience retail to serve the local market and visitors.

Housing Market Conditions

- Silverton has seen significant housing development in the east and south sections of the city. The supply of housing throughout the city has included primarily single family detached homes. There is only a very small supply of land zoned for multifamily development to accommodate young families, aging baby boomers looking to downsize, and affordable housing.
- There is demand in the market for more workforce/ affordable housing and multifamily housing, which could be appropriate in the study area.

Commercial and Employment Market Conditions

- Silverton's highest concentration of vacant or partially vacant lots range between half an acre to five acres rendering it challenging to attract large industrial users and employment.
- The existing cluster of industrial land, existing food-related manufacturing, and proximity to agriculture help favor food and beverage processing industrial uses in the future.
- The highest amount of job growth in the market is expected to be in health services, professional and business services, leisure and hospitality, as well as retail within the next 20 years, according to the EOA. The low existing surplus of commercial lands coupled with anticipated employment demand in commercial services suggests an opportunity for commercial development in the study area.
- Silverton's new hospital has been a source of substantial employment in the city as well as a valuable resource for its aging seniors. As is reflected nationally, health-related services and employment are expected to grow markedly in the coming years.
- The study area can accommodate expansion of community uses like the Senior Center and Hospital.

Development Program for the West-Side

A development program is a narrative and quantitative description of how an area is recommended for development. Such a program serves as a guide to the physical planners (land planners, architects, landscape architects, and others) who have responsibility for translating the narrative and quantitative program into plans for physical land use, transportation, civic amenities, utilities, and more. A development program includes an overall identity for the area and how the plan unfolds over time.

The development program, therefore, translates the forecast growth into a range of land uses that is achievable and appropriate for Silverton's West Side area, reflecting its physical location, opportunities and constraints, and competitive position compared to other commercial and residential development opportunities in Silverton. Included in the program is are the various civic and cultural land uses that complement private sector development to create a compelling sense of place that serves existing and future residents and employees of the area.

The program begins by allocating a reasonable share of Silverton's future residential growth to the study area. According to Marion County's Population Forecast Project, the population of Silverton is expected to grow to 14,418 by 2030, an annual growth rate of 1.3 percent. Assuming a comparable avetage household size (currently 2.71), the city will need 1,917 new dwelling units by 2030. Based on the Housing Element of the City's Comprehensive Plan, these units are expected to be 65 percent single family homes, 35 percent multifamily homes, and five percent mobile homes. This results in a 2010-2030 demand for 1,246 new single family homes, 575 multifamily units, and 96 mobile homes.

From this potential opportunity of housing, a fair share was allocated to the West Side area that reflected the following principles and conditions:

- Silverton has significant amounts of vacant single family land on its east side, which are expected to accommodate much of the future growth for that type of housing.
- New commercial uses on the West Side will not compete directly with those in the historic downtown core. This means that commercial uses will be limited to larger retail buildings (that cannot fit in nor would be appropriate for the historic downtown) and employment uses (light industrial).
- Numerous properties throughout the West Side are already developed and are not likely to redevelop during the planning horizon.

Therefore, the development program is as follows:

Land Use	Acres	Density	Amount	Notes
Gross Developable Area	142.0			
less 20% for ROW	-28.4			
less 20% for Open Space	-28.4			
Net Developable Area	**85.2**			
Housing			652	Total housing units
Apartments	*5.2*	*25/acre*	*130*	*2-3 apartment sites*
Townhomes	*8.0*	*16/acre*	*128*	*2-3 townhome neighborhoods*
Senior Housing	*5.0*	*30/ocre*	*150*	*1-2 senior housing developments*
Cottage Housing	*15.0*	*12/ocre*	*180*	*Several cottage communities*
Single Family Housing	*8.0*	*8/acre*	*64*	*Traditionol single family homes*
Light Industrial	25.0	FAR 0.30	326,700	Small manufacturers, food processors
Commercial/Retail	12.0	FAR 0.35	182,952	Hotel, restaurants, services
Civic	7.0	FAR 0.30	91,476	Education, library, cultural
Total	85.2			

Source: Lelond Consulting Group

Housing

Housing is a core element of the program for the study area. The housing program includes a range of different housing products in order to provide physical and architectural variety, to appeal to different market segments, and to allow for the property to develop in phases as market conditions evolve. Housing is an optimal use for the study area for several reasons:

- The study area includes and is close to a mix of amenities that would complement residential development including a school, Silverton Plaza, and Silvetton Hospital.
- The study area's location on the west side of the city along Silverton Road offers a convenient commute to employment in Salem without requiring residents to drive through town.
- The market analysis indicates a demand for multifamily housing, a use for which there is a very limited supply of vacant land in Silverton.

The program is deliberately designed to include a range of housing types. This allows for the opportunity for housing to be built at many different price points and in many different configurations in order to appeal to a btoad cross-section of Silverton's residents. This diversity also ensures a greater architectural variety, helping to ensure that as the area is built out, a residential neighborhood is the result rather than a single project. The following chart describes some of the specific atttibutes of the various housing types that are included in thc program.

Employment Uses

Employment uses, which can include a broad mix of retail, office, and industrial uses, are an important element of the program. The concept plan includes two primary employment districts. One is a commercial retail and services area centered on the existing Silverton Plaza shopping center on Westfield Street. The second is a light industrial employment zone straddling both sides of Silverton Road in the center of thc study area. The study arca has several assets that make it an appropriate location for employmcnt uses:

- The study arca is locatcd along Silverton Road, which serves as the western gateway to the city. This ensures convenience, visibility, and easy access. In particular, this means that trucks serving businesses do not need to navigate through the city center.
- The study area's proximity to the Oregon Garden is a strong advantage for retail tenants, as it offers visitors to the garden and its hotel nearby access to convenience shopping, restaurants, and cafes.
- Several parcels in the study area could potentially be served by rail, provided that spurs are constructed to provide site access.
- Much of the study area is undeveloped and has large lot sizes, providing flexibility for future users.

Silverton currently has a surplus of employment land according to the 2011 Economic Opportunities Analysis. However, the locational attributes of the study area may make it an attractive site for employment uses, drawing more employment in the short term. This is also in keeping with the existing mix of uses in the study area along Silverton Road. Potential retail uses in the study area are not intended to compete with or draw business away from Silverton's downtown historic core. Downtown is the heart of the community and community feedback strongly supports reinforcing this role. Therefore, the intent of the plan is that retail employment uses in the study area will be limited to the Silverton Plaza area and those retail uses allowed in the City's light industrial zoning. This would include larger format retailers that would likely not locate in downtown Silverton due to parking, site size, and visibility constraints. Therefore, any retail development in the light industrial employment area of the study area is not expected to have a negative impact on the vitality of downtown Silverton.

Employment uses in the area could also include some services to support the new neighborhoods and surrounding businesses, particularly in the health care sector, which is projcctcd to grow at a faster rate than other job sectors in Silverton. In the light industrial zone, small manufacturers and warehouses could locatc in the area, particularly in the food processing industry, an existing business cluster in Silverton. At roughly one to two jobs per 1,000 square feet of building, the employment areas of the study area could accommodate between 500 and 1,000 jobs at full build out. The following chart summarizes some of the attributes of potential employment uses that could locate in the light industrial and commercial arcas of the concept plan.

Housing

Cottage Housing
- 8 – 14 du/acre
- 1 to 2 stories
- On-street parking, clustered in shared lot, or garages in alleys

Townhouse
- 12 – 20 du/acre
- 2 to 3 stories
- Surface parking or parking within each unit

Wood Frame Apartments
- 20 – 35 du/acre
- 2 to 3 stories
- Surface, garage, or tuck under parking

Senior Housing
- 25 – 35 du/acre
- 2 to 4 stories
- Surface, garage, or tuck under parking

Employment

Hotel
- 75 to 100 units

Restaurant
- 2,000 to 4,000 SF

Services
- 1,000 to 3,000 SF

Retail
- Larger footprint
- Noncompetitive with downtown

Flexible Open Space
- 3,000 to 15,000 SF

Office/Warehouse
- Showroom

Light Manufacturing
- Production

Comprehensive Plan

The West-Side Plan should be adopted as a refinement plan of the Silverton Comprehensive Plan. A new section would be written for Chapter 2 – Urbanization that describes the area and policies. The current map designations of Commercial, Residential, Industrial, and Public/Semi-Public would continue to be used, but would be supplemented by the West-Side Plan vision statement, which serves as the specific policies for the area.

This approach provides guidance for policy and regulation development in the future at such time that properties are brought into the city limits. As part of the Comprehensive Plan, the West-Side Plan will provide the city's policies toward the character and development of the area.

This provides flexibility in implementation as the overall plan provides the vision and intent for the area without prescriptive regulations. It will show the desire for multi-use trails through green areas and also reflect the community's desire for the school property to become residential if the school district were to ever sell the back portion of its property.

The two property-specific amendments to the Comprehensive Plan Map are:

1. Change the large 24.5 acre property that forms part of the western boundary of the planning area immediately south of Silverton Road from Industrial to Single Family Residential designation.

2. For the purpose of consistency with other church properties, change the church property on Westfield Street to entirely Multi-Family Residential as opposed to its current split designation.

Mix of Housing Types

To achieve the mix of housing types called for in the preferred land use concept a new requirement should be added to the Silverton Development Code (SDC) for a mix of housing or building types on residentially-zoned properties over a certain size/acreage within the designated West-Side Plan Area.

The City of Corvallis uses this approach and requires the following variation in housing types:

1. Developments less than five acres - No housing or building type variation is required, although housing type variations are encouraged.

2. Developments of five ro 10 acres - At least two housing or building types are required. Each required housing or building type shall be at least 20 percent of the total units.

3. Developments greater than 10 acres - At least three housing or building types are required. Each required housing or building type shall be at least 20 percent of the total units.

The underlying requirements of the base zone would still apply. Therefore, consideration needs to be given to whether properties are zoned R-1 or R-5 in areas to receive Single Family Zoning. Currently, R-1 doesn't allow for housing types other than a single-family home or a duplex with standards or as a conditional use, whereas R-5 does.

Additionally, due to the large parcel size of many of the properties in the West-Side planning area, a Planned Development requirement should be added for residentially zoned properties over a certain size to ensure the mix of housing types requirement is met prior to land division.

Trails

The land use concept shows two areas of green open space with pathways. Each occurs along with a natural landscape feature: Silver Creek on the north and the steep drainage way on the south. Much of area is also covered by the Floodplain Overlay, the Hillside Overlay, or both. The SDC already allows the city to require properties that are subject to the hillside protection overlay to be processed as planned developments. This would cover the area along Silver Creek and some of the desired trail area in the south. If, as recommended above, parcels over a certain size in the West-Side area were required to be processed as a planned development as well, the rest of the area of the desired trail in the south would be covered.

The planned development review criteria require that "all relevant provisions of the comprehensive plan are met." If the West-Side Plan is adopted as a refinement to the Silverton Comprehensive Plan, then creation of the open space and trails as shown in the West-Side Plan would be a criterion for approval. The West-Side Plan would state that parks, open space, and trails shall be incorporated into proposed developments in the locations as generally shown on the Land Use Concept Map.

In addition, the approval criteria already require the creation and conveyance of open space in a master plan. The trails could meet or contribute to meeting that requirement. This approach would implement the open space and trails concept without the creation of new development standards or overlays.

Public Utilities Feasibility and Cost Estimate

The cost estimates for the sanitary waste water, storm water, and water improvements provided below are the cost for deficiencies noted in the master plan for the trunk lines, major transmission lines, and treatment plants. The cost estimates do not include the typical costs associated with construction of a residential subdivision or the commercial, industrial, retail, or civic site development. These improvements would be incidental to the construction and would be absorbed as part of the cost of development.

The cost for the deficiency improvements noted in the three master plans has been provided per unit for residential properties and per acre for the commercial, industrial, retail, civic areas of the study area. The cost per acre was estimated uniformly for all the uses listed. SDC funding was not included in the costs from the three Master Plans. The amount of residential units and commercial, industrial, retail, civic development acreages is taken from the preferred development table in this report. The costs are prorated for the study area when the master plan deficiencies are city wide improvements. A population of 14,418 has been used for the projected 2030 City wide population and a population of 1,767 has been used for the study area population projection. The population of the study area is projected based on 652 residential units with 2.71 residents per unit. The costs are divided amongst the various zones in the study area when the deficiencies are related only to the study area. The improvement costs are reduced to 12% (1,767/14,418) of the total when deficieneies are City wide to represent the portion attributable to the study area.

Waste Water

There are no pipeline capacity deficiencies identified within the Waste Water Master Plan within the study area. The typical 6" to 8" mainline improvements necessary for development would occur as development of the properties occurred. It is assumed that these new mainlines would connect to the existing main trunk lines or to the treatment plant via gravity flow and that a pump station or additional trunk lines would not be necessary. The costs for the 6" or 8" conveyance lines would be indirect cost to the property owners, paid for by the developer of the property and included in the purchase price of the property, whether it be residential, commercial or industrial. Therefore the cost associated with the conveyance would be typical for development and not directly paid for by the residents. Phasing of the improvements would best be accommodated by starting at the lower end of the area and progressing to higher ground.

The master plan identified several mainline improvement projects beginning in 2007. Assuming that the improvements scheduled for completion prior to 2012 have been completed the cost for the remaining improvements are $488,000. The costs associated with the treatment plant systems to accommodate growth to 2030 of the entire City have been prorated for the study area population at 2030. Therefore the cost of the treatment plant upgrades is estimated at $36 per unit for the residential area and $702 per acre for the commercial, industrial, retail, civic development areas.

Storm Water

The Storm Water Master Plan was in the process of completion when this study area analysis was initiated and has since been completed. The West-Side Study area is mostly included in the West Silver Creek basin, with additional areas to the west and south noted as 'other" in the master plan. The costs for the storm drain conveyance, treatment and detention systems that will be constructed with development are not included in the following cost estimates.

The master plan identified two deficiencies in the study area, Monsoon Road and McClain Street. These improvement projects are identified as priority 3 improvements to be completed in 2022 – 2032, at a cost of $255,000. SDC reductions are not included in this analysis. These projects are within the study area; therefore the costs for these would be shared solely by the residents within the study area only. The cost for these storm water improvements equates to $152 per unit for the residential area and $2,993 per acre for the commercial, industrial, retail, civic development areas.

Water

The water master plan identified deficiencies in the City system and placed them into three prioritized groups. Priority 1 projects included several City wide improvement projects to correct deficiencies in the system with benefits to existing and future users. These include a storage tank, booster pump, water supply and pump station, treatment

plant upgrades, and a pump house. The priority 1 also included funding for a rate study update. The total cost for the priority 1 projects total $6,206,000. These costs need to be prorated to the population of the study area as a portion of the City's projected population. The study area had two projects in the priority 2 category and five in the priority 3 category. These projects are deficiencies within the study area. The total cost of these projects is $514,000. Based on the total of 652 units in the study area the cost for these water improvements equates to $762 per unit for the residential area and $14,959 per acre for the commercial, industrial, retail, civic development areas.

Unit Cost Analysis

			Waste Water		Storm Water		Water	
Study Area Development	Acres	Percent of Study Area	Total Cost	Cost per Unit or Acre	Total Cost	Cost per Unit or Acre	Total Cost	Cost per Unit or Acre
Residential (652 Units)	33.2	39.0%	$190,160	$36	$99,366	$152	$496,653	$762
Light Industrial	25	29.3%	$143,192	$702	$74,824	$2,993	$373,986	$14,959
Commercial / Retail	20	23.5%	$114,554	$702	$59,859	$2,993	$299,188	$14,959
Civic	7	8.2%	$40,094	$702	$20,951	$2,993	$104,716	$14,959
Total	85.2	100.0%	$488,000		$255,000		$1,274,543	

Study area population as a percent of 2030 projected population

652 units x 2.71 residents per unit / 14,418= 12%

Water costs including City wide and study area deficiencies		
Priority 1	$6,206,000 x 12%	$760,543
Priority 2		$256,000
Priority 3		$258,000
	Total	$1,274,543

West-Side Land Use and Transportation Plan

Project Memorandum #7
Preferred Land Use & Transportation System Alternative
Part 2 - Transportation System

Otak, Inc.
DKS Associates
Leland Consulting Group
November 16, 2012
Deliverable: 7D

DRAFT PROJECT MEMORANDUM #7

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DATE: November 16, 2012

TO: Jennifer Mannhard, AICP, Otak

FROM: Chris Maciejewski, P.E., PTOE, DKS Associates
Ray Delahanty AICP, DKS Associates
Sai Sirandas, DKS Associates

SUBJECT: Preferred Land Use and Transportation System Alternative

P11059-000-006

The purpose of this memorandum is to present the transportation impacts of refining comprehensive plan and zoning designations for approximately 227 acres in Silverton, as well as to provide recommended mitigations for impacted study intersections. Specifically, this assessment addresses the Transportation Planning Rule (TPR) requirements for amending the City's Transportation System Plan (TSP). The following sections include an overview of the TPR requirements, an assessment of trip generation and distribution, capacity analysis of study intersections with existing zoning and proposed zoning, and potential mitigations necessary to address any deficiencies that were identified in the analysis.

PROJECT DESCRIPTION

The City of Silverton is conducting a process to help shape how the west side of the city, which is largely undeveloped today, may develop in the future. The outcome of this process will include changes to the City's comprehensive plan, TSP, and development code. Figure 1 shows the project study area and the surrounding roadway network. The network shown includes a proposed North-South Connector street that is included in the currently adopted TSP, and the study intersections for this project.

TRANSPORTATION PLANNING RULE (TPR) OVERVIEW

The Transportation Planning Rule[1] requires that, where an amendment to a comprehensive plan or zoning regulation would significantly affect an existing or planned transportation facility, the local government shall put in place measures that assure that allowed land uses are consistent with the function, capacity, and performance standards of the facility. The Silverton West-Side Plan proposes an amendment to the comprehensive plan map and zoning map. Therefore, the proposed map changes must comply with the TPR.

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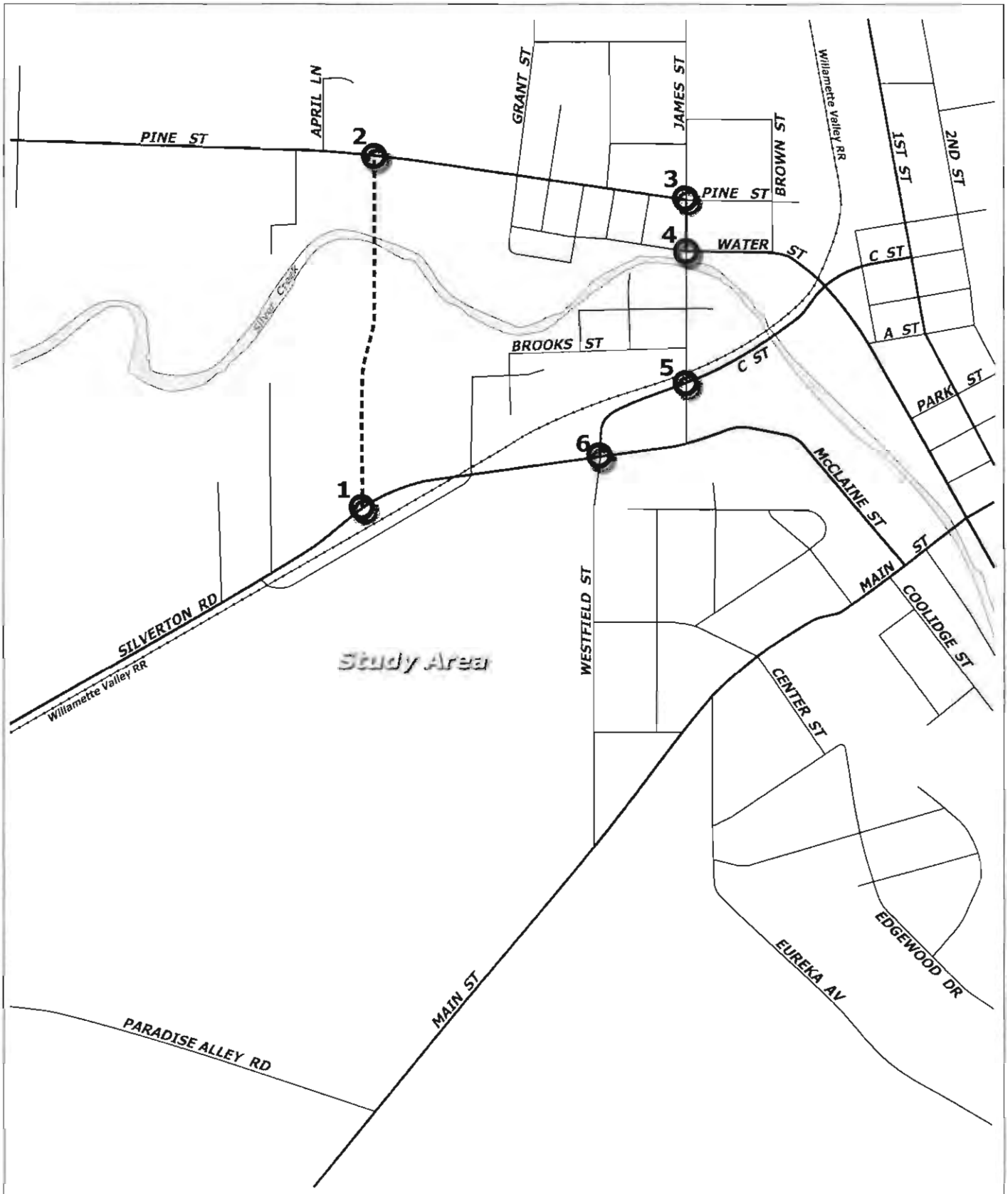
[1] Oregon Department of Land Conservation and Development. Transportation Planning Rule, Oregon Administrative Rules Chapter 660, Division 12, as amended September 2012.
[2] Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration (FHWA), 2009



LEGEND

1 - Study Intersection

----- - Proposed North-South Connector

DKS

No Scale

Figure **1**

STUDY AREA

The traffic analysis required by the TPR measures impacts by estimating the change in vehicle trips on the transportation system resulting from a comprehensive plan or zoning amendment. Generally, the analysis procedure then compares transportation system performance under the adopted comprehensive plan/zoning designation reasonable worst-case scenario to the performance under a proposed comprehensive plan/zoning designation reasonable worst-case scenario. If the proposed scenario is found to not have significant transportation system impacts (e.g., fewer estimated trips generated or insignificant offsite impacts from additional trips), no mitigation measures are required.

TRIP GENERATION AND TRAFFIC FORECASTING

As outlined in Project Memorandum #6: Transportation Analysis Methodology, the preferred alternative for the Silverton West-Side Plan proposes an amendment to the existing Comprehensive Plan, which will change the estimated traffic volumes upon which the current TSP is based. The changes in total PM Peak hour trip generation for the reasonable worst case of the proposed land use changes are summarized in Table 1.

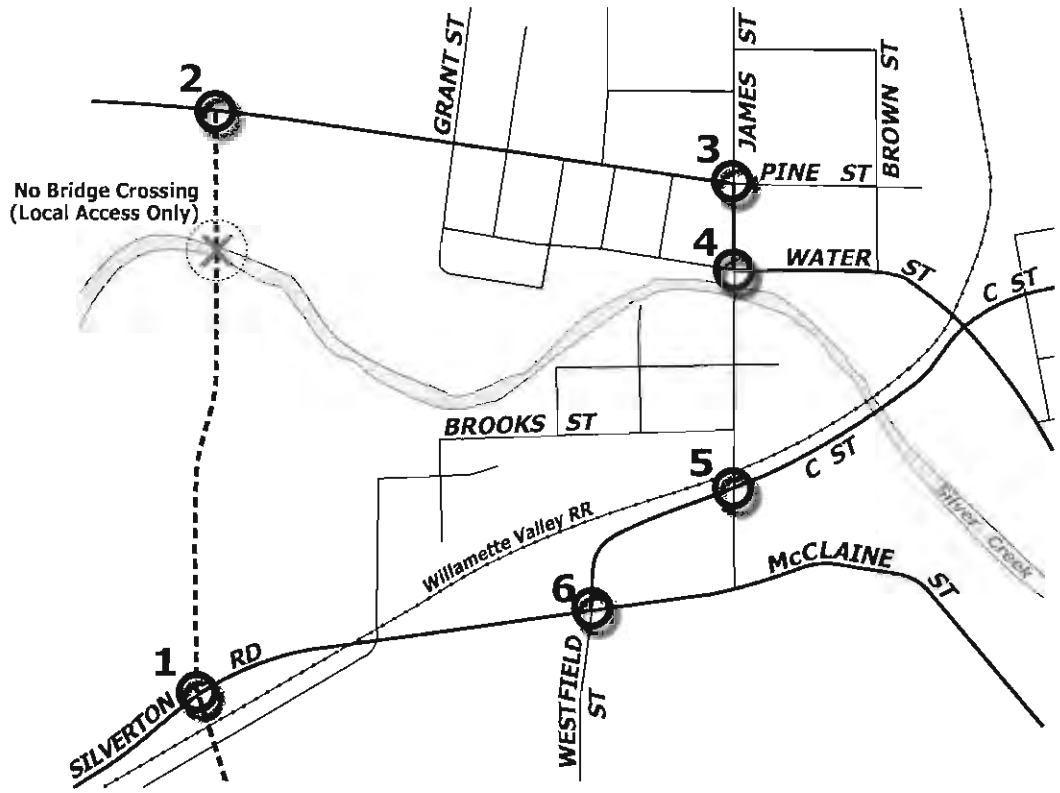
Table 1: Changes in PM Peak Hour Trip Generation (Proposed vs. Comprehensive Plan)

Land Use	Dwelling Units	Square Feet	Inbound Trips	Outbound Trips	Total Trips
Housing	+248		+158	+93	+250
Industrial		-324,000	-38	-277	-314
Total			**+120**	**-184**	**-64**

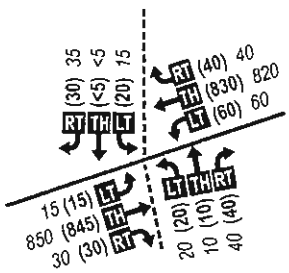
Source: DKS Associates, 2012

As listed in Table 1, the trip potential for the site would decrease by approximately 64 PM peak hour trips with the proposed reasonable worst-case scenario compared to the trips assumed in the adopted Silverton TSP. Therefore, since the proposed plan amendment would not have a significant effect on the transportation system when considering PM peak period trip generation, the surrounding transportation system is generally not degraded and meets TPR requirements. However, the significant change in inbound trips (a 12% increase from the current zoning trip generation) and outbound trips (a 15% decrease from the current zoning trip generation) means that some critical movements at study intersections might experience higher volumes. Therefore, key intersections were reassessed with the traffic volumes assumed from the proposed zoning to determine operational impacts.

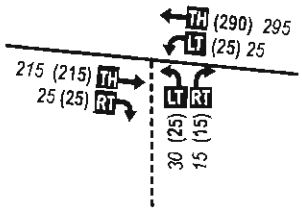
The forecasting tool developed for the Silverton TSP (via a cumulative analysis approach) was utilized to estimate changes to traffic volumes with the proposed land use. Figure 2 shows future year PM peak hour volumes for the base TSP Financially Constrained scenario, as well as the proposed land use scenario.



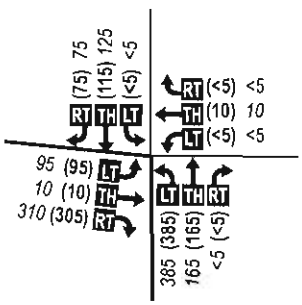
1. Silverton Rd. @ North-South Connector



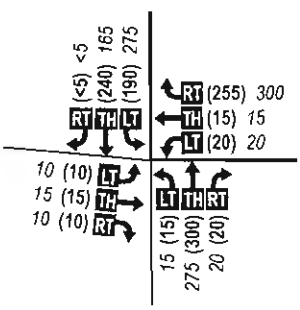
2. Pine St. @ North-South Connector



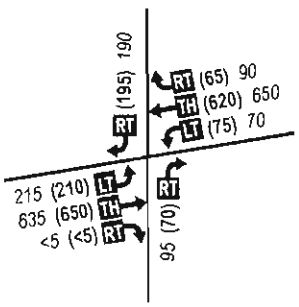
3. Pine St. @ James St.



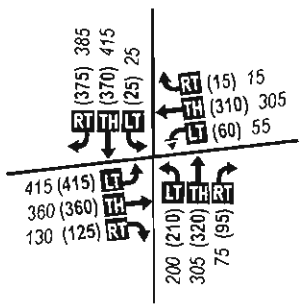
4. Water St. @ James St.



5. C St. @ James St.



6. McClaine St. @ C St.



LEGEND

1 - Study Intersection

---- - Proposed North-South Connector

LT TH RT - Volume Turn Movement (Left+Thru+Right)

(A) *B* - PM Peak Hour Traffic Volumes

(A) - Current TSP Land Use With Current TSP Network

B - Project Land Use With Current TSP Network

DKS

No Scale

Figure **2**

FUTURE 2030 PM PEAK HOUR TRAFFIC VOLUMES

Land Use Alternatives

OPERATIONAL ANALYSIS

Study Intersections

Based on the potential impact area of the trip generation changes listed in Table 1, the following intersections were identified as study intersections.

- Pine Street/North-South Connector
- Silverton Road/North-South Connector
- McClaine Street/ C Street
- Pine Street/James Street
- Water Street/James Street
- C Street/ James Street

The 2008 TSP includes the construction of a North-South Connector roadway providing connections from the west-side area to Pine Street and Silverton Road as part of the Master Plan list of project (i.e., it is not part of the Financially Constrained Scenario). However, at least a portion of this roadway that provides access to development areas (not the Silver Creek crossing) would be included as part of the Financially Constrained scenario, which would include some intersection improvements at the connections to the arterial network. The North-South Connector project as described in the TSP includes a roundabout at Silverton Road. Subsequent coordination with ODOT Rail determined that the construction of a roundabout is not feasible at this intersection due to the proximity of the adjacent at-grade rail crossing. Therefore, in the analysis presented in the following sections, the Silverton Road/North-South Connector intersection was evaluated in two ways – with a two way stop control and with a traffic signal -- since the Financially Constrained configuration has not been determined.

Traffic Signal Warrant Analysis

A traffic signal warrant analysis was completed to determine if the Silverton Road/North-South Connector intersection meets the requirements for the installation of a traffic signal as per the criteria outlined in the MUTCD[2]. The warrants considered include:

- Peak-Hour Volumes (Warrant 3)
- Intersection near a Grade Crossing (Warrant 9)

It was found that the peak hour traffic volumes at this intersection did not meet the Warrant 3 criteria. However, the combination of peak hour major and minor street traffic volumes and the proximity to the adjacent at-grade rail crossing do support signalization under Warrant 9 criteria. Supporting documentation for this analysis is included in the appendix.

Intersection Operations

The operational analysis for this study was conducted using TRAFFIX[3] software to create reports based on Highway Capacity Manual 2000 methodologies[4]. This study reports the level of service (LOS) and volume to capacity (v/c) ratio for study intersections.

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[2] Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration (FHWA), 2009
[3] TRAFFIX, PTV AG, Karlsruhe, Germany, 2007

Definition of Traffic Measures of Effectiveness

Level of Service (LOS) is used as a measure of effectiveness for intersection operation. It is similar to a "report card" rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F generally represents conditions where demand has exceeded capacity. This condition is typically evident in long queues and delays. .

Another performance measure for intersections is the volume-to-capacity (v/c) ratio. This measure of effectiveness takes into account the total volume entering an intersection and compares it to the overall capacity of that intersection to determine a ratio on a scale of 0.0 to 1.0. As an intersection's v/c ratio approaches 1.0, intersection conditions are more congested, and longer queues and delay exist. v/c is also calculated for individual movements at an intersection.

Marion County Standard: The Marion County operating standard for unsignalized intersections is level of service E. For signalized intersections, the standard is level of service D with a v/c ratio of 0.85.

City of Silverton Standard: For this analysis, the City of Silverton performance standards as recommended by Goal 4-(f) of the 2008 TSP were used. Operating standards include LOS D with a v/c ratio of 0.85 for all signalized and all-way stop controlled intersections, and LOS D with a v/c ratio of 0.90 for all unsignalized intersections.

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[4] Highway Capacity Manual 2000, Transportation Research Board, 2000

2030 Intersection Operations: Land Use Comparison

Table 3 compares the intersection operations under the proposed West-Side Area land use to those in the adopted TSP. The roadway network assumptions outlined in the 2030 financially constrained scenario of the 2008 TSP were used as the basis for this comparison.

Table 3: 2030 PM Peak Hour Intersection Operations with 2008 TSP Network Assumptions- Comparison of Land-Use Alternatives

				2008 TSP		West-Side Plan	
Intersection	**Control**	**Jurisdiction**	**Mobility Standard**	**LOS**	**V/C**	**LOS**	**V/C**
C Street/ McClaine Street	Signal	Marion County	LOS D & V/C 0.85	C	**0.90**	D	**0.90**
James Street/ Pine Street	AWSC	Silverton	LOS D & V/C 0.85	D	**0.95**	D	**0.96**
James Street/ Water Street	AWSC	Silverton	LOS D & V/C 0.85	C	0.72	C	0.77
James Street/ C Street	TWSC	Marion County	LOS D & V/C 0.90	A/C	0.45	B/C	0.46
Silverton Road/ North-South Connector	TWSC	Marion County	LOS D & V/C 0.85	B/**F**	**>1**	B/**F**	**>1**
	Signal	Marion County	LOS D & V/C 0.85	B	0.71	B	0.72
Pine Street/ North-South Connector	TWSC	Marion County	LOS D & V/C 0.90	A/B	0.05	A/B	0.07

Notes: Control: AWSC = All-Way Stop Controlled, TWSC = Two-Way Stop Controlled
A/A=major street LOS/minor street LOS
Signalized and all-way stop V/C ratio = average V/C ratio for entire intersection
Unsignalized V/C ratio = critical movement V/C ratio
Bold type indicates a failure to meet adopted mobility standard.
Shaded type indicates operations that fail to meet adopted mobility standards and further degrade from current TSP levels
Source: DKS Associates, 2012

The TPR requirements specify that land use or functional plan actions shall not cause the transportation system to perform worse than adopted mobility standards. Or, if facilities are already estimated to fail to meet mobility standards in the future, the proposed action cannot further degrade that condition.

As indicated in Table 3, in the West-Side Plan scenario, the v/c ratio at the C Street/McClaine Street intersection fails to meet the City's mobility standards. However, the v/c ratio is 0.90 in both the West-Side scenario and in the 2008 TSP, so performance is not degraded from TSP levels. The LOS of this intersection does deteriorate (from LOS C to LOS D) due to the rezoning actions, but continues to meet the City's LOS D mobility standard. Therefore, in this scenario, performance of the C Street/McClaine Street intersection under the proposed rezoning conditions complies with the TPR requirements.

The James Street/Pine Street intersection fails to meet mobility standards, and it also performs worse (0.96) than it does under the 2008 TSP (0.95). This intersection does not meet the "no further degradation" standard, and would require mitigation under the TPR.

The Silverton Road/ North-South Connector intersection with a two-way stop control also fails to meet mobility standards and its v/c performance is degraded compared to the 2008 TSP. With a traffic signal in place, this intersection performs better and meets the mobility standards.

NETWORK ALTERNATIVES

In the forecast year 2030, the James Street/Pine Street intersection operates at a v/c ratio of 0.95 under the 2008 TSP and a v/c ratio of 0.96 with the proposed West-Side rezoning. The degraded v/c ratio at this intersection is primarily due to traffic on James Street, which provides one of the few bridge crossings over Silver Creek. James Street also currently serves as the primary connection between Water Street and Pine Street. As a result, there is a high volume of northbound left turns from James Street turning into Pine Street. Congestion is even higher in the a.m. peak hour, when there are more trips going towards the high school. To mitigate these traffic conditions, alternative system improvements[5] were developed and evaluated:

Alternative 1: No-Build system (Current TSP)

The TPR requires a No-Build scenario to be included in the analysis. Data collected for the 2008 TSP update, including traffic volumes, facility inventories, and future year traffic forecasts, were used as the basis for the impact analysis.

Alternative 2: North-South Connector Bridge

This scenario includes the construction of a bridge crossing for the North-South Connector. This roadway would provide an additional connection over Silver Creek and help relieve the trips on James Street. The 2008 TSP identifies this improvement as one of the Master Plan (i.e., not financially constrained) projects that would enhance circulation and connectivity throughout Silverton. It was determined that this project may not be supported by study-area property owners.

Alternative 3: Brown Street Re-route

This alternative proposes to relieve congestion at the James Street/Pine Street intersection and improve circulation in the study area without constructing the North-South Connector bridge. This alternative involves upgrading Brown Street (From Water Street to Pine Street) and Pine Street (from Brown Street to James Street) to arterial standards and rerouting traffic between Water Street and Pine Street via the new arterial link. This improvement was evaluated with two different treatments at the James Street/Pine Street intersection: (1) with a roundabout, and (2) with a signal. Conceptual sketches, attached (see Appendix), illustrate the general network features of the Brown Street realignment, as well as more detail on the signalized and roundabout options. These planning level design drawings are based on the roadway cross-section standards outlined in the 2008 TSP[6].

Figure 3 shows the future year traffic volumes for the above three network alternatives.

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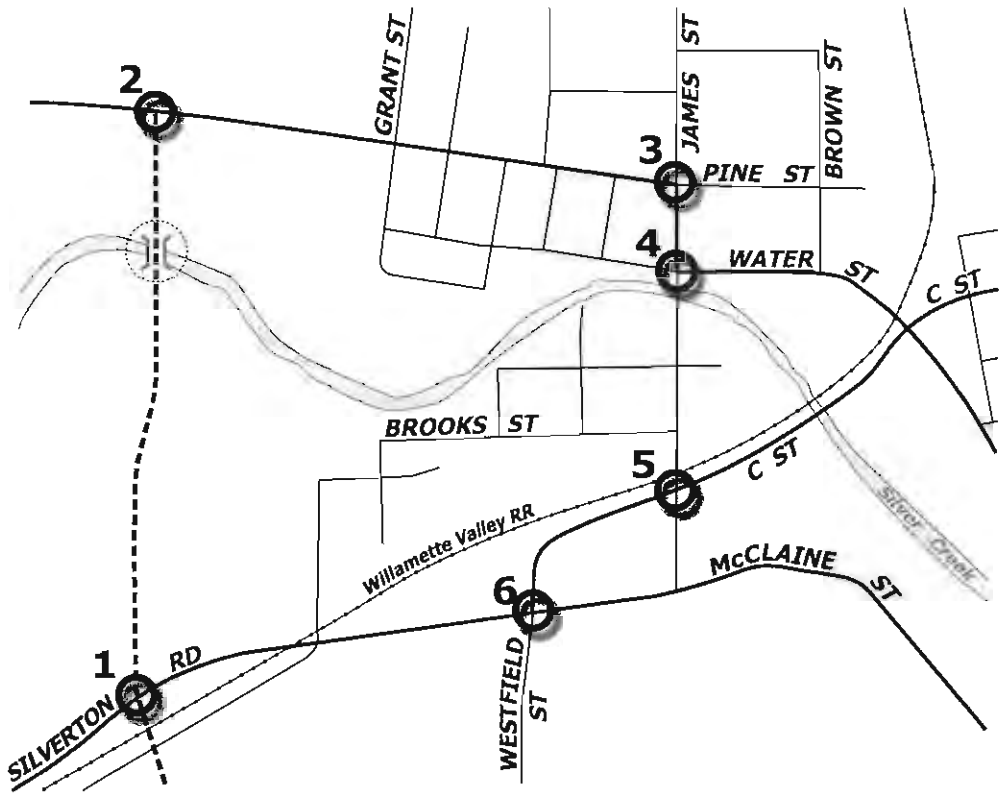
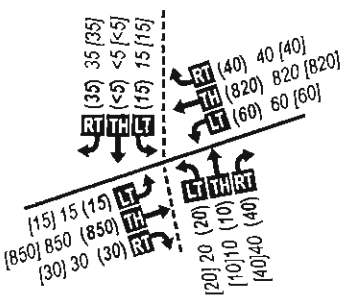
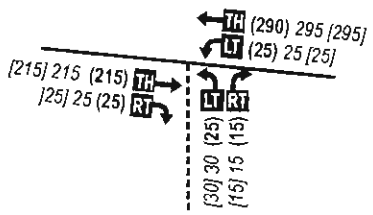
[5] These improvements are consistent with the requirements of the TPR (OAR 660-0012-0060-(2)-c) of amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.
[6] Typical left turn lane layout was based on ODOT's Highway Design Manual (2012). Typical roundabout layout was based on FHWA's Roundabouts: An Informational Guide (2000)



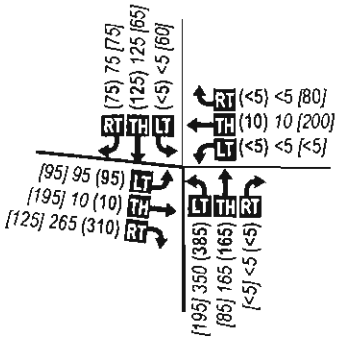
1. Silverton Rd. @ North-South Connector



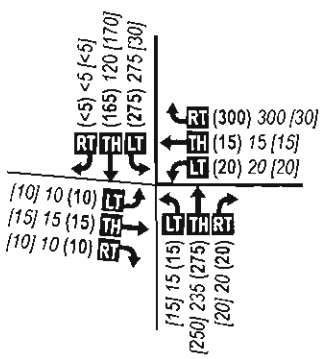
2. Pine St. @ North-South Connector



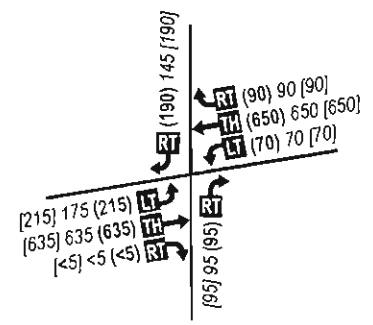
3. Pine St. @ James St.



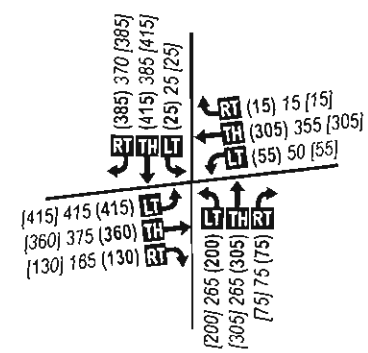
4. Water St. @ James St.



5. C St. @ James St.



6. McClaine St. @ C St.



LEGEND

1 - Study Intersection

- - - - Proposed North-South Connector

LT TH RT - Volume Turn Movement
Left-Thru-Right

(A) B [C] - PM Peak Hour Traffic Volumes

(A) - Project Land Use With Current TSP Network

B - Project Land Use With North-South Connector Bridge

[C] - Project Land Use With Brown Street Reroute

DKS

No Scale

Figure 3

FUTURE 2030 PM PEAK HOUR TRAFFIC VOLUMES

Network Alternatives

2030 Intersection Operations: Network Comparison

Performance of the North-South Connector bridge alternative and the two Brown Street Re-Route options were analyzed and compared to future operations with the 2008 TSP financially constrained network. This comparison assumes the proposed West-Side rezoning for all networks. Results are shown in Table 4.

Table 4: 2030 PM Peak Hour Intersection Operations with West-Side Land Use – Comparison of Network Alternatives

				2008 TSP Network		North-South Connector (with bridge crossing)		Brown St. Reroute (James/Pine **signal**)		Brown St. Reroute (James/Pine **roundabout**)	
Intersection	**Control**	**Jurisdiction**	**Mobility Standard**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
C Street/ McClaine Street	Signal	Marion County	LOS D & V/C 0.85	D	**0.90**	D	**0.99**	D	**0.90**	D	**0.90**
James Street/ Pine Street	AWSC (Varies)	Silverton	LOS D & V/C 0.85	D	**0.96**	C	0.83	C	0.73	A	0.46
James Street/ Water Street	AWSC	Silverton	LOS D & V/C 0.85	C	0.77	C	0.68	A	0.37	A	0.37
James Street/ C Street	TWSC	Marion County	LOS D & V/C 0.90	B/C	0.46	B/C	0.35	B/C	0.46	B/C	0.46
Silverton Road/ North-South Connector	TWSC	Marion County	LOS D & V/C 0.85	B/**F**	**>1**	-		B/**F**	**>1**	B/**F**	**>1**
	Signal	Marion County	LOS D & V/C 0.85	B	0.72	B	0.78	B	0.72	B	0.72
Pine Street/ North-South Connector	TWSC	Marion County	LOS D & V/C 0.90	A/B	0.07	A/C	0.26	A/B	0.07	A/B	0.07

Notes: Control: AWSC = All-Way Stop Controlled, TWSC = Two-Way Stop Controlled
A/A=major street LOS/minor street LOS
Signalized and all-way stop V/C ratio = average V/C ratio for entire intersection
Unsignalized V/C ratio = critical movement V/C ratio
Bold type indicates a failure to meet adopted mobility standard.
Shaded type indicates operations that fail to meet adopted mobility standards and further degrade from current TSP levels
Source: DKS Associates, 2012

North-South Connector with Bridge

With the new North-South Connector bridge in place, the James Street/Pine Street intersection shows improved performance and now meets the mobility standards. However, this network alternative results in a 0.99 v/c ratio at the C Street/McClaine Street intersection due to increased volumes from the new connection. This performance fails to meet the City's mobility standard, and is degraded compared to the TSP. The proposed network change does not meet the TPR requirements at this intersection and would require mitigation.

Brown Street Re-Route

With the Brown Street re-route in place, the James Street/Pine Street intersection operates at LOS C and V/C 0.73 with the signalized option and LOS A and V/C 0.46 with the roundabout option, meeting the City's mobility standards. The operations at the C Street/McClaine Street intersection, while not meeting the mobility standard, do not degrade from the 0.90 v/c performance under the adopted TSP. Therefore, the both Brown Street Re-Route network options comply with the TPR requirements.

FUTURE INTERIM PHASING OF IMPROVEMENTS

In addition to the 2030 planning horizon year, analysis was performed for interim phasing years at the study intersections to determine when improvements might be needed. The interim years analyzed were 2015, 2020, and 2025.

This phasing analysis included assumptions about when financially constrained projects from the adopted TSP would be constructed. Based on the funding evaluation provided in the Silverton TSP, the projects and associated year of construction assumed for this analysis are shown in Table 5.

Table 5: Assumptions for interim developments

Project Location	Description	Year of Implementation
C Street/McClaine Street	Construct southbound right turn lane	2020 (Silverton TSP Action Plan)
James Street/C Street	Restrict northbound and southbound left turns	2010 (Silverton TSP Action Plan)

Source: Silverton TSP, 2008

Intersection Operations: Phasing

The following tables provide a comparison of intersection operations in interim years. Table 6 shows operations for the interim years with the phased TSP improvements as shown above, with no additional mitigations. Table 7 shows the interim operations for the scenario with the Brown Street reroute in place. The North-South Connector bridge is not included in the phasing analysis.

Table 6: PM Peak Hour Interim Year Operations without North-South Connector Bridge (Proposed Land Use)

			2015		2020		2025		2030	
Intersection	**Jurisdiction**		**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
C Street/McClaine Street*	Marion County		C	0.73	C	0.64	C	0.78	D	**0.90**
James Street/Pine Street	Silverton	PM (AM)	B (C)[A]	0.52 (0.87)	B **(E)**	0.64 **(>1)**	C **(F)**	0.78 **(>1)**	D **(F)**	**0.96 (>1)**
James Street/Water Street	Silverton		B	0.50	B	0.58	B	0.67	C	0.77
James Street/C Street**	Marion County		A/B	0.23	A/B	0.29	A/C	0.37	B/C	0.46

Notes: *SB right Turn Lane included for 2020, 2025, 2030
** NB and SB through and left turns restricted.
Bold type indicates a failure to meet adopted mobility standard.
Source: DKS Associates, 2012

Table 7: PM Peak Hour Interim Year Operations without North-South Connector Bridge, with Brown Re-Route (Proposed Land Use)

			2015		2020		2025		2030	
Intersection	**Jurisdiction**		**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
C Street/McClaine Street*	Marion County		C	0.73	C	0.64	C	0.78	D	**0.90**
James Street/Pine Street	Silverton	PM (AM)	B	0.46	B	0.54	B (C)	0.66 (0.77)	C **(F)**	0.73 **(>1)**
James Street/Water Street	Silverton		A	0.23	A	0.28	A	0.32	A	0.37
James Street/C Street**	Marion County		A/B	0.23	A/B	0.29	A/C	0.37	B/C	0.46

Notes: *SB right Turn Lane included for 2020, 2025, 2030
** NB and SB through and left turns restricted.
Bold type indicates a failure to meet adopted mobility standard.
Source: DKS Associates, 2012

Table 6 shows that operations at the James Street/Pine Street intersection meet the City's mobility standards up until year 2015 without additional improvements. With the Brown Street Re-route in place, Table 7 shows that the James Street/Pine Street intersection would meet the City's mobility standards up to year 2025 with the existing all-

way stop control. In forecast year 2030, this intersection would fail to meet mobility standards in the a.m. peak hour due to heavy queuing on James Street.

Mitigation at James Street/Pine Street Intersection

As described earlier in this memo, two sub-options to the Brown Street Reroute, with different treatments at the James Street/Pine Street intersection, were developed and evaluated.

- **Sub-option 1.** Single lane roundabout at the James Street/Pine Street intersection
- **Sub-option 2.** Traffic signal at the James Street/Pine Street intersection with left-turn lanes on James Street

Traffic Signal Warrant Analysis

Traffic signal warrant analysis was completed to determine if the James Street/Pine Street intersection meets the requirements for the installation of a traffic signal as per Warrant 3 of the MUTCD. It was found that the warrant is supported for AM peak hour conditions under the future year 2030 scenario with the Brown Street Reroute network change in place. Supporting documentation for the signal warrant analysis is included in the Appendix.

A left-turn phasing analysis was also conducted to determine if protected or protected/permissive left-turn phasing should be considered for the northbound and southbound left-turn movements at this intersection. The analysis results indicated that the left-turns did not meet the criteria for protected or protected/permissive left-turn phasing and would therefore be permissive phasing.

CONCEPTUAL COST ESTIMATES AND RIGHT-OF-WAY IMPACTS

Conceptual, planning-level cost estimates for the network alternatives are summarized in Table 8. This table includes the cost estimates for the Brown Street realignment as well as the roundabout and signal sub-options at James Street/Pine Street. These cost estimates are based on general unit costs for transportation improvements and right-of-way costs. A cost estimate for the North-South Connector bridge crossing is also included.

Table 8: Concept-Level Preliminary Cost Estimates for Brown Street Realignment

Project	Description	Estimated Cost
Brown Street Realignment	Includes realignment of Brown Street and Pine Street. The new alignment is designed to arterial standards and includes 2x 12' travel lanes, 2x 5' bike lanes, 2x 6' buffer and 2x 6' sidewalks. The total cross-section width is 60'.	$2,185,000
Roundabout at James Street/Pine Street	Includes upgrading the Pine Street/ James Street intersection to a roundabout. Design includes a roundabout with 120' ICD, 20' circulatory roadway, and 10' truck apron. 6' buffer and 6' sidewalk is also included	$2,624,000
Signal and NB/SB Turn Lanes at James Street/Pine Street	Includes upgrading the Pine Street/ James Street intersection to a signalized intersection. The cross-section includes 2x 12' travel lanes, 1x 14' turn lane, 2x 5'buffer and 2x 6' sidewalks. The turn lane storage length is 80' for the NB approach and 50' for the SB approach	$966,000
North-South Connector Bridge	Includes the construction of the North South Connector bridge across Silver Creek. The 46' cross section includes 2x 12' travel lanes, 2x 5' bike lanes and 2x 6' sidewalks	$3,922,000

Source: DKS Associates, 2012

In the roundabout option, residential buildings adjacent to the intersection are impacted by the project right-of-way and add a significant cost to the project. The Brown Street realignment with the traffic signal at James Street/Pine Street, therefore, is a more cost-effective alternative. However, while the signalized option will have fewer impacts than the roundabout, there will be potential access issues and driveway impacts to the adjacent residential buildings when incorporating the traffic signal and turn lanes at this intersection.

As indicated by the estimates in Table 5, the cost of the Brown Street realignment with either a traffic signal or a roundabout at James Street/Pine Street is comparable to that of the North-South Connector bridge, with the signalized option of the 8rown Street Re-route being a less expensive option.

FINDINGS AND RECOMMENDATIONS

The traffic impact analysis completed for this project found that under the proposed West-Side land use scenario, the traffic operations at the James Street/Pine Street intersection fail to meet mobility standards and degrade from the existing TSP levels. To mitigate the traffic impacts at this intersection and meet the TPR requirements, network alternatives were proposed and evaluated.

With the North-South Connector bridge, the operations at the James Street/Pine Street intersection improve and meet TPR requirements, but operations at the C Street/McClaine Street intersection degrade and fail to meet TPR requirements. Further, it was found that study-area property owners may not support the construction of the bridge over Silver Creek. Therefore, this network alternative is not recommended.

With the Brown Street Re-Route and improvements at the James Street/Pine Street intersection, and no North-South Connector bridge, TPR requirements are met for the year 2030 for the proposed West-Side rezoning. Based on the interim year phasing analysis as well as conceptual cost estimates and right-of-way impacts, Table 9 shows the recommended mitigations and proposed years of construction.

Table 9: Concept-Level Preliminary Cost Estimates for Brown Street Realignment

Project	Construction Year	Estimated Cost
Brown Street Realignment	2020	$2,185,000
Signal and NB/SB Turn Lanes at James Street/Pine Street	2030	$966,000

As shown in the phasing analysis, the Brown Street Re-Route is needed by 2020 in order to mitigate sub-standard operations in the a.m. peak hour at the James Street/Pine Street intersection. The recommended James Street/Pine Street intersection improvement, which is needed by 2030, is the signal rather than the roundabout. The signal is recommended because it has fewer impacts on existing structures, and is the less expensive option.

To implement these changes, the following amendments would be need for the City's TSP:

- Remove the North-South Connector Project (replaced as local street connections)
- Add the Brown Street reroute as a new arterial corridor and improvement project
- Add the James Street/Pine Street intersection improvements, which could have an option as either a signal or roundabout configuration to be determined through a design process
- Consider changing the functional classification of Water Street between Brown Street and James Street to a local roadway (if Brown Street becomes the arterial corridor through the area). This could also include removing of pedestrian and bicycle improvement projects along this portion of Water Street.

West-Side Land Use and Transportation Plan

Project Memorandum #7
Preferred Land Use & Transportation System Alternative
Part 2 - Appendix

Otak, Inc.
DKS Associates
Leland Consulting Group

November 19, 2012
Deliverable: 7D

Appendix

Silverton West-Side Lond Use and Transportation Plan

Preferred Land Use and Transportation System Alternative

Traffix reports (HCM 2000 methodology)

Traffic signal warrant analysis

Planning-level design drawings

Cost estimates

2030 Future No-Build Wed Nov 14, 2007 15:16:36 Page 2-1

Silverton TSP Update
Future Conditions-2030 No-Build Mitigated
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del/Veh	V/C	LOS	Future Del/Veh	V/C	LOS	Change in
# 34 JAMES/"C"	20.4	0.000	C	19.9	0.000	-	-1.073 D/V
# 35 JAMES/WATER	10.2	0.460	C	16.9	0.722	-	0.262 V/C
# 36 JAMES/PINE	15.8	0.460	D	31.7	0.951	-	0.490 V/C
# 92 "C"/WILLAME	20.5	0.536	C	33.7	0.901	-	13.193 D/V

2030 Future No-Build Wed Nov 14, 2012 09:29:23 Page 2-1

Silverton TSP Update
Future Conditions w/Connector Severed (TSP LU)
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del/Veh	V/C	LOS	Future Del/Veh	V/C	LOS	Change in
#130 Westside Connector/Silverton R	A	9.0	0.000	F	350.6	0.000	-941.563 D/V
#131 Westside Connector/Pine Street	B	12.1	0.000	B	12.1	0.000	- 0.000 D/V

2030 Future No-Build Wed Nov 14, 2012 09:32:36 Page 2-1

Silverton TSP Update
Future Conditions w/Connector Severed (TSP LU) w/Signal
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del/Veh	V/C	LOS	Future Del/Veh	V/C	LOS	Change in
#130 Westside Connector/Silverton R	A	2.3	0.404	B	11.1	0.779	- 8.843 D/V
#131 Westside Connector/Pine Street	B	12.1	0.000	B	12.1	0.000	- 0.000 D/V

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2030 Future No-Build Wed Nov 14, 2007 15:16:20 Page 20-1

Silverton TSP Update
Future Conditions-2030 No-Build Mitigated
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 4.0 Worst Case Level Of Service: C(19.9)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	1	0	0	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 (c) 4:30-5:30 PM												
Base Vol:	0	21	21	0	13	224	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	0	13	224	120	431	4	9	345	38
Added Vol:	0	24	47	41	19	38	89	215	0	65	275	27
PasserByVol:	0	-45	0	-41	-31	30	0	0	0	0	0	0
Initial Fut:	0	0	68	0	0	292	209	646	4	74	620	65
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	72	0	0	307	220	680	4	78	653	68
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	72	0	0	307	220	680	4	78	653	68
Critical Gap Module:												
Critical Gap:xxxxx	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	
FollowUpTim:xxxxx	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	
Capacity Module:												
Cnflict Vol: xxxx	1399	682	2001	1967	681	721	xxxx	xxxxx	684	xxxx	xxxxx	
Potent Cap.: xxxx	81	453	45	84	458	890	xxxx	xxxxx	919	xxxx	xxxxx	
Move Cap.: xxxx	40	453	28	42	458	890	xxxx	xxxxx	919	xxxx	xxxxx	
Volume/Cap: xxxx	0.00	0.16	0.00	0.00	0.67	0.25	xxxx	xxxx	0.08	xxxx	xxxx	
Level Of Service Module:												
2Way95thQ: xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.0	xxxx	xxxxx	0.3	xxxx	xxxxx	
Control Del:xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.4	xxxx	xxxxx	9.3	xxxx	xxxxx	
LOS by Move:	*	*	*	*	*	*	B	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.: xxxx	xxxx	xxxx	453	xxxx	458	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	
SharedQueue:xxxxx	xxxx	0.6	xxxxx	2.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shrd ConDel:xxxxx	xxxx	14.4	xxxxx	15.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	B	*	C	*	*	*	*	*	*	*
ApproachDel:	14.4			15.1			xxxxxx			xxxxxx		
ApproachLOS:	B			C			*			*		

Note: Queue reported is the number of cars per lane.

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2030 Future No-Build       Wed Nov 14, 2007 15:16:28                  Page 22-1
--------------------------------------------------------------------------------
                          Silverton TSP Update
              Future Conditions-2030 No-Build Mitigated
                             PM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #35 JAMES/WATER
********************************************************************************
Cycle (sec):            1                Critical Vol./Cap.(X):        0.722
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):       16.5
Optimal Cycle:          0                Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
-------------|---------------|---------------|---------------|---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
-------------|---------------|---------------|---------------|---------------|
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:      12  150   18   141  142    1     8   12   10    17   12  140
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   12  150   18   141  142    1     8   12   10    17   12  140
Added Vol:      0  140    0    27   96    0     0    0    0     2    0  114
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   12  290   18   168  238    1     8   12   10    19   12  254
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    13  315   20   204  259    1     9   13   11    21   13  276
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   13  315   20   204  259    1     9   13   11    21   13  276
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   13  315   20   204  259    1     9   13   11    21   13  276
-------------|---------------|---------------|---------------|---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.04 0.90 0.06  0.44 0.55 0.01  0.27 0.40 0.33  0.07 0.04 0.89
Final Sat.:    23  567   35   283  358    2   121  181  151    41   26  545
-------------|---------------|---------------|---------------|---------------|
Capacity Analysis Module:
Vol/Sat:     0.56 0.56 0.56  0.72 0.72 0.72  0.07 0.07 0.07  0.51 0.51 0.51
Crit Moves:       ****            ****            ****            ****
Delay/Veh:   14.7 14.7 14.7  20.4 20.4 20.4   9.9  9.9  9.9  13.2 13.2 13.2
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  14.7 14.7 14.7  20.4 20.4 20.4   9.9  9.9  9.9  13.2 13.2 13.2
LOS by Move:    B    B    B     C    C    C     A    A    A     B    B    B
ApproachDel:      14.7            20.4             9.9            13.2
Delay Adj:        1.00            1.00            1.00            1.00
ApprAdjDel:       14.7            20.4             9.9            13.2
LOS by Appr:        B               C               A               B
AllWayAvgQ:   1.1  1.1  1.1   2.1  2.1  2.1   0.1  0.1  0.1   0.8  0.8  0.8
********************************************************************************
Note: Queue reported is the number of cars per lane.

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2030 Future No-Build       Wed Nov 14, 2007 15:16:28                  Page 24-1
--------------------------------------------------------------------------------
                          Silverton TSP Update
              Future Conditions-2030 No-Build Mitigated
                             PM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #36 JAMES/PINE
********************************************************************************
Cycle (sec):            1                Critical Vol./Cap.(X):        0.951
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):       31.9
Optimal Cycle:          0                Level Of Service:                 D
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
-------------|---------------|---------------|---------------|---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        0  0  1! 0  0   0  0  0  1  0   0  0  1! 0  0   0  0  1! 0  0
-------------|---------------|---------------|---------------|---------------|
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:     131  165    3     0  108   43    73    8  186     1    6    2
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  131  165    3     0  108   43    73    8  186     1    6    2
Added Vol:    253    0    0     0    6   28    20    0  117     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  384  165    3     0  114   71    93    8  303     1    6    2
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:   417  179    3     0  124   77   101    9  329     1    7    2
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  417  179    3     0  124   77   101    9  329     1    7    2
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:  417  179    3     0  124   77   101    9  329     1    7    2
-------------|---------------|---------------|---------------|---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.69 0.30 0.01  0.00 0.62 0.38  0.23 0.02 0.75  0.11 0.67 0.22
Final Sat.:   439  189    3     0  356  222   143   12  466    52  311  104
-------------|---------------|---------------|---------------|---------------|
Capacity Analysis Module:
Vol/Sat:     0.95 0.95 0.95  xxxx 0.35 0.35  0.71 0.71 0.71  0.02 0.02 0.02
Crit Moves:       ****                 ****            ****  ****
Delay/Veh:   47.1 47.1 47.1   0.0 11.8 11.8  20.2 20.2 20.2  10.1 10.1 10.1
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  47.1 47.1 47.1   0.0 11.8 11.8  20.2 20.2 20.2  10.1 10.1 10.1
LOS by Move:    E    E    E     *    B    B     C    C    C     B    B    B
ApproachDel:      47.1            11.8            20.2            10.1
Delay Adj:        1.00            1.00            1.00            1.00
ApprAdjDel:       47.1            11.8            20.2            10.1
LOS by Appr:        E               B               C               B
AllWayAvgQ:   6.7  6.7  6.7   0.5  0.5  0.5   2.0  2.0  2.0   0.0  0.0  0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.

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2030 Future No-Build       Wed Nov 14, 2007 15:16:28                  Page 28-1
--------------------------------------------------------------------------------
                          Silverton TSP Update
              Future Conditions-2030 No-Build Mitigated
                             PM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
         2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #42 "C"/McCLAINE
********************************************************************************
Cycle (sec):           90                Critical Vol./Cap.(X):        0.901
Loss Time (sec):       12 (Y+R=4.0 sec)  Average Delay (sec/veh):       33.1
Optimal Cycle:        104                Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
-------------|---------------|---------------|---------------|---------------|
Control:        Permitted        Permitted        Protected        Permitted
Rights:          Include            Ovl            Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  0  1  0   1  0  1  0  1   1  0  0  1  0   1  0  0  1  0
-------------|---------------|---------------|---------------|---------------|
Volume Module: >> Count Date: 2 Sep 2006 << 4:50-5:50 PM
Base Vol:      95  206   37    22  185  257   265  273   60    42  201   11
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   95  206   37    22  185  257   265  273   60    42  201   11
Added Vol:    114  114   58     1  146  116   149   84   61    17  109    1
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  209  320   95    23  331  373   414  357  121    59  310   12
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:   220  337  100    24  351  393   436  376  127    62  323   13
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  220  337  100    24  351  393   436  376  127    62  323   13
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:  220  337  100    24  351  393   436  376  127    62  323   13
-------------|---------------|---------------|---------------|---------------|
Saturation Flow Module:
Sat/Lane:    1800 1800 1800  1800 1800 1800  1800 1800 1800  1800 1800 1800
Adjustment:  0.36 0.97 0.97  0.31 1.00 0.85  0.95 0.96 0.96  0.22 0.99 0.99
Lanes:       1.00 0.77 0.23  1.00 1.00 1.00  1.00 0.75 0.25  1.00 0.96 0.04
Final Sat.:   652 1341  398   569 1800 1530  1710 1293  438   394 1722   69
-------------|---------------|---------------|---------------|---------------|
Capacity Analysis Module:
Vol/Sat:     0.34 0.25 0.25  0.04 0.20 0.26  0.25 0.29 0.29  0.16 0.19 0.19
Crit Moves:  ****                            ****                 ****
Green/Cycle: 0.39 0.39 0.39  0.39 0.39 0.66  0.27 0.48 0.48  0.20 0.20 0.20
Volume/Cap:  0.87 0.64 0.64  0.11 0.51 0.39  0.93 0.61 0.61  0.79 0.93 0.93
Delay/Veh:   50.5 24.4 24.4  17.3 22.3  7.4  51.1 18.8 18.8  41.2 46.4 46.4
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  50.5 24.4 24.4  17.3 22.3  7.4  51.1 18.8 18.8  41.2 46.4 46.4
LOS by Move:    D    C    C     B    C    A     D    B    B     D    D    D
HCM2kAvgQ:      9   11   11     1    9    5    18   11   11     3   13   13
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************

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2030 Future No-Build       Wed Nov 14, 2012 09:28:22                   Page 7-1
--------------------------------------------------------------------------------
                          Silverton TSP Update
          Future Conditions w/Connector Severed (TSP LU)
                             PM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #155 Westside Connector/Silverton Rd
********************************************************************************
Average Delay (sec/veh):     14.1      Worst Case Level Of Service: F[350.6]
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
-------------|---------------|---------------|---------------|---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
-------------|---------------|---------------|---------------|---------------|
Volume Module:
Base Vol:       0    0    0     0    0    0     0  550    0     0  500    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0    0    0     0    0    0     0  550    0     0  500    0
Added Vol:      0    0    0    29    0   16     0  294    0     1  321   37
PasserByVol:   20   10   40     0    0    0    15    0   30    60    0    0
Initial Fut:   20   10   40    29    0   16    15  844   30    60  821   37
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    22   11   43    32    0   17    16  917   33    65  892   40
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:   22   11   43    32    0   17    16  917   33    65  892   40
-------------|---------------|---------------|---------------|---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5  6.2   7.1  6.5  6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0  3.3   3.5  4.0  3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
-------------|---------------|---------------|---------------|---------------|
Capacity Module:
Cnflict Vol: 2024 2036  934  2043 2032  912   932 xxxx xxxxx   950 xxxx xxxxx
Potent Cap.:   42   48  325    42   48  332   738 xxxx xxxxx   731 xxxx xxxxx
Move Cap.:     32   41  325    28   51  332   738 xxxx xxxxx   731 xxxx xxxxx
Volume/Cap:  0.58 0.21 0.13  1.13 0.00 0.05  0.02 xxxx  xxxx  0.09 xxxx  xxxx
-------------|---------------|---------------|---------------|---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx   0.3 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  10.0 xxxx xxxxx  10.4 xxxx xxxxx
LOS by Move:    *    *    *     *    *    *     A    *    *     B    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx   82 xxxxx  xxxx   61 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  5.8 xxxxx xxxxx  4.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  168 xxxxx xxxxx  351 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F    *     *    F    *     *    *    *     *    *    *
ApproachDel:      167.8           350.6           xxxxxx          xxxxxx
ApproachLOS:        F               F               *               *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************

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Silverton TSP Update
Future Conditions w/Connector Severed (TSP LU)
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #156 Westside Connector/Pine Street

Average Delay (sec/veh): 1.1   Worst Case Level Of Service: B[12.1]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	23	0	14	0	0	0	0	211	21	24	289	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	23	0	14	0	0	0	0	211	21	24	289	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	23	0	14	0	0	0	0	211	21	24	289	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	25	0	15	0	0	0	0	229	23	26	314	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	0	15	0	0	0	0	229	23	26	314	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	607	607	241	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	252	xxxx	xxxxx
Potent Cap.:	443	414	803	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1325	xxxx	xxxxx
Move Cap.:	434	405	803	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1325	xxxx	xxxxx
Volume/Cap:	0.06	0.00	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	545	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	12.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:		12.1			xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:		B			*			*			*	

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Connector Severed (TSP LU) w/Signal
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #159 Westside Connector/Silverton Rd

Cycle (sec): 90   Critical Vol./Cap.(X): 0.708
Loss Time (sec): 16 (Y+R=4.0 sec)   Average Delay (sec/veh): 11.1
Optimal Cycle: 69   Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 0 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	550	0	0	506	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	550	0	0	506	0
Added Vol:	0	0	0	29	0	16	0	294	0	4	321	37
PasserByVol:	20	10	40	0	0	0	15	0	30	56	0	0
Initial Fut:	20	10	40	29	0	16	15	844	30	60	827	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	22	11	43	32	0	17	16	917	33	65	899	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	22	11	43	32	0	17	16	917	33	65	899	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	22	11	43	32	0	17	16	917	33	65	899	40
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.88	0.88	0.95	1.00	0.85	0.23	1.00	1.00	0.22	0.99	0.99
Lanes:	1.00	0.20	0.80	1.00	0.00	1.00	1.00	0.97	0.03	1.00	0.96	0.04
Final Sat.:	1810	337	1347	1810	0	1615	407	1730	61	388	1713	77
Capacity Analysis Module:												
Vol/Sat:	0.01	0.03	0.03	0.02	0.00	0.01	0.04	0.53	0.53	0.16	0.52	0.52
Crit Moves:			****	****				****				
Green/Cycle:	0.05	0.05	0.05	0.03	0.00	0.03	0.75	0.75	0.75	0.75	0.75	0.75
Volume/Cap:	0.26	0.71	0.71	0.71	0.00	0.44	0.05	0.71	0.71	0.22	0.70	0.70
Delay/Veh:	43.0	68.6	68.6	85.8	0.0	50.7	3.1	7.9	7.9	3.8	7.7	7.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	68.6	68.6	85.8	0.0	50.7	3.1	7.9	7.9	3.8	7.7	7.7
LOS by Move:	D	E	E	F	A	D	A	A	A	A	A	A
HCM2kAvgQ:	1	3	3	2	0	1	0	15	15	1	15	15

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Connector Severed (TSP LU) w/Signal
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #156 Westside Connector/Pine Street

Average Delay (sec/veh): 1.1   Worst Case Level Of Service: B[12.1]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	23	0	14	0	0	0	0	211	21	24	289	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	23	0	14	0	0	0	0	211	21	24	289	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	23	0	14	0	0	0	0	211	21	24	289	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	25	0	15	0	0	0	0	229	23	26	314	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	0	15	0	0	0	0	229	23	26	314	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	607	607	241	615	618	314	xxxx	xxxx	xxxxx	252	xxxx	xxxxx
Potent Cap.:	443	414	803	407	407	731	xxxx	xxxx	xxxxx	1325	xxxx	xxxxx
Move Cap.:	434	405	803	383	388	731	xxxx	xxxx	xxxxx	1325	xxxx	xxxxx
Volume/Cap:	0.06	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	545	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	12.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:		12.1			xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:		B			*			*			*	

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 34 JAMES/"C"	C	22.3	0.000	E	30.2	0.000	+8.004 D/V
# 35 JAMES/WATER	B	10.2	0.450	C	18.3	0.744	+ 0.314 V/C
# 36 JAMES/PINE	B	10.8	0.482	D	33.0	0.960	+ 0.478 V/C
# 42 "C"/MACLAINE	C	21.5	0.482	D	39.3	0.960	+11.554 D/V

Silverton TSP Update
Future Conditions w/Westside Connector Removed and Updated Land Use
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
#155 Westside Connector/Silverton R	A	9.0	0.000	F	396.8	0.000	+387.859 D/V
#156 Westside Connector/Pine Street	B	12.6	0.000	B	12.4	0.000	+ 0.000 D/V

Silverton TSP Update
Future Conditions w/Westside Connector Removed and Updated Land Use Alt
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
#155 Westside Connector/Silverton R	A	9.0	0.000	B	11.3	0.178	+ 0.034 D/V
#156 Westside Connector/Pine Street	B	12.6	0.000	B	12.4	0.000	+ 0.000 D/V

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 4.3 Worst Case Level Of Service: C(20.2)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	1	0	0	0	0	1!	0	0	0

Volume Module: >> Count Date: 28 Sep 2009 << 4:26-5:26 PM												
Base Vol:	0	21	21	26	12	104	120	431	4	9	385	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	104	120	431	4	9	385	38
Added Vol.:	0	24	26	62	54	66	91	202	0	64	301	29
James/C Adj:	0	-45	45	-68	-47	0	0	0	0	17	0	0
Initial Fut:	0	0	92	0	0	190	211	633	4	90	686	67
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	97	0	0	200	222	666	4	95	680	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	97	0	0	200	222	666	4	95	680	71

Critical Gap Module:												
Critical Gap:	xxxxx	6.5	6.2	xxx	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	xxxxx	4.0	3.3	xxx	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx

Capacity Module:												
Cnflict Vol:	xxxx	2053	669	2066	2019	705	951	xxxx	xxxxx	691	xxxx	xxxxx
Potent Cap.:	xxxx	56	466	42	58	431	668	xxxx	xxxxx	909	xxxx	xxxxx
Move Cap.:	xxxx	39	466	25	37	431	868	xxxx	xxxxx	829	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.21	0.00	0.00	0.46	0.26	xxxx	xxxx	0.10	xxxx	xxxx

Level Of Service Module:												
2Way95th Q:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.0	xxxx	xxxxx	0.3	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.6	xxxx	xxxxx	9.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	466	xxxx	434	xxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	0.8	xxxxx	2.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	14.4	xxxxx	20.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	B	*	C	*	*	*	*	*	*	*
ApproachDel:	14.9			20.2			xxxxxx			xxxxxx		
ApproachLOS:	B			C			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec): 1 Critical Vol./Cap.(X): 0.769
Lost Time (sec): 0 (Y=N=4.0 sec) Average Delay (sec/veh): 18.4
Optimal Cycle: 0 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	0	1	0	0	1	0	0

Volume Module: >> Count Date: 28 Sep 2009 << 4:26-5:26 PM												
Base Vol:	12	150	14	141	142	0	8	12	10	11	13	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	14	141	142	0	8	12	10	11	13	140
Added Vol.:	0	144	0	28	10	0	0	0	0	2	0	11
James/C Adj:	0	-21	0	85	-85	0	0	0	0	0	0	45
Initial Fut:	12	273	14	254	167	1	8	12	10	13	13	296
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	296	20	298	182	1	9	13	11	21	13	322
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	13	296	20	298	182	1	9	13	11	21	13	322
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	296	20	298	182	1	9	13	11	21	13	322

Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.04	0.90	0.06	0.82	0.37	0.01	0.21	0.40	0.33	0.64	0.04	0.90
Final Sat.:	24	541	36	787	236	1	179	338	148	76	22	654

Capacity Analysis Module:												
Vol/Sat:	0.56	0.55	0.56	0.38	0.77	0.77	0.05	0.04	0.03	0.28	0.59	0.36
Crit Moves:	****			****							****	
Delay/Veh:	14.8	14.8	14.8	23.8	23.8	23.8	10.1	10.1	10.1	14.9	14.9	14.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	14.8	14.8	14.8	23.8	23.8	23.8	10.1	10.1	10.1	14.9	14.9	14.9
LOS by Move:	B	B	B	C	C	C	B	B	B	B	B	B
ApproachDel:	14.8			23.8			10.1			14.9		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	14.8			23.8			10.1			14.9		
LOS by Appr:	B			C			B			B		
A1_WayAvgQ:	1.0	1.0	1.0	2.8	2.8	2.8	0.1	0.1	0.1	1.1	1.1	1.1

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec): 1 Critical Vol./Cap.(X): 0.960
Lost Time (sec): 0 (Y=N=4.0 sec) Average Delay (sec/veh): 11.0
Optimal Cycle: 0 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	0	1	0	0	1	0	0

Volume Module: >> Count Date: 28 Sep 2009 << 4:26-5:26 PM												
Base Vol:	131	165	3	0	208	43	73	8	186	1	6	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	131	165	3	0	208	43	73	8	186	1	6	2
Added Vol.:	254	0	0	0	14	91	20	0	123	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	385	165	3	0	224	134	93	8	309	1	6	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	418	179	3	0	135	80	101	9	335	1	7	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	418	179	3	0	135	80	101	9	335	1	7	2
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	418	179	3	0	135	80	101	9	335	1	7	2

Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.69	0.30	0.01	0.00	0.43	0.57	0.23	0.02	0.75	0.01	0.01	0.22
Final Sat.:	436	191	3	0	361	215	141	14	486	11	10	142

Capacity Analysis Module:												
Vol/Sat:	0.96	0.96	0.96	xxxx	0.37	0.37	0.72	0.72	0.72	0.02	0.02	0.02
Crit Moves:	****						****			****		
Delay/Veh:	49.6	49.6	49.6	0.0	12.3	12.3	21.1	21.1	21.1	10.1	10.1	10.1
Delay Adj:	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	49.6	49.6	49.6	0.0	12.3	12.3	21.1	21.1	21.1	10.1	10.1	10.1
LOS by Move:	E	E	E	*	B	B	C	C	C	B	B	B
ApproachDel:	49.6			12.3			21.1			10.1		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	49.6			12.3			21.1			10.1		
LOS by Appr:	E			B			C			B		
A1_WayAvgQ:	7.1	7.1	7.1	0.9	0.9	0.9	2.1	2.1	2.1	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

```
2030 Future No-Build      Thu Sep 6, 2012 14:28:41                  Page 4-1
----------------------------------------------------------------------------
                          Silverton TSP Update
      2030 Conditions w/Updated Land Use and no Westside Connector
                              PM Peak Hour
----------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
****************************************************************************
Intersection #42 "C"/McCLAINE
****************************************************************************
Cycle (sec):          120              Critical Vol./Cap.(X):         0.900
Loss Time (sec):       12 (Y+R=4.0 sec) Average Delay (sec/veh):       39.3
Optimal Cycle:        120              Level Of Service:                  D
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include           Ovl             Include          Include
Min. Green:   0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        1  0  0  1  0    1  0  1  0  1    1  0  0  1  0    1  0  0  1  0
------------|----------------|----------------|----------------|----------------|
Volume Module: >> Count Date:  2 Sep 2008 << 4:30-5:30 PM
Base Vol:      95   206    37    22   185   257   265   273    60    42   201    11
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   95   206    37    22   185   257   265   273    60    42   201    11
Added Vol:    104    96    38     1   228   124   149    84    68     9   104     1
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  199   302    75    23   413   381   414   357   128    51   305    12
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:   209   318    79    24   435   401   436   376   135    54   321    13
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  209   318    79    24   435   401   436   376   135    54   321    13
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  209   318    79    24   435   401   436   376   135    54   321    13
------------|----------------|----------------|----------------|----------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.32  0.97  0.97  0.34  1.00  0.85  0.95  0.96  0.96  0.95  0.99  0.99
Lanes:       1.00  0.80  0.20  1.00  1.00  1.00  1.00  0.74  0.26  1.00  0.96  0.04
Final Sat.:   569  1399   341   639  1900  1538  1710  1272   456  1710  1721    68
------------|----------------|----------------|----------------|----------------|
Capacity Analysis Module:
Vol/Sat:     0.37  0.23  0.23  0.04  0.24  0.26  0.25  0.30  0.30  0.03  0.19  0.19
Crit Moves:  ****                              ****                    ****
Green/Cycle: 0.41  0.41  0.41  0.41  0.41  0.69  0.28  0.44  0.44  0.05  0.21  0.21
Volume/Cap:  0.90  0.56  0.56  0.09  0.59  0.38  0.90  0.67  0.67  0.67  0.90  0.90
Delay/Veh:   66.5  28.1  28.1  21.9  28.8   7.9  60.9  28.6  28.6  75.4  70.2  70.2
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  66.5  28.1  28.1  21.9  28.8   7.9  60.9  28.6  28.6  75.4  70.2  70.2
LOS by Move:    E     C     C     C     C     A     E     C     C     E     E     E
HCM2kAvgQ:     10    11    11     1    13     6    19    15    15     3    15    15
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************

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2030 Future No-Build      Wed Nov 14, 2012 09:25:50                 Page 1-1
----------------------------------------------------------------------------
                          Silverton TSP Update
   Future Conditions w/Westside Connector Severed and Updated Land Use
                              PM Peak Hour
----------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #155 Westside Connector/Silverton Rd
****************************************************************************
Average Delay (sec/veh):       16.1       Worst Case Level Of Service: F[396.9]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0 1! 0  0    0  0 1! 0  0    0  0 1! 0  0    0  0 1! 0  0
------------|----------------|----------------|----------------|----------------|
Volume Module:
Base Vol:       0     0     0     0     0     0     0   550     0     0   500     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    0     0     0     0     0     0     0   550     0     0   500     0
Added Vol:      0     0     0    32     0    15     0   300     0     0   318    39
PasserByVol:   20    10    40     0     0     0    15     0    30    60     0     0
Initial Fut:   20    10    40    32     0    15    15   850    30    60   818    39
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92
PHF Volume:    22    11    43    35     0    16    16   924    33    65   889    42
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:   22    11    43    35     0    16    16   924    33    65   889    42
------------|----------------|----------------|----------------|----------------|
Critical Gap Module:
Critical Gp:  7.1   6.5   6.2   7.1   6.5   6.2   4.1  xxxx xxxxx   4.1  xxxx xxxxx
FollowUpTim:  3.5   4.0   3.3   3.5   4.0   3.3   2.2  xxxx xxxxx   2.2  xxxx xxxxx
------------|----------------|----------------|----------------|----------------|
Capacity Module:
Cnflict Vol: 2020  2033   940  2039  2020   908   929  xxxx xxxxx   957  xxxx xxxxx
Potent Cap.:   44    58   322    42    58   338   744  xxxx xxxxx   727  xxxx xxxxx
Move Cap.:     38    51   322    28    52   338   744  xxxx xxxxx   727  xxxx xxxxx
Volume/Cap:  0.57  0.21  0.13  1.24  0.00  0.05  0.02  xxxx  xxxx  0.09  xxxx  xxxx
------------|----------------|----------------|----------------|----------------|
Level Of Service Module:
2Way95thQ:   xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   0.1  xxxx xxxxx   0.3  xxxx xxxxx
Control Del:xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   9.9  xxxx xxxxx  10.4  xxxx xxxxx
LOS by Move:    *     *     *     *     *     *     A     *     *     B     *     *
Movement:     LT  - LTR - RT    LT  - LTR - RT    LT  - LTR - RT    LT  - LTR - RT
Shared Cap.: xxxx    83 xxxxx  xxxx    40 xxxxx  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx
SharedQueue:xxxxx   4.9 xxxxx xxxxx   3.1 xxxxx xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx
Shrd ConDel:xxxxx   165 xxxxx xxxxx   397 xxxxx xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx
Shared LOS:     *     F     *     *     F     *     *     *     *     *     *     *
ApproachDel:      165.3             396.9            xxxxxx            xxxxxx
ApproachLOS:        F                 F                 *                 *
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************

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2030 Future No-Build      Wed Nov 14, 2012 09:25:50                 Page 4-1
----------------------------------------------------------------------------
                          Silverton TSP Update
   Future Conditions w/Westside Connector Severed and Updated Land Use
                              PM Peak Hour
----------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #156 Westside Connector/Pine Street
****************************************************************************
Average Delay (sec/veh):        1.2       Worst Case Level Of Service: B[ 12.6]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0 1! 0  0    0  0  0  0  0    0  0  0  1  0    1  0  1  0  0
------------|----------------|----------------|----------------|----------------|
Volume Module:
Base Vol:      28     0    11     0     0     0     0   211    22    25   295     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   28     0    11     0     0     0     0   211    22    25   295     0
Added Vol:      0     0     0     0     0     0     0     0     0     0     0     0
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   28     0    11     0     0     0     0   211    22    25   295     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92
PHF Volume:    30     0    12     0     0     0     0   229    24    27   321     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:   30     0    12     0     0     0     0   229    24    27   321     0
------------|----------------|----------------|----------------|----------------|
Critical Gap Module:
Critical Gp:  6.4   6.5   6.2 xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   4.1  xxxx xxxxx
FollowUpTim:  3.5   4.0   3.3 xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   2.2  xxxx xxxxx
------------|----------------|----------------|----------------|----------------|
Capacity Module:
Cnflict Vol:  616   616   241  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   253  xxxx xxxxx
Potent Cap.:  454   409   803  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx  1324  xxxx xxxxx
Move Cap.:    450   400   803  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx  1324  xxxx xxxxx
Volume/Cap:  0.07  0.00  0.01  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  0.02  xxxx  xxxx
------------|----------------|----------------|----------------|----------------|
Level Of Service Module:
2Way95thQ:   xxxx  xxxx xxxxx  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   0.1  xxxx xxxxx
Control Del:xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   7.8  xxxx xxxxx
LOS by Move:    *     *     *     *     *     *     *     *     *     A     *     *
Movement:     LT  - LTR - RT    LT  - LTR - RT    LT  - LTR - RT    LT  - LTR - RT
Shared Cap.: xxxx   513 xxxxx  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx
SharedQueue:xxxxx   0.3 xxxxx xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   0.1  xxxx xxxxx
Shrd ConDel:xxxxx  12.6 xxxxx xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   7.8  xxxx xxxxx
Shared LOS:     *     B     *     *     *     *     *     *     *     A     *     *
ApproachDel:       12.6            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:        B                 *                 *                 *
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************

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2030 Future No-Build      Wed Nov 14, 2012 09:27:29                 Page 3-1
----------------------------------------------------------------------------
                          Silverton TSP Update
 Future Conditions w/Westside Connector Severed and Updated Land Use Mit
                              PM Peak Hour
----------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
****************************************************************************
Intersection #155 Westside Connector/Silverton Rd
****************************************************************************
Cycle (sec):           90              Critical Vol./Cap.(X):         0.718
Loss Time (sec):       16 (Y+R=4.0 sec) Average Delay (sec/veh):       11.3
Optimal Cycle:         69              Level Of Service:                  B
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:       Split Phase      Split Phase       Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:   0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        1  0  0  1  0    1  0  0  1  0    1  0  0  1  0    1  0  0  1  0
------------|----------------|----------------|----------------|----------------|
Volume Module:
Base Vol:       0     0     0     0     0     0     0   550     0     0   500     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    0     0     0     0     0     0     0   550     0     0   500     0
Added Vol:      0     0     0    32     0    15     0   300     0     0   318    39
P:             20    10    40     0     0     0    15     0    30    60     0     0
Initial Fut:   20    10    40    32     0    15    15   850    30    60   818    39
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92  0.92
PHF Volume:    22    11    43    35     0    16    16   924    33    65   889    42
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   22    11    43    35     0    16    16   924    33    65   889    42
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:   22    11    43    35     0    16    16   924    33    65   889    42
------------|----------------|----------------|----------------|----------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.95  0.88  0.88  0.95  1.00  0.85  0.23  1.00  1.00  0.22  0.99  0.99
Lanes:       1.00  0.20  0.80  1.00  0.00  1.00  1.00  0.97  0.03  1.00  0.95  0.05
Final Sat.:  1710   317  1267  1810     0  1530   412  1850    81   391  1806    82
------------|----------------|----------------|----------------|----------------|
Capacity Analysis Module:
Vol/Sat:     0.01  0.03  0.03  0.02  0.00  0.01  0.04  0.50  0.50  0.17  0.52  0.52
Crit Moves:                ****  ****                    ****
Green/Cycle: 0.05  0.05  0.05  0.03  0.00  0.03  0.75  0.75  0.75  0.75  0.75  0.75
Volume/Cap:  0.21  0.72  0.72  0.72  0.00  0.38  0.05  0.72  0.72  0.22  0.70  0.70
Delay/Veh:   43.1  69.9  69.9  81.4   0.0  48.3   3.1   8.1   8.1   4.9   7.7   7.7
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  43.1  69.9  69.9  81.4   0.0  48.3   3.1   8.1   8.1   4.9   7.7   7.7
LOS by Move:    D     E     E     F     A     D     A     A     A     A     A     A
HCM2kAvgQ:      1     3     3     2     0     1     0    15    15     1    15    15
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************

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Silverton TSP Update
Future Conditions w/Westside Connector Severed and Updated Land Use Mix
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #156 Westside Connector/Pine Street

Average Delay (sec/veh): 1.2 Worst Case Level Of Service: B(12.6)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0	0	0	0	0	0	0	1! 0	0	0
Volume Module:												
Base Vol:	28	0	11	0	0	0	0	211	22	25	295	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	28	0	11	0	0	0	0	211	22	25	295	0
Added Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol.:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	28	0	11	0	0	0	0	211	22	25	295	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	30	0	12	0	0	0	0	229	24	27	321	0
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	30	0	12	0	0	0	0	229	24	27	321	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	614	616	241	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	253	xxxx	xxxxx
Potent Cap.:	457	469	803	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1324	xxxx	xxxxx
Move Cap.:	456	469	803	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1324	xxxx	xxxxx
Volume/Cap:	0.07	0.00	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	513	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	12.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:	12.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del/ LOS	V/ C	Future Del/ LOS	V/ C	Change in
* 34 JAMES/"C"	C 22.3	0.000	C 17.7	0.000	-4.570 D/V
* 35 JAMES/WATER	B 10.2	0.410	C 14.3	0.619	+ 0.209 V/C
* 36 JAMES/PINE	B 10.5	0.442	C 20.8	0.841	+ 0.399 V/C
* 38 Westside Connector/Pine	A 8.8	0.000	C 16.9	0.000	+ 8.091 D/V
* 42 "C"/MACLAINE	D 27.5	0.462	D 49.4	0.992	+21.941 D/V
*156 Westside Connector/Silverton R	A 2.3	0.404	B 13.4	0.780	+11.110 D/V

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 3.5 Worst Case Level Of Service: C(19.7)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0	0	0	0	0	0	1! 0	0	0	0
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol.:	0	24	26	42	9	21	53	202	0	84	301	29
James/C Adj:	0	-45	45	-68	-17	0	0	0	0	17	0	0
Initial Fut:	0	0	92	0	-3	145	173	633	4	90	646	67
User Adj:	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	97	0	0	153	182	666	4	95	680	71
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	97	0	0	153	182	666	4	95	680	71
Critical Gap Module:												
Critical Gp:xxxxx	6.4	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:xxxxx	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol: xxxx	1973	669	1946	1919	715	751	xxxx	xxxxx	xxxxx	431	xxxx	xxxxx
Potent Cap.: xxxx	63	461	68	66	434	868	xxxx	xxxxx	xxxxx	929	xxxx	xxxxx
Move Cap.: xxxx	43	461	29	43	434	868	xxxx	xxxxx	xxxxx	929	xxxx	xxxxx
Volume/Cap: xxxx	0.00	0.21	0.00	0.00	0.35	0.21	xxxx	xxxx	xxxx	0.10	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.8	xxxx	xxxxx	0.3	xxxx	xxxxx
Control Del:xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxx	xxxxx	10.2	xxxx	xxxxx	9.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.: xxxx	xxxx	461	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	
SharedQueue:xxxxx	xxxx	0.8	xxxxx	xxxx	1.6	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shrd ConDel:xxxxx	xxxx	14.9	xxxxx	xxxx	17.7	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	B	*	*	C	*	*	*	*	*	*
ApproachDel:		14.9			17.7		xxxxxx			xxxxxx		
ApproachLOS:		B			C		*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec):	0	Critical Vol./Cap.(X):	0.878
Loss Time (sec):	0 (Y=N-4.0 sec)	Average Delay (sec/veh):	18.3
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	1!	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	12	150	18	161	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	161	142	1	8	12	10	17	12	140
Added Vol.:	0	69	0	28	63	0	0	0	0	2	0	11
PasserByVol.:	0	-21	0	85	-85	0	0	0	0	0	0	45
Initial Fut:	12	234	18	274	120	1	8	12	10	19	12	296
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	254	20	298	130	1	9	13	11	21	13	322
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	13	254	20	298	130	1	9	13	11	21	13	322
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	254	20	298	130	1	9	13	11	21	13	322
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.04	0.89	0.07	0.68	0.30	0.01	0.29	0.42	0.33	0.06	0.04	0.90
Final Sat.:	28	543	42	939	392	2	124	181	155	37	24	582
Capacity Analysis Module:												
Vol/Sat:	0.47	0.47	0.47	0.68	0.68	0.68	0.07	0.07	0.07	0.55	0.55	0.55
Crit Moves:	****			****				****	****			
Delay/Veh:	12.9	12.9	12.9	18.5	18.5	18.5	9.1	9.1	9.1	13.8	13.8	13.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.9	12.9	12.9	18.5	18.5	18.5	9.1	9.1	9.1	13.8	13.8	13.8
LOS by Move:	B	B	B	C	C	C	A	A	A	B	B	B
ApproachDel:		12.9			18.5			9.1			13.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		12.9			18.5			9.1			13.8	
LOS by Appr:		B			C			A			B	
Ai/WayAvgQ:	0.7	0.7	0.7	1.8	1.8	1.8	0.2	0.2	0.2	1.6	1.6	1.6

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec):	0	Critical Vol./Cap.(X):	0.631
Loss Time (sec):	0 (Y=N-4.0 sec)	Average Delay (sec/veh):	20.8
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	1!	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	131	165	3	0	108	43	73	8	186	1	4	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	131	165	3	0	108	43	73	8	186	1	4	2
Added Vol.:	206	0	0	0	16	31	20	0	75	0	0	0
PasserByVol.:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	341	165	3	0	124	74	93	8	261	1	4	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	381	174	3	0	131	78	98	8	275	1	4	2
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	381	174	3	0	131	78	98	8	275	1	4	2
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	381	174	3	0	131	78	98	8	275	1	4	2
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.67	0.32	0.01	0.00	0.63	0.37	0.26	0.02	0.72	0.11	0.61	0.28
Final Sat.:	440	209	4	0	379	226	161	14	491	53	319	156
Capacity Analysis Module:												
Vol/Sat:	0.87	0.83	0.87	xxxx	0.34	0.34	0.61	0.61	0.61	0.02	0.02	0.02
Crit Moves:	****						****				****	
Delay/Veh:	28.3	28.3	28.3	0.0	11.2	11.2	15.6	15.6	15.6	9.6	9.6	9.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.3	28.3	28.3	0.0	11.2	11.2	15.6	15.6	15.6	9.6	9.6	9.6
LOS by Move:	D	D	D	A	B	B	C	C	C	A	A	A
ApproachDel:		28.3			11.2			15.6			9.6	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		28.3			11.2			15.6			9.6	
LOS by Appr:		D			B			C			A	
Ai/WayAvgQ:	3.6	3.6	3.6	0.4	0.4	0.4	1.2	1.2	1.2	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #38 Westside Connector/Pine

Average Delay (sec/veh): 4.6 Worst Case Level Of Service: C(15.9)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:		Include			Include			Include			Include	
Lanes:	0	0	1!	0	0	1!	0	0	1!	0	0	1!
Volume Module:												
Base Vol:	0	0	6	15	2	16	9	169	0	0	100	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	6	15	2	16	9	169	0	0	100	0
Added Vol.:	25	0	4	43	20	3	1	45	20	0	176	53
PasserByVol.:	17	0	0	0	0	0	0	-30	20	0	-77	0
Initial Fut:	42	0	4	58	22	19	1	184	40	0	199	53
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	114	0	4	63	22	21	1	200	44	0	216	58
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	114	0	4	63	22	21	1	200	44	0	216	58
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	389	516	229	493	518	245	314	xxxx	xxxxx	252	xxxx	xxxxx
Potent Cap.:	618	566	815	568	489	789	1261	xxxx	xxxxx	1325	xxxx	xxxxx
Move Cap.:	447	566	815	479	467	789	1261	xxxx	xxxxx	1325	xxxx	xxxxx
Volume/Cap:	0.26	0.00	0.00	0.13	0.05	0.03	0.00	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	1.4	xxxx	xxxxx	0.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxx	xxxxx	xxxx	527	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	7.1	xxxxx	xxxxx	2.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	12.9	xxxxx	xxxxx	13.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	C	*	*	B	*	*	*	*	*	*	*
ApproachDel:		15.9			13.1			xxxxxx			xxxxxx	
ApproachLOS:		C			B			*			*	

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #42 "C"/McCLAINE

Cycle (sec):	120	Critical Vol./Cap.(X):	0.952
Loss Time (sec):	12 (Y=N-4.0 sec)	Average Delay (sec/veh):	49.4
Optimal Cycle:	180	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:		Include			Ov.			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0	1	0	1	0	1	1	0	1	0
Volume Module: >> Count Date: 7 Sep 2006 << 4:50-5:50 PM												
Base Vol:	95	206	30	22	185	251	265	273	60	42	201	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	30	22	185	251	265	273	60	42	201	11
Added Vol.:	142	58	38	1	196	100	149	84	100	8	102	1
PasserByVol.:	25	0	0	0	0	0	0	15	0	0	32	0
Initial Fut:	262	264	68	23	381	351	414	372	160	50	335	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	276	278	72	24	401	369	436	392	168	53	374	13
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	276	278	72	24	401	369	436	392	168	53	374	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	276	278	72	24	401	369	436	392	168	53	374	13
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.36	0.97	0.97	0.41	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00
Lanes:	1.00	0.78	0.22	1.00	1.00	1.00	1.00	0.69	0.31	1.00	0.97	0.03
Final Sat.:	653	1356	341	729	1800	1690	1710	1290	528	1710	1732	59
Capacity Analysis Module:												
Vol/Sat:	0.42	0.21	0.21	0.03	0.22	0.22	0.26	0.30	0.32	0.03	0.22	0.22
Crit Moves:	****							****			****	
Green/Cycle:	0.43	0.43	0.43	0.43	0.43	0.68	0.26	0.41	0.41	0.04	0.22	0.22
Volume/Cap:	0.99	0.48	0.48	0.08	0.52	0.32	0.98	0.74	0.76	0.74	0.99	0.99
Delay/Veh:	85.8	25.6	25.6	24.4	28.1	8.5	86.1	33.2	33.8	86.7	90.2	90.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	85.8	25.6	25.6	24.4	28.1	8.5	86.1	33.2	33.8	86.7	90.2	90.2
LOS by Move:	F	C	C	C	C	A	F	C	C	F	F	F
HCM2kAvgQ:	19	10	10	1	11	6	22	13	13	3	20	20

Note: Queue reported is the number of cars per lane.

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Silverton TSP Update
Future Conditions w/Westside Connector and Updated Land Use
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #155 Westside Connector/Silverton Rd

Cycle (sec):	90	Critical Vol./Cap.(X):	0.780
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	13.8
Optimal Cycle:	79	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 0 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	[illegible]	0	0	300	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00
Initial Bse:	0	0	0	0	0	0	0	[illegible]	0	0	[illegible]	0
Added Vol:	0	0	0	32	0	15	0	300	0	0	316	79
Exist Recom:	20	10	40	20	0	0	15	0	80	60	0	37
Initial Fut:	20	10	40	52	0	15	15	850	80	60	816	116
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	22	11	43	57	0	16	16	924	53	65	887	126
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	22	11	43	57	0	16	16	924	53	65	887	126
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	22	11	43	57	0	16	16	924	53	65	887	126
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.95	0.88	0.88	0.95	1.00	0.85	0.19	1.00	1.00	0.21	0.98	0.98
Lanes:	1.00	0.20	0.80	1.00	0.00	1.00	1.00	0.97	0.03	1.00	0.88	0.12
Final Sat.:	1710	317	1267	1710	0	1530	335	1750	41	380	1544	220
Capacity Analysis Module:												
Vol/Sat:	0.01	0.03	0.03	0.03	0.00	0.01	0.05	0.53	0.53	0.17	0.57	0.57
Crit Moves:			****	****							****	
Green/Cycle:	0.04	0.04	0.04	0.04	0.00	0.04	0.14	0.74	0.74	0.74	0.74	0.74
Volume/Cap:	0.29	0.78	0.78	0.78	0.00	0.29	0.07	0.73	0.73	0.23	0.78	0.78
Delay/Veh:	43.8	84.5	84.5	83.3	0.0	43.7	3.4	8.8	8.8	4.2	10.5	10.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.8	84.5	84.5	83.3	0.0	43.7	3.4	8.8	8.8	4.2	10.5	10.5
LOS by Move:	D	F	F	F	A	D	A	A	A	A	B	B
HCM2kAvgQ:	1	3	3	3	0	1	0	16	16	1	19	19

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Rebuilt Sig
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 34 JAMES/"C"	C	22.3	0.000	C	24.2	0.000	+2.118 D/V
# 35 JAMES/WATER	B	10.2	0.450	A	9.3	0.370	-0.080 V/C
# 36 JAMES/PINE	B	14.3	0.384	C	26.4	0.728	+12.136 D/V
# 42 "C"/MACLAINE	C	27.5	0.482	D	39.3	0.900	+11.759 D/V

2030 Future No-Build   Tue Oct 23, 2012 11:52:12   Page [illegible]

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute Sig
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/[illegible]

Average Delay (sec/veh): 4.3   Worst Case Level Of Service: C[20.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 1!	0 0	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol:	0	24	26	42	[illegible]	66	91	202	0	64	[illegible]	29
[illegible] Adj:	0	-45	45	-48	[illegible]	[illegible]	0	[illegible]	0	17	[illegible]	[illegible]
Initial Fut:	0	[illegible]	92	[illegible]	0	190	211	633	4	90	[illegible]	[illegible]
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	[illegible]	[illegible]	97	[illegible]	0	[illegible]	222	666	4	95	[illegible]	[illegible]
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	222	666	4	95	[illegible]	[illegible]
Critical Gap Module:												
Critical Gp:	xxxxx	[illegible]	6.2	[illegible]	[illegible]	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	xxxxx	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	2053	[illegible]	[illegible]	2018	[illegible]	[illegible]	xxxx	xxxxx	[illegible]	xxxx	xxxxx
Potent Cap.:	xxxx	56	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	xxxx	xxxxx	929	xxxx	xxxxx
Move Cap.:	xxxx	[illegible]	[illegible]	21	[illegible]	434	[illegible]	xxxx	xxxxx	929	xxxx	xxxxx
Volume/Cap:	xxxx	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.26	xxxx	xxxx	[illegible]	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	[illegible]	xxxx	xxxxx	[illegible]	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	10.6	xxxx	xxxxx	[illegible]	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	[illegible]	xxxx	[illegible]	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	[illegible]	xxxxx	[illegible]	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	[illegible]	xxxxx	[illegible]	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	[illegible]	*	C	*	*	*	*	*	*	*
ApproachDel:		[illegible]			20.2			xxxxxx			xxxxxx	
ApproachLOS:		[illegible]			C			*			*	

Note: Queue reported is the number of cars per lane.

Traffix [illegible] (c) 200[illegible] Dowling Assoc. Licensed to DKS ASSOC., PORTLAND, OR

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Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute Sig
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec): 1   Critical Vol./Cap.(X): [illegible]
Loss Time (sec): 0 (Y+R=4.0 sec)   Average Delay (sec/veh): 9.3
Optimal Cycle: 0   Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	12	150	18	161	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	161	142	1	8	12	10	17	12	140
Added Vol:	0	143	0	28	110	0	0	0	0	2	0	111
BrownReRout:	0	-45	0	-160	-85	0	0	0	0	0	0	-225
Initial Fut:	12	248	18	29	167	1	8	12	10	19	12	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	270	20	32	182	1	9	13	11	21	13	28
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	13	270	20	32	182	1	9	13	11	21	13	28
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	270	20	32	182	1	9	13	11	21	13	28
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.04	0.90	0.06	0.14	0.85	0.01	0.27	0.40	0.33	0.33	0.21	0.46
Final Sat.:	35	728	53	118	687	4	178	265	221	227	143	310
Capacity Analysis Module:												
Vol/Sat:	0.37	0.37	0.37	0.27	0.27	0.27	0.05	0.05	0.05	0.09	0.09	0.09
Crit Moves:			****		****		****				****	
Delay/Veh:	9.8	9.8	9.8	9.1	9.1	9.1	8.2	8.2	8.2	8.3	8.3	8.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.8	9.8	9.8	9.1	9.1	9.1	8.2	8.2	8.2	8.3	8.3	8.3
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:		9.8			9.1			8.2			8.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		9.8			9.1			8.2			8.3	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.6	0.6	0.6	0.4	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

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Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute Sig
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #[illegible] [illegible]/PINE

Cycle (sec): [illegible]   Critical Vol./Cap.(X): [illegible]
Loss Time (sec): [illegible] (Y+R=4.0 sec)   Average Delay (sec/veh): [illegible]
Optimal Cycle: [illegible]   Level Of Service: [illegible]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lanes:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	43	13	8	[illegible]	1	6	[illegible]
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	[illegible]	165	[illegible]	[illegible]	[illegible]	43	73	[illegible]	146	[illegible]	6	[illegible]
Added Vol:	254	[illegible]	[illegible]	[illegible]	[illegible]	31	24	[illegible]	122	[illegible]	[illegible]	[illegible]
BrownReRoute:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	185	-135	[illegible]	192	[illegible]
Initial Fut:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	[illegible]	193	[illegible]	[illegible]	[illegible]	90
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80	[illegible]	210	[illegible]	[illegible]	[illegible]	[illegible]
Reduct Vol:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reduced Vol:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80	[illegible]	210	[illegible]	[illegible]	[illegible]	[illegible]
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80	[illegible]	210	[illegible]	[illegible]	[illegible]	[illegible]
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lanes:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Final Sat.:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Capacity Analysis Module:												
Vol/Sat:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Crit Moves:	****						****				****	
Green/Cycle:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Volume/Cap:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delay/Veh:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24.2	24.2	24.2	[illegible]	[illegible]	[illegible]
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24.2	24.2	24.2	[illegible]	[illegible]	[illegible]
LOS by Move:	[illegible]	[illegible]	[illegible]	[illegible]	B	B	C	C	C	[illegible]	[illegible]	[illegible]
HCM2kAvgQ:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	9	[illegible]	[illegible]	[illegible]

Note: Queue reported is the number of cars per lane.

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Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute Sig
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #42 "C"/[illegible]

Cycle (sec): 120   Critical Vol./Cap.(X): [illegible]
Loss Time (sec): 12 (Y+R=4.0 sec)   Average Delay (sec/veh): [illegible]
Optimal Cycle: 120   Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Ovl			Include			Include		
Min. Green:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lanes:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Volume Module: >> Count Date: [illegible] Sep 2006 << 4:50-5:50 PM												
Base Vol:	95	206	[illegible]	[illegible]	[illegible]	[illegible]	265	[illegible]	[illegible]	42	[illegible]	[illegible]
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Added Vol:	104	96	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]Vol:	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]	0
Initial Fut:	199	302	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	209	318	[illegible]	24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	209	318	[illegible]	24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	[illegible]	[illegible]	[illegible]	24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lanes:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Final Sat.:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Capacity Analysis Module:												
Vol/Sat:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Crit Moves:	****						****				****	
Green/Cycle:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Volume/Cap:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delay/Veh:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	66.[illegible]	28.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LOS by Move:	E	C	[illegible]	[illegible]	[illegible]	A	[illegible]	[illegible]	[illegible]	[illegible]	E	E
HCM2kAvgQ:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	15

Note: Queue reported is the number of cars per lane.

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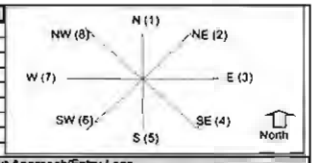
NCHRP Report 572 Roundabout Calculator
Single-Lane

Version 1.0
01/15/08

General & Site Information	
Analyst:	JXS
Agency/Company:	DKS Associates
Date:	9/12/2012
Project Name:	Silverton w/Brown
Intersection:	James St/Pine St
Analysis Time Period:	PM Peak
Jurisdiction:	Silverton
Year:	2030



Volumes		Roundabout Approach/Entry Legs							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Input Volumes to Leg #	N (1), vph			80		65		93	
	NE (2), vph								
	E (3), vph	60				3		193	
	SE (4), vph								
	S (5), vph	64		1				123	
	SW (6), vph								
	W (7), vph	74		198		195			
	NW (8), vph								
Output	Total Vehicles	198	0	279	0	263	0	409	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Trucks	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
E_i	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
$F_{HV,i}$	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	89	0	94	0	103	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	67	0	0	0	3	0	214	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	71	0	1	0	0	0	136	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	82	0	220	0	216	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	220	0	309	0	314	0	453	0
Conflicting flow, pcu/h	437	723	414	697	384	592	139	656

Results	N	NE	E	SE	S	SW	W	NW
Entry Capacity, pcu/h	730	NA	747	NA	770	NA	984	NA
Leg v/c ratio	0.30		0.41		0.41		0.46	
Control Delay, s/pcu	7.0		8.2		7.9		6.7	
LOS	A		A		A		A	
95th Percentile Queue (ft)*	33	0	53	0	51	0	64	0

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Silverton TSP Update
2030 Conditions w/Updated Land Use Exist Geometry
AM Peak Hour

Input Analysis Report
Level Of Service

Intersection	Base Delay	V/C	LOS	Future Delay	V/C	LOS	Change in V/C
#158	C 22.4	0.365	C	22.4	0.365	C	0.000

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Oregon Dept of Transportation

Transportation Planning Analysis Unit

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Silverton TSP Update
2030 Conditions w/Updated Land Use Exist Geometry
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #158

Cycle (sec):	90	Critical Vol./Cap.(X):	0.365
Loss Time (sec):	0 (Y=R+4.0 sec)	Average Delay (sec/veh):	22.4
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module: AM Peak Hour												
Base Vol:	231	169	0	0	124	53	56	16	188	1	17	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	231	169	0	0	124	53	56	16	188	1	17	3
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	231	169	0	0	124	53	56	16	188	1	17	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PHF Volume:	308	225	0	0	165	71	75	21	251	1	23	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	308	225	0	0	165	71	75	21	251	1	23	4
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	308	225	0	0	165	71	75	21	251	1	23	4
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.55	0.44	0.01	1.00	0.70	0.29	0.63	0.17	0.19	0.04	0.81	0.14
Final Sat.:	304	251	8	0	402	177	139	40	471	27	546	99
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.00	0.00	0.00	0.00	0.54	0.54	0.54	0.04	0.04	0.04
Crit Moves:		****			****			****			****	
Delay/Veh:	32.0	32.0	32.0	22.0	22.0	22.0	24.4	24.4	24.4	20.0	20.0	20.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.0	32.0	32.0	22.0	22.0	22.0	24.4	24.4	24.4	20.0	20.0	20.0
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
ApproachDel:		32.0			22.0			24.4			20.0	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		32.0			22.0			24.4			20.0	
LOS by Appr:		C			C			C			C	
AllWayAvgQ:	4.3	4.3	4.3	0.6	0.6	0.6	0.9	0.9	0.9	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

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2030 Future No-Build Mon Oct 29, 2012 10:26:54 Page 3-1

Silverton TSP Update
2030 Conditions w/Updated Land Use Exist Geometry
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #158

Cycle (sec):	90	Critical Vol./Cap.(X):	0.365
Loss Time (sec):	0 (Y=R+4.0 sec)	Average Delay (sec/veh):	22.4
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module: AM Peak Hour												
Base Vol:	231	169	0	0	124	53	56	16	188	1	17	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	231	169	0	0	124	53	56	16	188	1	17	3
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	231	169	0	0	124	53	56	16	188	1	17	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PHF Volume:	308	225	0	0	165	71	75	21	251	1	23	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	308	225	0	0	165	71	75	21	251	1	23	4
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	308	225	0	0	165	71	75	21	251	1	23	4
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.55	0.44	0.01	1.00	0.70	0.29	0.63	0.17	0.19	0.04	0.81	0.14
Final Sat.:	304	251	8	0	402	177	139	40	471	27	546	99
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.00	0.00	0.00	0.00	0.54	0.54	0.54	0.04	0.04	0.04
Crit Moves:		****			****			****			****	
Delay/Veh:	32.0	32.0	32.0	22.0	22.0	22.0	24.4	24.4	24.4	20.0	20.0	20.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.0	32.0	32.0	22.0	22.0	22.0	24.4	24.4	24.4	20.0	20.0	20.0
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
ApproachDel:		32.0			22.0			24.4			20.0	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		32.0			22.0			24.4			20.0	
LOS by Appr:		C			C			C			C	
AllWayAvgQ:	4.3	4.3	4.3	0.6	0.6	0.6	0.9	0.9	0.9	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

TRAFFIX 7.9.0415 (c) 2007 Dowling Assoc. Licensed to DKS ASSOC., PORTLAND, OR

2030 Future No-Build Mon Oct 29, 2012 10:24:04 Page 3-1

Silverton TSP Update
2030 Conditions w/Updated Land Use Exist Geometry
AM Peak Hour

Input Analysis Report
Level Of Service

Intersection	Base Delay	V/C	LOS	Future Delay	V/C	LOS	Change in V/C
#158	E 41.3	1.067	E	41.3	1.067	E	0.000

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2030 Future No-Build         Mon Oct 29, 2012 10:24:05                  Page 3-1
--------------------------------------------------------------------------------
                            Silverton TSP Update
             2030 Conditions w/Updated Land Use Exist Geometry
                                AM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #158
********************************************************************************
Cycle (sec):               90              Critical Vol./Cap.(X):        1.067
Loss Time (sec):            0 (Y+R=4.0 sec) Average Delay (sec/veh):      47.4
Optimal Cycle:              0              Level Of Service:                 E
********************************************************************************
Approach:      North Bound    South Bound     East Bound      West Bound
Movement:     L  -  T  -  R  L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------|---------------|---------------|---------------|
Control:       Stop Sign       Stop Sign       Stop Sign       Stop Sign
Rights:          Include         Include         Include         Include
Min. Green:    0     0     0   0     0     0   0     0     0   0     0     0
Lanes:        0  0  1! 0  0  0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|---------------|---------------|---------------|---------------|
Volume Module:AM Peak Hour
Base Vol:     282  209     6     2  139    62    65   17   206     1   18     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  282  209     6     2  139    62    65   17   206     1   18     2
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  282  209     6     2  139    62    65   17   206     1   18     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:   376  279     8     3  185    83    87   23   275     1   24     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  376  279     8     3  185    83    87   23   275     1   24     3
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  376  279     8     3  185    83    87   23   275     1   24     3
------------|---------------|---------------|---------------|---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.57 0.42  0.01  0.01 0.68  0.31  0.21 0.06  0.73  0.05 0.88  0.09
Final Sat.:   352  261     7     6  395   176   133   35   423    21  383    43
------------|---------------|---------------|---------------|---------------|
Capacity Analysis Module:
Vol/Sat:     1.07 1.07  1.07  0.47 0.47  0.47  0.65 0.65  0.65  0.06 0.06  0.06
Crit Moves:             ****  ****                   ****        ****
Delay/Veh:   78.6 78.6  78.6  14.1 14.1  14.1  19.1 19.1  19.1  10.7 10.7  10.7
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  78.6 78.6  78.6  14.1 14.1  14.1  19.1 19.1  19.1  10.7 10.7  10.7
LOS by Move:    F    F     F     B    B     B     C    C     C     B    B     B
ApproachDel:      78.6            14.1            19.1            10.7
Delay Adj:        1.00            1.00            1.00            1.00
ApprAdjDel:       78.6            14.1            19.1            10.7
LOS by Appr:        F               B               C               B
AllWayAvgQ:  12.1 12.1  12.1   0.8  0.8   0.8   1.7  1.7   1.7   0.1  0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
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2030 Future No-Build         Mon Oct 29, 2012 10:21:17                  Page 2-1
--------------------------------------------------------------------------------
                            Silverton TSP Update
             2030 Conditions w/Updated Land Use Exist Geometry
                                AM Peak Hour
--------------------------------------------------------------------------------
                          Impact Analysis Report
                             Level Of Service

Intersection                                   Base          Future       Change
                                            Del/   V/     Del/   V/         in
                                          LOS Veh   C   LOS Veh   C
#158                                      F  90.6 1.286 F  90.6 1.286  + 0.000 V/C

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2030 Future No-Build         Mon Oct 29, 2012 10:11:17                  Page 4-1
--------------------------------------------------------------------------------
                            Silverton TSP Update
             2030 Conditions w/Updated Land Use Exist Geometry
                                AM Peak Hour
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #158
********************************************************************************
Cycle (sec):               90              Critical Vol./Cap.(X):        1.284
Loss Time (sec):            0 (Y+R=4.0 sec) Average Delay (sec/veh):      95.4
Optimal Cycle:              0              Level Of Service:                 F
********************************************************************************
Approach:      North Bound    South Bound     East Bound      West Bound
Movement:     L  -  T  -  R  L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------|---------------|---------------|---------------|
Control:       Stop Sign       Stop Sign       Stop Sign       Stop Sign
Rights:          Include         Include         Include         Include
Min. Green:    0     0     0   0     0     0   0     0     0   0     0     0
Lanes:        0  0  1! 0  0  0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|---------------|---------------|---------------|---------------|
Volume Module:AM Peak Hour
Base Vol:     334  229     6     2  152    70    73   18   243     1   20     1
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  334  229     6     2  152    70    73   18   243     1   20     1
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  334  229     6     2  152    70    73   18   243     1   20     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:   445  305     8     3  203    93    97   24   324     1   27     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  445  305     8     3  203    93    97   24   324     1   27     1
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  445  305     8     3  203    93    97   24   324     1   27     1
------------|---------------|---------------|---------------|---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.59 0.40  0.01  0.01 0.68  0.31  0.22 0.05  0.73  0.04 0.91  0.05
Final Sat.:   344  237     6     5  378   173   128   32   426    29  382    19
------------|---------------|---------------|---------------|---------------|
Capacity Analysis Module:
Vol/Sat:     1.29 1.29  1.29  0.54 0.54  0.54  0.76 0.76  0.76  0.07 0.07  0.07
Crit Moves:             ****       ****                  ****        ****
Delay/Veh:  161.2  161 161.2  16.1 16.1  16.1  25.3 25.3  25.3  11.2 11.2  11.2
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 161.2  161 161.2  16.1 16.1  16.1  25.3 25.3  25.3  11.2 11.2  11.2
LOS by Move:    F    F     F     C    C     C     D    D     D     B    B     B
ApproachDel:     161.2            16.1            25.3            11.2
Delay Adj:        1.00            1.00            1.00            1.00
ApprAdjDel:      161.2            16.1            25.3            11.2
LOS by Appr:        F               C               D               B
AllWayAvgQ:  24.9 24.9  24.9   1.0  1.0   1.0   2.6  2.6   2.6   0.1  0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.

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2030 Future No-Build         Mon Oct 29, 2012 10:14:34                  Page 2-1
--------------------------------------------------------------------------------
                            Silverton TSP Update
             2030 Conditions w/Updated Land Use Exist Geometry
                                AM Peak Hour
--------------------------------------------------------------------------------
                          Impact Analysis Report
                             Level Of Service

Intersection                                   Base          Future       Change
                                            Del/   V/     Del/   V/         in
                                          LOS Veh   C   LOS Veh   C
#158                                      F 131.2 1.629 F 131.2 1.629  + 0.000 V/C

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Silverton TSP Update
2030 Conditions w/Updated Land Use Exist Geometry
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #158

Cycle (sec):	90	Critical Vol./Cap.(X):	1.629
Loss Time (sec):	8 (Y=R=4.0 Sec)	Average Delay (sec/veh):	141.2
Optimal Cycle:	0	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	1	0 0
Volume Module:AM Peak Hour												
Base Vol:	406	257	6	2	241	81	86	19	296	1	21	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	406	257	6	2	241	81	86	19	296	1	21	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	406	257	6	2	241	81	86	19	296	1	21	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PHF Volume:	541	343	8	3	321	108	115	25	395	1	28	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	541	343	8	3	321	108	115	25	395	1	28	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	541	343	8	3	321	108	115	25	395	1	28	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.61	0.38	0.01	0.01	0.47	0.32	0.21	0.05	0.74	0.05	0.95	0.00
Final Sat.:	332	210	5	4	304	168	124	27	426	19	389	0
Capacity Analysis Module:												
Vol/Sat:	1.63	1.63	1.63	0.64	0.64	0.64	0.93	0.93	0.93	0.07	0.07	xxxx
Crit Moves:	****			****			****			****		
Delay/Veh:	308.9	309	308.9	20.4	20.4	20.4	45.6	45.6	45.6	11.8	11.8	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	308.9	309	308.9	20.4	20.4	20.4	45.6	45.6	45.6	11.8	11.8	0.0
LOS by Move:	F	F	F	C	C	C	E	E	E	B	B	*
ApproachDel:	308.9			20.4			45.6			11.8		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	308.9			20.4			45.6			11.8		
LOS by Appr:	F			C			E			B		
A_95thQ(#):	45.5	45.5	45.5	1.6	1.6	1.6	5.8	5.8	5.8	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use Exist Geometry w/Brown
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del./ LOS	Veh	V/ C	Future Del./ LOS	Veh	V/ C	Change in V/C
#158	C	20.7	0.766	C	20.7	0.766	+ 0.000

Silverton TSP Update
2025 Conditions w/Updated Land Use Exist Geometry w/Brown
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #158

Cycle (sec):	90	Critical Vol./Cap.(X):	1.281
Loss Time (sec):	8 (Y=R=4.0 sec)	Average Delay (sec/veh):	112.8
Optimal Cycle:	0	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	1	0 0
Volume Module:AM Peak Hour												
Base Vol:	182	115	4	24	67	58	62	103	133	1	131	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	182	115	4	24	67	58	62	103	133	1	131	77
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	182	115	4	24	67	58	62	103	133	1	131	77
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PHF Volume:	243	153	5	32	89	77	83	137	177	1	175	103
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	243	153	5	32	89	77	83	137	177	1	175	103
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	243	153	5	32	89	77	83	137	177	1	175	103
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.61	0.38	0.01	0.06	0.45	0.39	0.21	0.34	0.45	0.01	0.65	0.34
Final Sat.:	317	200	7	74	206	178	113	189	243	2	322	191
Capacity Analysis Module:												
Vol/Sat:	0.77	0.77	0.77	0.43	0.43	0.43	0.73	0.73	0.73	0.51	0.54	0.54
Crit Moves:	****			****			****			****		
Delay/Veh:	25.7	25.7	25.7	13.8	13.8	13.8	22.3	22.3	22.3	16.4	16.4	16.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.7	25.7	25.7	13.8	13.8	13.8	22.3	22.3	22.3	16.4	16.4	16.4
LOS by Move:	D	D	D	B	B	B	C	C	C	B	C	C
ApproachDel:	25.7			13.8			22.3			16.4		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	25.7			13.8			22.3			16.4		
LOS by Appr:	D			B			C			C		
A_95thQ(#):	2.3	2.3	2.3	1.0	1.0	1.0	2.6	2.6	2.6	1.0	1.0	1.0

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Accents
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base Del./ LOS	Veh	V/ C	Future Del./ LOS	Veh	V/ C	Change in V/C
#158	F	112.8	1.281	F	112.8	1.281	+ 0.000

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #154

Cycle (sec):	90	Critical Vol./Cap.(X):	1.287
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	112.8
Optimal Cycle:	0	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module:												
Base Vol:	253	160	6	33	93	81	86	143	184	1	191	107
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	253	160	6	33	93	81	86	143	184	1	191	107
Added Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol.:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	253	160	6	33	93	81	86	143	184	1	191	107
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PHF Volume:	337	213	8	44	124	108	115	191	245	1	255	143
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	337	213	8	44	124	108	115	191	245	1	255	143
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	337	213	8	44	124	108	115	191	245	1	255	143
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.61	0.39	0.02	0.16	0.45	0.39	0.21	0.35	0.44	0.01	0.64	0.35
Final Sat.:	242	166	6	65	182	159	94	151	202	1	281	157
Capacity Analysis Module:												
Vol/Sat:	1.39	1.28	1.29	0.68	0.68	0.68	1.22	1.22	1.22	0.91	0.91	0.91
Crit Moves:		****			****			****			****	
Delay/Veh:	210.6	191	190.6	21.5	21.5	21.5	141.9	142	141.9	50.8	50.8	50.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	210.6	191	190.6	21.5	21.5	21.5	141.9	142	141.9	50.8	50.8	50.8
LOS by Move:	F	F	F	C	C	C	F	F	F	F	F	F
ApproachDel:	210.6			21.5			141.9			50.8		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	210.6			21.5			141.9			50.8		
LOS by Appr:	F			C			F			F		
AllWayQ:	18.2	18.2	18.2	1.8	1.8	1.8	16.5	16.5	16.5	4.8	4.8	4.8

Note: Queue reported is the number of cars per lane.

Scenario Report

Scenario:	2035 Future No-Build
Command:	2035 PM Peak
Volume:	2035 Base
Geometry:	2035 Base
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Impact Analysis Report
Level Of Service

Intersection	Base Del/ Veh	LOS	V/ C	Future Del/ Veh	LOS	V/ C	Change in
# 22 WATER/"C"	B	19.3	0.425	C	20.4	0.578	+ 0.153 D/V
# 33 JAMES/MACLAINE	B	12.9	0.000	B	13.4	0.000	+ 0.016 D/V
# 34 JAMES/"C"	C	22.3	0.000	B	12.5	0.005	-9.811 D/V
# 35 JAMES/WATER	B	10.2	0.450	B	10.9	0.503	+ 0.053 V/C
# 36 JAMES/PINE	B	16.6	0.442	B	11.0	0.516	- 0.044 V/C
# 42 "C"/MACLAINE	C	23.5	0.659	C	25.4	0.742	+ 1.918 D/V

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #72 WATER/"C"

Cycle (sec):	100	Critical Vol./Cap.(X):	0.919
Loss Time (sec):	12 (Y=3+4.0 sec)	Average Delay (sec/veh):	25.4
Optimal Cycle:	46	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0 0	0	0	1 0	0	1	0	1	2	1 0
Volume Module: >> Count Date: 27 May 2006 (c) 4:00-5:00												
Base Vol:	0	0	0	64	170	23	16	382	140	58	403	113
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	64	170	23	16	382	140	58	403	113
Added Vol.:	0	0	0	0	5	0	0	14	32	33	67	19
Comm/C Adj:	0	0	0	15	15	15	25	0	0	0	25	0
Initial Fut:	0	0	0	79	190	39	41	396	172	91	495	132
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	83	200	41	43	417	181	227	485	139
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	0	0	0	83	200	41	43	417	181	227	485	139
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	83	200	41	43	417	181	227	485	139
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.93	0.98	0.98	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	0.00	0.00	0.00	1.00	0.84	0.17	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	0	0	0	1830	3456	289	1710	3800	1530	1710	3800	1530
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.05	0.06	0.14	0.03	0.11	0.12	0.13	0.13	0.09
Crit Moves:					****			****			****	
Green/Cycle:	0.00	0.00	0.00	0.24	0.24	0.24	0.05	0.41	0.41	0.23	0.59	0.59
Volume/Cap:	0.00	0.00	0.00	0.23	0.27	0.57	0.47	0.27	0.29	0.56	0.23	0.16
Delay/Veh:	0.0	0.0	0.0	31.9	32.0	38.9	62.2	26.2	21.2	39.1	13.4	9.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	31.9	32.0	38.9	62.2	26.2	21.2	39.1	13.4	9.8
LOS by Move:	A	A	A	C	C	D	E	C	C+	D	B	A
HCDelAvg:	0	0	0	2	2	3	4	1	1	3	1	0

Note: Queue reported is the number of cars per lane.

```
----------------------------------------------------------------------------
                        Silverton TSP Update
     2015 Conditions w/Updated Land Use and no Westside Connector
                            PM Peak Hour
----------------------------------------------------------------------------
                 Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #33 JAMES/McCLAINE
****************************************************************************
Average Delay (sec/veh):       2.1      Worst Case Level Of Service: B[ 12.4]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|----------------|----------------|----------------|----------------
Volume Module:
Base Vol:       0    0     0   25    0    40   60  285     0    0  245    35
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0   25    0    40   60  285     0    0  245    35
Added Vol:      0    0     0    0    0    12    8   13     0    0    8     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0   25    0    52   68  298     0    0  253    35
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:     0    0     0   26    0    55   72  314     0    0  266    37
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    0    0     0   26    0    55   72  314     0    0  266    37
------------|----------------|----------------|----------------|----------------
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx  6.4  6.5   6.2  4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx  3.5  4.0   3.3  2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|----------------|----------------|----------------|----------------
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  742  762   285  303 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  386  346   759 1269 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  369  326   759 1269 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx 0.07 0.00  0.07 0.06 xxxx  xxxx  xxxx xxxx  xxxx
------------|----------------|----------------|----------------|----------------
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *    *    *     *    A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  565 xxxxx xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.5 xxxxx  0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 12.4 xxxxx  8.0 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *    *    B     *    A    *     *     *    *     *
ApproachDel:     xxxxxx            12.4           xxxxxx           xxxxxx
ApproachLOS:        *                B               *                *
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************
```



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----------------------------------------------------------------------------
                        Silverton TSP Update
     2015 Conditions w/Updated Land Use and no Westside Connector
                            PM Peak Hour
----------------------------------------------------------------------------
                 Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #34 JAMES/"C"
****************************************************************************
Average Delay (sec/veh):       3.0      Worst Case Level Of Service: B[ 12.5]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:       0   21    21   26   12   124  120  431     4    9  345    38
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   21    21   26   12   124  120  431     4    9  345    38
Added Vol:      0    4     5    7    1    11   16   35     0   11   51     5
James/C Adj:    0  -25    25  -33  -13     0    0    0     0   13    0     0
Initial Fut:    0    0    51    0    0   135  136  466     4   33  396    43
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:     0    0    54    0    0   142  143  491     4   35  417    45
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    0    0    54    0    0   142  143  491     4   35  417    45
------------|----------------|----------------|----------------|----------------
Critical Gap Module:
Critical Gp:xxxxx  6.5   6.2  7.1  6.5   6.2  4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx  4.0   3.3  3.5  4.0   3.3  2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|----------------|----------------|----------------|----------------
Capacity Module:
Cnflict Vol: xxxx 1311   493 1335 1290   439  462 xxxx xxxxx   495 xxxx xxxxx
Potent Cap.: xxxx  160   580  136  165   622 1110 xxxx xxxxx  1079 xxxx xxxxx
Move Cap.:   xxxx  133   580  108  137   622 1110 xxxx xxxxx  1079 xxxx xxxxx
Volume/Cap:  xxxx 0.00  0.09 0.00 0.00  0.23 0.13 xxxx  xxxx  0.03 xxxx  xxxx
------------|----------------|----------------|----------------|----------------
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.4 xxxx xxxxx   0.1 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  8.7 xxxx xxxxx   8.4 xxxx xxxxx
LOS by Move:    *    *     *    *    *     *    A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx   580  xxxx  622 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.3 xxxxx  0.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx  11.8 xxxxx 12.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     B    *    B     *    *    *     *     *    *     *
ApproachDel:       11.8            12.5           xxxxxx           xxxxxx
ApproachLOS:        B                B               *                *
****************************************************************************
Note: Queue reported is the number of cars per lane.
****************************************************************************
```



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----------------------------------------------------------------------------
                        Silverton TSP Update
     2015 Conditions w/Updated Land Use and no Westside Connector
                            PM Peak Hour
----------------------------------------------------------------------------
                 Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
****************************************************************************
Intersection #35 JAMES/WATER
****************************************************************************
Cycle (sec):           1                Critical Vol./Cap.(X):        0.503
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):       10.9
Optimal Cycle:         0                Level Of Service:                 B
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:      12  150    18  161  142     1    8   12    10   17   12   140
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   12  150    18  161  142     1    8   12    10   17   12   140
Added Vol:      0   24     0    5   19     0    0    0     0    0    0    19
James/C Adj:    0  -25     0   46  -46     0    0    0     0    0    0    25
Initial Fut:   12  149    18  212  115     1    8   12    10   17   12   184
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:    13  162    20  230  125     1    9   13    11   18   13   200
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   13  162    20  230  125     1    9   13    11   18   13   200
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   13  162    20  230  125     1    9   13    11   18   13   200
------------|----------------|----------------|----------------|----------------
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.07 0.83  0.10 0.64 0.35  0.01 0.27 0.40  0.33 0.08 0.06  0.86
Final Sat.:    45  575    69  458  249     2  151  225   188   56   40   603
------------|----------------|----------------|----------------|----------------
Capacity Analysis Module:
Vol/Sat:     0.28 0.28  0.28 0.50 0.50  0.50 0.06 0.06  0.06 0.33 0.33  0.33
Crit Moves:       ****             ****             ****             ****
Delay/Veh:    9.7  9.7   9.7 12.5 12.5  12.5  8.7  8.7   8.7  9.8  9.8   9.8
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   9.7  9.7   9.7 12.5 12.5  12.5  8.7  8.7   8.7  9.8  9.8   9.8
LOS by Move:    A    A     A    B    B     B    A    A     A    A    A     A
ApproachDel:        9.7             12.5              8.7              9.8
Delay Adj:         1.00             1.00             1.00             1.00
ApprAdjDel:         9.7             12.5              8.7              9.8
LOS by Appr:          A                B                A                A
AllWayAvgQ:   0.3  0.3   0.3  0.9  0.9   0.9  0.0  0.0   0.0  0.4  0.4   0.4
****************************************************************************
Note: Queue reported is the number of cars per lane.
```



```
----------------------------------------------------------------------------
                        Silverton TSP Update
     2015 Conditions w/Updated Land Use and no Westside Connector
                            PM Peak Hour
----------------------------------------------------------------------------
                 Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
****************************************************************************
Intersection #36 JAMES/PINE
****************************************************************************
Cycle (sec):           1                Critical Vol./Cap.(X):        0.516
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):       11.5
Optimal Cycle:         0                Level Of Service:                 B
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  0  1! 0  0   0  0  0  1  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:     131  165     3    0  109    43   73    8   186    1    6     2
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  131  165     3    0  109    43   73    8   186    1    6     2
Added Vol:     43    0     0    0    3     5    1    0    21    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  174  165     3    0  112    48   74    8   207    1    6     2
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:   183  174     3    0  118    51   78    8   218    1    6     2
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  183  174     3    0  118    51   78    8   218    1    6     2
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  183  174     3    0  118    51   78    8   218    1    6     2
------------|----------------|----------------|----------------|----------------
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.51 0.48  0.01 0.00 0.70  0.30 0.26 0.03  0.71 0.11 0.67  0.22
Final Sat.:   356  337     6    0  415   206  184   19   512   64  381   127
------------|----------------|----------------|----------------|----------------
Capacity Analysis Module:
Vol/Sat:     0.52 0.52  0.52 xxxx 0.25  0.25 0.43 0.43  0.43 0.02 0.02  0.02
Crit Moves:       ****             ****             ****             ****
Delay/Veh:   12.8 12.8  12.8  0.0  9.4   9.4 11.1 11.1  11.1  8.6  8.6   8.6
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  12.8 12.8  12.8  0.0  9.4   9.4 11.1 11.1  11.1  8.6  8.6   8.6
LOS by Move:    B    B     B    *    A     A    B    B     B    A    A     A
ApproachDel:       12.8              9.4             11.1              8.6
Delay Adj:         1.00             1.00             1.00             1.00
ApprAdjDel:        12.8              9.4             11.1              8.6
LOS by Appr:          B                A                B                A
AllWayAvgQ:   0.9  0.9   0.9  0.3  0.3   0.3  0.6  0.6   0.6  0.0  0.0   0.0
****************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
2030 Future No-Build       Thu Sep 6, 2012 14:13:29                    Page 1-1
---------------------------------------------------------------------------------
                        Silverton TSP Update
 2015 Conditions w/Updated Land Use and no Westside Connector, Brown Bypass
                           PM Peak Hour
---------------------------------------------------------------------------------
                          Scenario Report
Scenario:            2030 Future No-Build

Command:             2020 PM Peak
Volume:              2020 Base
Geometry:            2020 Base
Impact Fee:          Default Impact Fee
Trip Generation:     Default Trip Generation
Trip Distribution:   Default Trip Distribution
Paths:               Default Path
Routes:              Default Route
Configuration:       Default Configuration
```



```
2030 Future No-Build       Thu Sep 6, 2012 14:15:30                    Page 2-1
---------------------------------------------------------------------------------
                        Silverton TSP Update
 2015 Conditions w/Updated Land Use and no Westside Connector, Brown Bypass
                           PM Peak Hour
---------------------------------------------------------------------------------
                       Impact Analysis Report
                          Level Of Service

Intersection                           Base              Future          Change
                                   Del/     V/       Del/     V/           in
                               LOS Veh      C    LOS Veh      C
# 32 WATER/"C"                  B  18.3 0.425    C  25.4 0.370   + 6.178 D/V

# 33 JAMES/McCLAINE             B  12.5 0.000    B  12.4 0.000   - 0.116 D/V

# 34 JAMES/"C"                  C  22.3 0.000    B  12.5 0.000   -9.811 D/V

# 35 JAMES/WATER                B  10.2 0.450    A   8.3 0.232   -0.219 V/C

# 36 JAMES/PINE                 B  10.8 0.460    B  10.9 0.464   + 0.003 V/C

# 42 "C"/McCLAINE               C  23.5 0.659    C  25.4 0.732   + 1.918 D/V
```



```
2030 Future No-Build       Thu Sep 6, 2012 14:15:30                    Page 3-1
---------------------------------------------------------------------------------
                        Silverton TSP Update
 2015 Conditions w/Updated Land Use and no Westside Connector, Brown Bypass
                           PM Peak Hour
---------------------------------------------------------------------------------
                 Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #32 WATER/"C"
*********************************************************************************
Cycle (sec):            100              Critical Vol./Cap.(X):        0.370
Loss Time (sec):         12 (Y+R=4.0 sec) Average Delay (sec/veh):      25.4
Optimal Cycle:           46              Level Of Service:                 C
*********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:         Split Phase      Split Phase       Protected        Protected
Rights:            Include          Include          Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:          0  0  0  0  0    1  0  0  1  0    1  0  1  0  1    1  0  1  0  1
------------|----------------||----------------||----------------||----------------|
Volume Module: >> Count Date: 23 May 2006 << 4:00-5:00
Base Vol:         0     0     0    64   170    23    26   382   149    58   403   113
Growth Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:      0     0     0    64   170    23    26   382   149    58   403   113
Added Vol:        0     0     0     0     5     9     0    14    32    33    67    19
James/C Adj:      0     0     0    15    15    14    25     0     0   125     0     0
Initial Fut:      0     0     0    79   190    46    41   396   172   216   470   132
User Adj:      1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:       0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:       0     0     0    83   200    41    43   417   181   227   495   139
Reduct Vol:       0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:      0     0     0    83   200    41    43   417   181   227   495   139
PCE Adj:       1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:       1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:      0     0     0    83   200    41    43   417   181   227   495   139
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:      1800  1800  1800  1800  1800  1800  1800  1800  1800  1800  1800  1800
Adjustment:    1.00  1.00  1.00  0.95  0.98  0.98  0.95  1.00  0.85  0.95  1.00  0.85
Lanes:         0.00  0.00  0.00  1.00  0.81  0.19  1.00  1.00  1.00  1.00  1.00  1.00
Final Sat.:       0     0     0  1710  1456   299  1710  1800  1530  1710  1800  1530
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:       0.00  0.00  0.00  0.05  0.14  0.14  0.03  0.23  0.12  0.13  0.27  0.09
Crit Moves:                                  ****        ****        ****
Green/Cycle:   0.00  0.00  0.00  0.24  0.24  0.24  0.05  0.41  0.41  0.23  0.59  0.59
Volume/Cap:    0.00  0.00  0.00  0.23  0.57  0.57  0.57  0.57  0.28  0.57  0.47  0.16
Delay/Veh:      0.0   0.0   0.0  31.9  38.9  38.9  62.2  26.2  21.2  39.1  11.4   9.8
User DelAdj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:     0.0   0.0   0.0  31.9  38.9  38.9  62.2  26.2  21.2  39.1  11.4   9.8
LOS by Move:      A     A     A     C     D     D     E     C     C     D     B     A
HCM2kAvgQ:        0     0     0     2     7     7     3    15     4     7     5     2
*********************************************************************************
Note: Queue reported is the number of cars per lane.
*********************************************************************************
```



```
2030 Future No-Build       Thu Sep 6, 2012 14:23:54                    Page 8-1
---------------------------------------------------------------------------------
                        Silverton TSP Update
   2015 Conditions w/Updated Land Use and no Westside Connector
                           PM Peak Hour
---------------------------------------------------------------------------------
                 Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #42 "C"/McCLAINE
*********************************************************************************
Cycle (sec):             90              Critical Vol./Cap.(X):        0.732
Loss Time (sec):         12 (Y+R=4.0 sec) Average Delay (sec/veh):      25.4
Optimal Cycle:           62              Level Of Service:                 C
*********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:          Permitted        Permitted        Protected        Protected
Rights:            Include            Ovl            Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:          1  0  0  1  0    1  0  0  1  0    1  0  0  1  0    1  0  0  1  0
------------|----------------||----------------||----------------||----------------|
Volume Module: >> Count Date: 2 Sep 2006 << 4:50-5:50 PM
Base Vol:        95   206    41    22   185   257   265   273    60    42   201    11
Growth Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:     95   206    41    22   185   257   265   273    60    42   201    11
Added Vol:       18    17     6     0    39    21    25    14    12     2    18     0
PasserByVol:      0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    113   223    43    22   224   278   290   287    72    44   219    11
User Adj:      1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:       0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:     119   235    45    23   236   293   305   302    76    46   231    12
Reduct Vol:       0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    119   235    45    23   236   293   305   302    76    46   231    12
PCE Adj:       1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:       1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:    119   235    45    23   236   293   305   302    76    46   231    12
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:      1800  1800  1800  1800  1800  1800  1800  1800  1800  1800  1800  1800
Adjustment:    0.28  0.98  0.98  0.50  0.92  0.92  0.95  0.97  0.97  0.98  0.99  0.99
Lanes:         1.00  0.84  0.16  1.00  0.45  0.55  1.00  0.80  0.20  1.00  0.95  0.05
Final Sat.:     471  1473   284   905   731   894  1710  1396   350  1760  1702    85
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:       0.25  0.16  0.16  0.03  0.32  0.32  0.18  0.22  0.22  0.03  0.14  0.14
Crit Moves:                            ****        ****                    ****
Green/Cycle:   0.44  0.44  0.46  0.44  0.44  0.68  0.24  0.38  0.38  0.04  0.19  0.19
Volume/Cap:    0.57  0.36  0.36  0.06  0.73  0.47  0.73  0.57  0.57  0.51  0.73  0.73
Delay/Veh:     22.9  17.2  17.2  16.1  24.8   7.0  37.8  23.1  23.1  61.0  42.1  42.1
User DelAdj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:    22.9  17.2  17.2  16.1  24.8   7.0  37.8  23.1  23.1  61.0  42.1  42.1
LOS by Move:      C     B     B     B     C     A     D     C     C     E     D     D
HCM2kAvgQ:        3     5     5     1    10     7     9     9     9     2     9     4
*********************************************************************************
Note: Queue reported is the number of cars per lane.
*********************************************************************************
```

Silverton TSP Update
2015 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #33 JAMES/MacLAINE

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B(12.4)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	25	0	40	60	285	0	0	245	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	25	0	40	60	285	0	0	245	35
Added Vol:	0	0	0	0	0	12	8	13	0	0	8	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	25	0	52	68	298	0	0	253	35
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	26	0	55	72	314	0	0	266	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	26	0	55	72	314	0	0	266	37
Critical Gap Module:												
Critical Gp:xxxxx	xxxx	xxxxx		6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:xxxxx	xxxx	xxxxx		3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	742	742	285	583	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	386	368	759	1269	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	369	326	759	1269	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.07	0.00	0.07	0.06	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95th@:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	8.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	94%	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:xxxxx	xxxx	xxxxx		xxxxx	0.5	xxxxx	0.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:xxxxx	xxxx	xxxxx		xxxxx	12.4	xxxxx	8.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	B	*	A	*	*	*	*	*
ApproachDel:	xxxxxx				12.4		xxxxxx			xxxxxx		
ApproachLOS:	*				B		*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2015 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 3.6 Worst Case Level Of Service: B(12.5)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	1	0	0	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol:	0	4	5	7	1	11	16	35	0	11	61	5
PasserByVol:	0	-25	25	-33	-13	0	0	0	0	13	0	0
Initial Fut:	0	0	51	0	0	135	136	466	4	33	406	43
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	54	0	0	142	143	491	4	35	427	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	54	0	0	142	143	491	4	35	427	45
Critical Gap Module:												
Critical Gp:xxxxx	6.9	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	
FollowUpTim:xxxxx	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	
Capacity Module:												
Cnflict Vol:	xxxx	1311	493	1315	1296	489	462	xxxx	xxxxx	495	xxxx	xxxxx
Potent Cap.:	xxxx	160	580	136	160	622	1110	xxxx	xxxxx	1079	xxxx	xxxxx
Move Cap.:	xxxx	133	580	108	133	622	1110	xxxx	xxxxx	1079	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.09	0.00	0.00	0.23	0.13	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95th@:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx	8.4	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	580	xxxx	622	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:xxxxx	xxxx	0.3	xxxxx	0.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shrd ConDel:xxxxx	xxxx	11.8	xxxxx	12.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	
Shared LOS:	*	B	*	B	*	*	*	*	*	*	*	
ApproachDel:	11.8			12.5			xxxxxx			xxxxxx		
ApproachLOS:	B			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2015 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec):	1	Critical Vol./Cap.(X):	0.232
Loss Time (sec):	0 (Y=0-4.0 sec)	Average Delay (sec/veh):	8.3
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	1!	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	12	150	18	161	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	161	142	1	8	12	10	17	12	140
Added Vol:	0	24	0	5	19	0	0	0	0	0	0	19
PasserByVol:	0	-25	0	-146	-46	0	0	0	0	0	0	-140
Initial Fut:	12	149	18	20	115	1	8	12	10	17	12	19
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	162	20	22	125	1	9	13	11	18	13	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	13	162	20	22	125	1	9	13	11	18	13	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	162	20	22	125	1	9	13	11	18	13	21
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.07	0.83	0.10	0.14	0.81	0.01	0.27	0.40	0.33	0.35	0.25	0.40
Final Sat.:	56	698	84	149	862	6	197	295	246	265	187	296
Capacity Analysis Module:												
Vol/Sat:	0.23	0.23	0.23	0.15	0.15	0.15	0.04	0.04	0.04	0.07	0.07	0.07
Crit Moves:	****			****			****			****		
Delay/Veh:	8.4	8.4	8.4	8.3	8.3	8.3	7.7	7.7	7.7	7.8	7.8	7.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.4	8.4	8.4	8.3	8.3	8.3	7.7	7.7	7.7	7.8	7.8	7.8
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.4			8.3			7.7			7.8		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.4			8.3			7.7			7.8		
LOS by Appr:	A			A			A			A		
A_RaWaSum:	0.3	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2015 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec):	1	Critical Vol./Cap.(X):	0.464
Loss Time (sec):	0 (Y=0-4.0 sec)	Average Delay (sec/veh):	10.9
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1!	0	0	1!	0	0	1!	0	0	1!
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	131	165	3	6	108	43	73	8	196	1	6	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	131	165	3	6	108	43	73	8	196	1	6	2
Added Vol:	43	0	0	1	3	5	3	0	21	0	0	0
PasserByVol:	-40	-75	0	56	-56	0	0	130	-130	0	88	77
Initial Fut:	94	90	3	63	55	48	76	138	77	1	94	79
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	91	98	3	61	60	52	83	150	84	1	102	86
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	91	98	3	61	60	52	83	150	84	1	102	86
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	91	98	3	61	60	52	83	150	84	1	102	86
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.47	0.47	0.06	0.35	0.35	0.30	0.26	0.48	0.26	0.01	0.34	0.65
Final Sat.:	288	308	38	218	214	187	178	324	181	4	358	301
Capacity Analysis Module:												
Vol/Sat:	0.32	0.32	0.32	0.28	0.28	0.28	0.46	0.46	0.46	0.29	0.29	0.29
Crit Moves:	****			****			****			****		
Delay/Veh:	10.7	10.7	10.7	10.2	10.2	10.2	11.9	11.9	11.9	9.8	9.8	9.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.7	10.7	10.7	10.2	10.2	10.2	11.9	11.9	11.9	9.8	9.8	9.8
LOS by Move:	B	B	B	B	B	B	B	B	B	A	A	A
ApproachDel:	10.7			10.2			11.9			9.8		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	10.7			10.2			11.9			9.8		
LOS by Appr:	B			B			B			A		
A_RaWaSum:	0.4	0.4	0.4	0.3	0.3	0.3	0.7	0.7	0.7	0.3	0.3	0.3

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Heights
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #42 "C"/McCLAINE

Cycle (sec):	90	Critical Vol./Cap.(X):	0.[illegible]
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	25.4
Optimal Cycle:	42	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module: >> Count Date: 2 Sep 2006 << 4:50-5:50 PM												
Base Vol:	95	206	37	22	185	257	265	273	60	42	201	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	37	22	185	257	265	273	60	42	201	11
Added Vol:	18	17	6	0	39	21	25	14	12	2	18	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	113	223	43	22	224	278	290	287	72	44	219	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	119	235	45	23	236	293	305	302	76	46	231	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	119	235	45	23	236	293	305	302	76	46	231	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	119	235	45	23	236	293	305	302	76	46	231	12
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.26	0.98	0.98	0.50	0.92	0.92	0.95	0.97	0.97	0.95	0.99	0.99
Lanes:	1.00	0.84	0.16	1.00	0.45	0.55	1.00	0.80	0.20	1.00	0.95	0.05
Final Sat.:	473	1478	284	905	737	914	1710	1396	350	1710	1702	89
Capacity Analysis Module:												
Vol/Sat:	0.25	0.16	0.16	0.03	0.32	0.32	0.18	0.22	0.22	0.03	0.14	0.14
Crit Moves:					****		****				****	
Green/Cycle:	0.44	0.44	0.44	0.44	0.44	0.68	0.24	0.38	0.38	0.05	0.18	0.18
Volume/Cap:	0.57	0.36	0.36	0.06	0.73	0.47	0.73	0.57	0.57	0.57	0.73	0.73
Delay/Veh:	22.9	17.2	17.2	14.7	24.8	7.8	37.8	23.1	23.1	51.0	42.7	42.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	22.9	17.2	17.2	14.7	24.8	7.8	37.8	23.1	23.1	51.0	42.7	42.7
LOS by Move:	C	B	B	B	C	A	D	C	C	D	D	D
HCM2kAvgQ:	3	5	5	0	10	7	9	9	9	2	8	8

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Scenario Report

Scenario:	2030 Future No-Build
Command:	2030 PM Peak
Volume:	2030 Base
Geometry:	2030 Base
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 22 WATER/"C"	B	19.3	0.425	C	26.8	0.692	+ 7.515 D/V
# 33 JAMES/McCLAINE	B	12.3	0.000	B	12.7	0.000	+ 0.420 D/V
# 34 JAMES/"C"	C	22.3	0.000	B	14.2	0.000	-8.142 D/V
# 35 JAMES/WATER	B	10.2	0.450	B	12.3	0.581	+ 0.131 V/C
# 36 JAMES/PINE	B	10.6	0.442	B	13.8	0.641	+ 0.200 V/C
# 42 "C"/McCLAINE	C	21.7	0.500	C	23.9	0.644	+ 2.229 D/V

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #30 WATER/"C"

Cycle (sec):	100	Critical Vol./Cap.(X):	0.632
Loss Time (sec):	12 (Y=R+4.0 sec)	Average Delay (sec/veh):	26.8
Optimal Cycle:	81	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0 0	0	1 0	0 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module: >> Count Date: 23 May 2006 << 4:00-5:00												
Base Vol:	0	0	0	64	130	23	16	382	140	58	403	113
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	64	130	23	16	382	140	58	403	113
Added Vol.:	0	0	0	6	13	0	0	36	83	88	123	49
Users/C Adj:	0	0	0	30	20	10	50	0	0	125	0	0
Initial Fut:	0	0	0	94	163	33	67	418	223	269	526	162
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	98	171	34	70	440	235	283	554	171
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol.:	0	0	0	98	171	34	70	440	235	283	554	171
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	98	171	34	70	440	235	283	554	171
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	1.00	0.85	0.98	0.98	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	0.00	0.00	0.00	1.00	0.83	0.17	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	0	0	1530	1440	295	1710	1800	1530	1710	1800	1530
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.06	0.12	0.12	0.04	0.24	0.15	0.17	0.31	0.11
Crit Moves:					****			****			****	
Green/Cycle:	0.00	0.00	0.00	0.23	0.23	0.23	0.05	0.39	0.39	0.26	0.60	0.60
Volume/Cap:	0.00	0.00	0.00	0.25	0.53	0.53	0.56	0.63	0.40	0.63	0.52	0.19
Delay/Veh:	0.0	0.0	0.0	33.0	41.9	41.9	58.0	29.2	24.9	39.1	14.4	9.6
User Del Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	33.0	41.9	41.9	58.0	29.2	24.9	39.1	14.4	9.6
LOS by Move:	A	A	A	C	D	D	E	C	C	D	B	A
HCMSAvgQ:	0	0	0	2	6	6	2	12	5	8	11	2

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #33 JAMES/WATER

Average Delay (sec/veh): 2.3 Worst Case Level Of Service: B(12.7)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:		Include			Include			Include			Include	
Lanes:	0 0	0 0	0	0 0	1! 0	0	0 0	1! 1	0	0 0	1 1	0
Volume Module:												
Base Vol:	0	0	0	25	0	40	661	385	0	0	285	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	25	0	40	661	385	0	0	285	35
Added Vol.:	0	0	0	0	0	30	21	33	0	0	20	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	25	0	70	682	418	0	0	305	36
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	26	0	74	718	440	0	0	279	38
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	26	0	74	718	440	0	0	279	38
Critical Gap Module:												
Critical Gp:xxxxx	xxxx	xxxxx		6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:xxxxx	xxxx	xxxxx		3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	801	803	298	317	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	325	319	748	1255	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	306	296	748	1255	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.08	0.00	0.10	0.57	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	565	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	0.6	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	12.7	xxxxx	8.1	xxxx	xxxxx	xxxx	xxxx
Shared LOS:	*	*	*	*	*	B	*	A	*	*	*	*
ApproachDel:	xxxxxx			12.7			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 3.3 Worst Case Level Of Service: B(14.2)

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:		Include			Include			Include			Include	
Lanes:	0 0	0 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: >> Count Date: 28 Sep 2006 << 4:30-5:30 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol.:	0	10	11	18	0	19	40	89	0	28	133	13
Users/C Adj:	0	-31	31	-44	-14	0	0	0	0	14	0	0
Initial Fut:	0	0	63	0	0	143	160	520	4	51	478	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	66	0	0	151	168	547	4	54	503	54
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	66	0	0	151	168	547	4	54	503	54
Critical Gap Module:												
Critical Gp:xxxxx	6.5	6.2		7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:xxxxx	4.0	3.3		3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	549	1565	1014	530	557	xxxx	xxxxx	552	xxxx	xxxxx	
Potent Cap.:	xxxx	519	91	251	563	1024	xxxx	xxxxx	1029	xxxx	xxxxx	
Move Cap.:	xxxx	519	66	91	563	1024	xxxx	xxxxx	1029	xxxx	xxxxx	
Volume/Cap:	xxxx	0.00	0.10	0.00	0.27	0.28	0.16	xxxx	xxxx	0.05	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.6	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.2	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	519	xxxx	563	xxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx
SharedQueue:	xxxxx	xxxx	0.4	xxxxx	1.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	12.8	xxxxx	14.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	B	*	B	*	*	*	*	*	*	*
ApproachDel:	12.8			14.2			xxxxxx			xxxxxx		
ApproachLOS:	B			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/MAIN

Cycle (sec):	0	Critical Vol./Cap.(X):	0.981
Loss Time (sec):	0 (Y=R+4.0 sec)	Average Delay (sec/veh):	17.3
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: >> Count Date: 28 Sep 2006 << 4:30-5:30 PM												
Base Vol:	12	150	18	16	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	16	142	1	8	12	10	17	12	140
Added Vol.:	1	47	0	13	49	0	0	0	0	1	0	69
Users/C Adj:	0	-91	0	58	-58	0	0	0	0	0	0	31
Initial Fut:	13	106	18	231	133	1	8	12	10	18	12	240
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	14	164	20	251	145	1	9	13	11	20	13	239
Reduct Vol.:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	14	164	20	251	145	1	9	13	11	20	13	239
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.06	0.94	0.09	0.63	0.36	0.01	0.27	0.40	0.33	0.07	0.05	0.88
Final Sat.:	31	561	56	432	249	2	144	214	180	49	32	593
Capacity Analysis Module:												
Vol/Sat:	0.06	0.01	0.36	0.58	0.58	0.58	0.06	0.06	0.06	0.40	0.40	0.40
Crit Moves:		****			****			****			****	
Delay/Veh:	12.7	10.1	10.7	14.5	14.5	14.5	9.6	9.6	9.6	10.9	10.9	10.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.7	10.1	10.7	14.5	14.5	14.5	9.6	9.6	9.6	10.9	10.9	10.9
LOS by Move:	B	B	B	B	B	B	A	A	A	B	B	B
ApproachDel:	10.7			14.5			9.6			10.9		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	10.7			14.5			9.6			10.9		
LOS by Appr:	B			B			A			B		
AllWayAvgQ:	0.5	0.5	0.9	1.2	1.2	1.2	0.6	0.6	0.6	0.8	0.8	0.8

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec):	100	Critical Vol./Cap.(X):	0.441
Loss Time (sec):	0 (Y=R+0.0 sec)	Average Delay (sec/veh):	13.8
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	0	0	0 1	0	0	1! 0	0	0	1! 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:00-5:00 PM												
Base Vol:	130	165	3	0	108	43	73	8	186	2	6	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	130	165	3	0	108	43	73	8	186	2	6	2
Added Vol:	12	0	0	0	7	14	9	0	64	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	243	165	3	0	115	57	82	8	250	2	6	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	256	174	3	0	121	60	86	8	263	2	6	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	256	174	3	0	121	60	86	8	263	2	6	2
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	256	174	3	0	121	60	86	8	263	2	6	2
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.59	0.40	0.01	0.00	0.67	0.33	0.25	0.02	0.73	0.22	0.67	0.22
Final Sat.:	399	271	5	0	932	274	168	16	491	58	346	116
Capacity Analysis Module:												
Vol/Sat:	0.64	0.64	0.64	xxxx	0.28	0.28	0.51	0.51	0.51	0.04	0.02	0.02
Crit Moves:			****		****			****			****	
Delay/Veh:	16.4	16.4	16.4	0.0	10.1	10.1	12.7	12.7	12.7	9.0	9.0	9.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	16.4	16.4	16.4	0.0	10.1	10.1	12.7	12.7	12.7	9.0	9.0	9.0
LOS by Move:	C	C	C	*	B	B	B	B	B	A	A	A
ApproachDel:		16.4			10.1			12.7			9.0	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		16.4			10.1			12.7			9.0	
LOS by Appr:		C			B			B			A	
AllWayAvgQ:	3.9	1.5	1.5	0.3	0.4	0.3	0.9	0.9	0.9	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

2030 Future No-Build Thu Sep 6, 2012 14:22:53 Page 2-1

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #40 "C"/WESTLAIND

Cycle (sec):	90	Critical Vol./Cap.(X):	0.644
Loss Time (sec):	12 (Y=R+4.0 sec)	Average Delay (sec/veh):	27.4
Optimal Cycle:	52	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Ov.			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1	0	1 0	1	0	0 1	0	0	0 1
Volume Module: >> Count Date: 2 Sep 2006 << 4:00-5:00 PM												
Base Vol:	95	206	31	22	145	257	265	273	60	42	206	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	31	22	145	257	265	273	60	42	206	11
Added Vol:	46	42	11	1	100	55	65	57	66	4	46	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	141	248	54	23	245	312	330	330	90	46	252	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	148	261	57	24	316	328	347	326	95	48	260	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	148	261	57	24	316	328	347	326	95	48	260	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	148	261	57	24	316	328	347	326	95	48	260	12
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.91	0.91	0.91	0.38	1.00	0.85	0.95	0.97	0.97	0.95	0.99	0.99
Lanes:	1.00	0.82	0.18	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.96	0.04
Final Sat.:	729	1498	383	686	1800	1530	1710	1388	391	1710	1710	76
Capacity Analysis Module:												
Vol/Sat:	0.20	0.18	0.18	0.04	0.18	0.21	0.20	0.24	0.24	0.03	0.15	0.15
Crit Moves:	****										****	
Green/Cycle:	0.32	0.32	0.32	0.32	0.32	0.63	0.32	0.49	0.49	0.08	0.24	0.24
Volume/Cap:	0.64	0.57	0.57	0.11	0.57	0.34	0.64	0.49	0.49	0.49	0.64	0.64
Delay/Veh:	32.6	27.8	27.8	22.1	28.2	9.0	29.2	15.7	15.7	44.9	38.4	38.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.6	27.8	27.8	22.1	28.2	9.0	29.2	15.7	15.7	44.9	38.4	38.4
LOS by Move:	C	C	C	C	C	A	C	B	B	D	C	C
95thQueue:	5	8	8	1	9	6	9	8	8	2	8	8

Note: Queue reported is the number of cars per lane.

2030 Future No-Build Thu Sep 6, 2012 14:14:25 Page 1-1

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector, Grant Avenue
PM Peak Hour

Scenario Report

Scenario:	2030 Future No-Build
Command:	2020 PM Peak
Volume:	2020 Base
Geometry:	2020 Base
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 22 WATER/"C"	B	19.3	0.425	C	26.8	0.632	+ 7.575 D/V
# 33 JAMES/McCLAINE	B	12.3	0.000	B	12.7	0.000	+ 0.420 D/V
# 34 JAMES/"C"	C	22.3	0.000	B	14.2	0.000	-8.142 D/V
# 35 JAMES/WATER	B	10.2	0.450	A	8.6	0.277	-0.173 V/C
# 36 JAMES/PINE	B	10.8	0.460	B	12.0	0.542	+ 0.082 V/C
# 42 "C"/McCLAINE	C	21.7	0.500	C	23.9	0.644	+ 2.229 D/V

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #22 WATER/"C"

Cycle (sec): 100 Critical Vol./Cap.(X): 0.632
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 26.8
Optimal Cycle: 51 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	1 0	0	1 0	1 0	1	0 1	1 0	1	0 1
Volume Module: >> Count Date: 23 May 2006 << 4:00-6:00												
Base Vol:	0	0	0	64	170	23	16	382	140	58	403	113
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	64	170	23	16	382	140	58	403	113
Added Vol:	0	0	0	0	13	0	0	36	83	86	173	49
James/C Adj:	0	0	0	20	20	18	31	0	0	125	0	0
Initial Fut:	0	0	0	84	203	41	47	418	223	269	576	162
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	88	214	43	49	440	235	283	606	171
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	88	214	43	49	440	235	283	606	171
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	88	214	43	49	440	235	283	606	171
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	1.00	0.95	0.98	0.98	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	0.00	0.00	0.00	1.00	0.83	0.17	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	0	0	1710	1460	295	1710	1800	1530	1710	1800	1530
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.05	0.15	0.15	0.03	0.24	0.15	0.17	0.34	0.11
Crit Moves:						****		****		****		
Green/Cycle:	0.00	0.00	0.00	0.23	0.23	0.23	0.05	0.39	0.39	0.26	0.60	0.60
Volume/Cap:	0.00	0.00	0.00	0.23	0.63	0.63	0.56	0.63	0.40	0.63	0.56	0.19
Delay/Veh:	0.0	0.0	0.0	33.0	41.9	41.9	70.0	29.2	24.2	39.3	14.4	9.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	33.0	41.9	41.9	70.0	29.2	24.2	39.3	14.4	9.6
LOS by Move:	A	A	A	C	D	D	E	C	C	D	B	A
HCM2kAvgQ:	0	0	0	2	8	8	3	12	5	8	11	2

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #33 JAMES/McCLAINE

Average Delay (sec/veh): 2.3 Worst Case Level Of Service: B[12.7]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	25	0	40	60	285	0	0	245	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	25	0	40	60	285	0	0	245	35
Added Vol:	0	0	0	0	0	30	21	33	0	0	20	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	25	0	70	81	318	0	0	265	36
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	26	0	74	85	335	0	0	279	38
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	26	0	74	85	335	0	0	279	38
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	807	801	298	317	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	355	319	746	1255	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	336	296	746	1255	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.08	0.00	0.10	0.07	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	565	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.6	xxxxx	0.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	12.7	xxxxx	8.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	B	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			12.7			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2020 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): 3.3 Worst Case Level Of Service: B[14.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	1 0	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:30-5:30 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol:	0	10	11	18	2	29	40	89	0	28	133	13
James/C Adj:	0	-31	31	-44	-14	0	0	0	0	18	0	0
Initial Fut:	0	0	63	0	0	153	160	520	4	55	478	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	66	0	0	161	168	547	4	58	503	54
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	66	0	0	161	168	547	4	58	503	54
Critical Gap Module:												
Critical Gp:	xxxxx	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	xxxxx	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	1559	549	1565	1524	550	557	xxxx	xxxxx	552	xxxx	xxxxx
Potent Cap.:	xxxx	113	539	87	117	535	1024	xxxx	xxxxx	1028	xxxx	xxxxx
Move Cap.:	xxxx	97	539	66	92	535	1024	xxxx	xxxxx	1028	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.12	0.00	0.00	0.29	0.16	xxxx	xxxx	0.06	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.6	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.2	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	539	xxxx	553	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	0.4	xxxxx	1.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	12.6	xxxxx	14.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	B	*	B	*	*	*	*	*	*	*
ApproachDel:	12.6			14.2			xxxxxx			xxxxxx		
ApproachLOS:	B			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec):	1	Critical Vol./Cap.(X):	0.277
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	8.6
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	12	150	18	161	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	161	142	1	8	12	10	17	12	140
Added Vol:	0	63	0	12	49	0	0	0	0	1	0	49
BrownReRoute:	0	-31	0	-145	-58	0	0	0	0	0	0	-170
Initial Fut:	12	182	18	28	133	1	8	12	10	18	12	19
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	198	20	30	145	1	9	13	11	20	13	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	13	198	20	30	145	1	9	13	11	20	13	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	198	20	30	145	1	9	13	11	20	13	21
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.06	0.86	0.08	0.17	0.82	0.01	0.27	0.40	0.33	0.37	0.24	0.39
Final Sat.:	47	714	71	139	662	5	198	284	231	264	170	279
Capacity Analysis Module:												
Vol/Sat:	0.28	0.28	0.28	0.22	0.22	0.22	0.05	0.05	0.05	0.07	0.07	0.07
Crit Moves:		****			****		****				****	
Delay/Veh:	8.8	8.8	8.8	8.5	8.5	8.5	7.9	7.9	7.9	8.0	8.0	8.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.8	8.8	8.8	8.5	8.5	8.5	7.9	7.9	7.9	8.0	8.0	8.0
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:		8.8			8.5			7.9			8.0	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		8.8			8.5			7.9			8.0	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.4	0.4	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec):	1	Critical Vol./Cap.(X):	0.542
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	12.0
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	131	165	3	0	108	43	73	8	186	1	6	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	131	165	3	0	108	43	73	8	186	1	6	2
Added Vol:	112	0	0	0	7	14	9	0	54	0	0	0
BrownReRoute:	-124	-77	0	58	-58	0	0	125	-125	0	105	65
Initial Fut:	119	88	3	58	57	57	82	133	115	1	111	67
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	129	96	3	63	62	62	89	145	125	1	121	73
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	129	96	3	63	62	62	89	145	125	1	121	73
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	129	96	3	63	62	62	89	145	125	1	121	73
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.57	0.42	0.01	0.34	0.33	0.33	0.25	0.40	0.35	0.01	0.62	0.37
Final Sat.:	330	244	8	190	186	186	165	267	231	3	383	231
Capacity Analysis Module:												
Vol/Sat:	0.39	0.39	0.39	0.32	0.32	0.32	0.54	0.54	0.54	0.32	0.32	0.32
Crit Moves:		****				****		****		****		
Delay/Veh:	11.9	11.9	11.9	10.8	10.8	10.8	13.6	13.6	13.6	10.5	10.5	10.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.9	11.9	11.9	10.8	10.8	10.8	13.6	13.6	13.6	10.5	10.5	10.5
LOS by Move:	B	B	B	B	B	B	B	B	B	B	B	B
ApproachDel:		11.9			10.8			13.6			10.5	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		11.9			10.8			13.6			10.5	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.5	0.5	0.5	0.4	0.4	0.4	1.0	1.0	1.0	0.4	0.4	0.4

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2030 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #42 "C"/McCLAINE

Cycle (sec):	90	Critical Vol./Cap.(X):	0.644
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	23.9
Optimal Cycle:	52	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1 0	1	0 1	1 0	0	1 0	1 0	0	1 0
Volume Module: >> Count Date: 5 Sep 2006 << 4:50-5:50 PM												
Base Vol:	95	206	37	22	185	257	265	273	60	42	201	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	37	22	185	257	265	273	60	42	201	11
Added Vol:	46	42	17	1	100	55	65	37	30	4	46	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	141	248	54	23	285	312	330	310	90	46	247	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	148	261	57	24	300	328	347	326	95	48	260	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	148	261	57	24	300	328	347	326	95	48	260	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	148	261	57	24	300	328	347	326	95	48	260	12
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.41	0.97	0.97	0.38	1.00	0.85	0.95	0.97	0.97	0.95	0.99	0.99
Lanes:	1.00	0.82	0.18	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.96	0.04
Final Sat.:	729	1438	313	686	1800	1530	1710	1360	391	1710	1713	76
Capacity Analysis Module:												
Vol/Sat:	0.20	0.18	0.18	0.04	0.17	0.21	0.20	0.24	0.24	0.03	0.15	0.15
Crit Moves:	****						****				****	
Green/Cycle:	0.32	0.32	0.32	0.32	0.32	0.63	0.32	0.49	0.49	0.05	0.24	0.24
Volume/Cap:	0.64	0.57	0.57	0.11	0.53	0.34	0.64	0.49	0.49	0.49	0.64	0.64
Delay/Veh:	32.6	27.2	27.2	22.1	26.3	8.0	29.2	15.1	15.1	44.9	34.4	34.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.6	27.2	27.2	22.1	26.3	8.0	29.2	15.1	15.1	44.9	34.4	34.4
LOS by Move:	C	C	C	C	C	A	C	B	B	D	C	C
HCM2kAvgQ:	5	5	5	1	5	4	9	8	8	2	8	8

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Scenario Report

Scenario:	2030 Future No-Build
Comment:	2030 PM Peak
Volume:	2030 Base
Geometry:	2030 Base
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 32 WATER/"C"	B	19.3	0.425	C	28.9	0.696	+ 9.589 D/V
# 33 JAMES/McCLAINE	B	12.3	0.000	B	13.2	0.000	+ 0.853 D/V
# 34 JAMES/"C"	C	22.3	0.000	C	16.5	0.000	-5.700 D/V
# 35 JAMES/WATER	B	10.8	0.450	B	14.4	0.661	+ 0.211 V/C
# 36 JAMES/PINE	B	10.5	0.442	C	10.2	0.776	+ 0.334 V/C
# 42 "C"/McCLAINE	C	21.7	0.500	C	27.0	0.780	+ 5.295 D/V

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #32 WATER/"C"

Cycle (sec):	100	Critical Vol./Cap.(X):	0.696
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	28.9
Optimal Cycle:	59	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0 0	0	1 0	0 1	0	1 0	1 0	1	1 0	1 0	1
Volume Module: >> Count Date: 23 May 2006 << 4:00-5:00												
Base Vol:	0	0	0	64	170	23	18	382	140	58	403	113
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	64	170	23	18	382	140	58	403	113
Added Vol:	0	0	0	0	21	0	0	59	136	140	282	80
James/C Adj:	0	0	0	25	25	21	38	0	0	125	0	0
Initial Fut:	0	0	0	89	216	44	54	441	276	323	685	193
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	94	227	46	57	464	291	340	721	203
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	94	227	46	57	464	291	340	721	203
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	94	227	46	57	464	291	340	721	203
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	1.00	0.85	0.98	0.98	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	0.00	0.00	0.00	1.00	0.83	0.17	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	0	0	1530	1458	291	1710	1800	1530	1710	1800	1530
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.06	0.16	0.16	0.03	0.26	0.19	0.20	0.40	0.13
Crit Moves:						****		****		****		
Green/Cycle:	0.00	0.00	0.00	0.22	0.22	0.22	0.05	0.37	0.37	0.29	0.61	0.61
Volume/Cap:	0.00	0.00	0.00	0.27	0.70	0.70	0.65	0.70	0.50	0.70	0.66	0.22
Delay/Veh:	0.0	0.0	0.0	34.0	45.5	45.5	60.2	32.6	27.8	39.8	16.1	9.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	34.0	45.5	45.5	60.2	32.6	27.8	39.8	16.1	9.5
LOS by Move:	A	A	A	C	D	D	F	C	C	D	B	A
HCM2kAvgQ:	0	0	0	3	9	9	3	13	[illegible]	10	15	3

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #33 JAMES/McCLAINE

Average Delay (sec/veh): 2.6   Worst Case Level Of Service: B[13.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 0	0	0 0	1! 0	0	0 1	0 0	0	0 0	0 1	0
Volume Module:												
Base Vol:	0	0	0	25	0	40	60	295	0	0	245	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	25	0	40	60	295	0	0	245	35
Added Vol:	0	0	0	0	0	49	34	35	0	0	33	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	25	0	89	94	340	0	0	278	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	26	0	94	99	358	0	0	293	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	26	0	94	99	358	0	0	293	39
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	868	868	312	332	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	326	293	733	1239	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	304	268	733	1239	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.09	0.00	0.13	0.08	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	560	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.8	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	13.2	xxxxx	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	B	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			13.2			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #34 JAMES/"C"

Average Delay (sec/veh): [illegible] Worst Case Level Of Service: C[16.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	0	21	21	26	12	124	120	431	4	9	345	38
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	21	26	12	124	120	431	4	9	345	38
Added Vol:	0	11	19	30	3	47	65	145	0	48	216	21
James/C Adj:	0	-38	38	-56	-15	0	0	0	0	13	0	0
Initial Fut:	0	0	78	0	0	171	185	576	4	70	561	59
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	82	0	0	180	195	606	4	74	591	62
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	82	0	0	180	195	606	4	74	591	62
Critical Gap Module:												
Critical Gp:	xxxxx	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	xxxxx	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	[illegible]	608	1808	1769	622	653	xxxx	xxxxx	610	xxxx	xxxxx
Potent Cap.:	xxxx	81	499	62	84	491	944	xxxx	xxxxx	918	xxxx	xxxxx
Move Cap.:	xxxx	57	499	40	60	491	944	xxxx	xxxxx	918	xxxx	xxxxx
Volume/Cap:	xxxx	0.00	0.16	0.00	0.00	0.37	0.21	xxxx	xxxx	0.08	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.8	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.8	xxxx	xxxxx	9.0	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	499	xxxx	491	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	0.6	xxxxx	1.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	13.4	xxxxx	16.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	B	*	C	*	*	*	*	*	*	*
ApproachDel:		13.4			16.5			xxxxxx			xxxxxx	
ApproachLOS:		B			C			*			*	

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #35 JAMES/WATER

Cycle (sec): 1 Critical Vol./Cap.(X): 0.667
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 14.6
Optimal Cycle: 0 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	12	150	18	161	142	1	8	12	10	17	12	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	150	18	161	142	1	8	12	10	17	12	140
Added Vol:	0	103	0	20	79	0	0	0	0	1	0	80
James/C Adj:	0	-38	0	71	-61	0	0	0	0	0	0	38
Initial Fut:	12	215	18	252	160	1	8	12	10	18	12	258
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	13	234	20	274	174	1	9	13	11	20	13	280
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	13	234	20	274	174	1	9	13	11	20	13	280
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	13	234	20	274	174	1	9	13	11	20	13	280
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.05	0.88	0.07	0.62	0.37	0.01	0.27	0.40	0.33	0.06	0.04	0.90
Final Sat.:	31	554	46	411	264	2	170	198	164	40	27	575
Capacity Analysis Module:												
Vol/Sat:	0.42	0.42	0.42	0.67	0.67	0.67	0.07	0.07	0.07	0.48	0.48	0.48
Crit Moves:		****			****			****			****	
Delay/Veh:	12.0	12.0	12.0	17.6	17.6	17.6	9.5	9.5	9.5	12.4	12.4	12.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.0	12.0	12.0	17.6	17.6	17.6	9.5	9.5	9.5	12.4	12.4	12.4
LOS by Move:	B	B	B	C	C	C	A	A	A	B	B	B
ApproachDel:		12.0			17.6			9.5			12.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		12.0			17.6			9.5			12.4	
LOS by Appr:		B			C			A			B	
AllWayAvgQ:	0.6	0.6	0.6	1.7	1.7	1.7	0.0	0.0	0.0	0.8	0.8	0.8

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #36 JAMES/PINE

Cycle (sec): 1 Critical Vol./Cap.(X): 0.778
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 19.2
Optimal Cycle: 0 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM												
Base Vol:	131	165	3	0	108	43	73	8	186	1	6	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	131	165	3	0	108	43	73	8	186	1	6	2
Added Vol:	183	0	0	0	11	22	15	0	88	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	314	165	3	0	119	65	88	8	274	1	6	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	331	174	3	0	125	68	93	8	288	1	6	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	174	3	0	125	68	93	8	288	1	6	2
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	331	174	3	0	125	68	93	8	288	1	6	2
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.65	0.34	0.01	0.00	0.65	0.35	0.24	0.02	0.74	0.11	0.67	0.22
Final Sat.:	426	224	4	0	394	216	253	14	477	54	322	107
Capacity Analysis Module:												
Vol/Sat:	0.78	0.78	0.78	xxxx	0.32	0.32	0.60	0.60	0.60	0.02	0.02	0.02
Crit Moves:	****					****		****			****	
Delay/Veh:	23.5	23.5	23.5	0.0	10.8	10.8	15.2	15.2	15.2	9.4	9.4	9.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	23.5	23.5	23.5	0.0	10.8	10.8	15.2	15.2	15.2	9.4	9.4	9.4
LOS by Move:	C	C	C	*	B	B	C	C	C	A	A	A
ApproachDel:		23.5			10.8			15.2			9.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		23.5			10.8			15.2			9.4	
LOS by Appr:		C			B			C			A	
AllWayAvgQ:	2.7	2.7	2.7	0.4	0.4	0.4	1.2	1.2	1.2	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #42 "C"/MCCLAINE

Cycle (sec): 90 Critical Vol./Cap.(X): 0.480
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 27.0
Optimal Cycle: 40 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 1 0 1			1 0 0 1 0			1 0 0 1 0		
Volume Module: >> Count Date: 2 Sep 2006 << 4:30-5:30 PM												
Base Vol:	95	206	37	22	185	257	265	273	60	42	201	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	206	37	22	185	257	265	273	60	42	201	11
Added Vol:	75	69	27	1	163	89	107	61	49	6	75	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	170	275	64	23	348	346	372	334	109	48	276	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	179	289	67	24	366	364	392	352	115	51	291	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	179	289	67	24	366	364	392	352	115	51	291	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	179	289	67	24	366	364	392	352	115	51	291	13
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.36	0.97	0.97	0.31	1.00	0.85	0.95	0.96	0.96	0.95	0.99	0.99
Lanes:	1.00	0.81	0.19	1.00	1.00	1.00	1.00	0.75	0.25	1.00	0.96	0.04
Final Sat.:	644	1418	330	564	1800	1530	1710	1307	427	1710	1715	75
Capacity Analysis Module:												
Vol/Sat:	0.28	0.20	0.20	0.04	0.20	0.24	0.23	0.27	0.27	0.03	0.17	0.17
Crit Moves:	****						****				****	
Green/Cycle:	0.36	0.36	0.36	0.36	0.36	0.45	0.29	0.46	0.46	0.05	0.22	0.22
Volume/Cap:	0.78	0.57	0.57	0.10	0.57	0.53	0.78	0.58	0.58	0.58	0.78	0.78
Delay/Veh:	41.5	24.1	24.1	19.6	24.1	7.5	46.9	18.1	18.1	51.7	43.0	43.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	41.5	24.1	24.1	19.6	24.1	7.5	46.9	18.1	18.1	51.7	43.0	43.0
LOS by Move:	D	C	C	B	C	A	D	B	B	D	D	D
HCM2kAvgQ:	7	9	9	1	9	9	13	10	10	2	10	10

Note: Queue reported is the number of cars per lane.

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Scenario Report

Scenario:	2030 Future No-Build
Command:	2020 PM Peak
Volume:	2020 Base
Geometry:	2020 Base
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 22 WATER/"C"	B	19.3	0.425	C	28.9	0.696	+ 9.589 D/V
# 33 JAMES/McCLAINE	B	12.3	0.000	B	13.2	0.000	+ 0.855 D/V
# 34 JAMES/"C"	C	22.3	0.000	C	16.5	0.000	-5.788 D/V
# 35 JAMES/WATER	B	14.2	0.452	A	8.9	0.322	-0.128 V/C
# 36 JAMES/PINE	B	10.8	0.460	B	14.9	0.654	+ 0.194 V/C
# 42 "C"/McCLAINE	C	21.7	0.500	C	27.0	0.780	+ 5.275 D/V

Silverton TSP Update
2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #22 WATER/"C"

Cycle (sec):	100	Critical Vol./Cap.(X):	0.696
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	28.9
Optimal Cycle:	59	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	1 0	0	1 0	1 0	1	0 1	1 0	1	0 1
Volume Module: >> Count Date: 23 May 2006 << 4:00-5:00												
Base Vol:	0	0	0	64	170	23	16	382	140	58	403	113
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	64	170	23	16	382	140	58	403	113
Added Vol:	0	0	0	0	21	0	0	59	136	140	292	80
James/C Adj:	0	0	0	25	25	21	38	0	0	125	0	0
Initial Fut:	0	0	0	89	216	44	54	441	276	323	695	193
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	94	227	46	57	464	291	340	732	203
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	94	227	46	57	464	291	340	732	203
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	94	227	46	57	464	291	340	732	203
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	1.00	0.85	0.98	0.98	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	0.00	0.00	0.00	1.00	0.83	0.17	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	0	0	1530	1468	291	1710	1800	1530	1710	1800	1530
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.06	0.16	0.16	0.03	0.26	0.19	0.20	0.40	0.13
Crit Moves:						****		****		****		
Green/Cycle:	0.00	0.00	0.00	0.22	0.22	0.22	0.05	0.37	0.37	0.29	0.61	0.61
Volume/Cap:	0.00	0.00	0.00	0.27	0.70	0.70	0.66	0.70	0.51	0.70	0.66	0.22
Delay/Veh:	0.0	0.0	0.0	34.0	45.5	45.5	80.2	32.6	27.4	39.8	16.1	9.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	34.0	45.5	45.5	80.2	32.6	27.4	39.8	16.1	9.5
LOS by Move:	A	A	A	C	D	D	F	C	C	D	B	A
HCM2kAvgQ:	0	0	0	3	9	9	3	13	7	10	15	3

Note: Queue reported is the number of cars per lane.

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2030 Future No-Build        Thu Sep 6, 2012 14:17:31                  Page 4-1
--------------------------------------------------------------------------------
                             Silverton TSP Update
   2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
                                 PM Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #33 JAMES/MCCLAINE
********************************************************************************
Average Delay (sec/veh):      2.8       Worst Case Level Of Service: B[ 13.2]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:         0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|----------------|----------------|----------------|----------------|
Volume Module:
Base Vol:        0    0    0    25    0   40    61  285    0     0  245   35
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0    0    0    25    0   40    60  285    0     0  245   35
Added Vol:       0    0    0     0    0   49    34   55    0     0   33    2
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0    0    0    25    0   89    94  340    0     0  278   37
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:      0    0    0    26    0   94    99  358    0     0  293   39
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:     0    0    0    26    0   94    99  358    0     0  293   39
------------|----------------|----------------|----------------|----------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5  6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0  3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|----------------|----------------|----------------|----------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   868  868  312   332 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   326  293  733  1239 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   304  268  733  1239 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.09 0.00 0.13  0.08 xxxx  xxxx  xxxx xxxx  xxxx
------------|----------------|----------------|----------------|----------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *    *     *    *    *     A    *    *     *    *    *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  560 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.8 xxxxx   0.3 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 13.2 xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     *    B    *     A    *    *     *    *    *
ApproachDel:       xxxxxx            13.2            xxxxxx           xxxxxx
ApproachLOS:          *                B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************

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```
2030 Future No-Build        Thu Sep 6, 2012 14:17:31                  Page 5-1
--------------------------------------------------------------------------------
                             Silverton TSP Update
   2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
                                 PM Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #34 JAMES/"C"
********************************************************************************
Average Delay (sec/veh):      3.7       Worst Case Level Of Service: C[ 18.5]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:         0  0  0  1  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------|
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:        0   21   21    34   12  124   120  431    4     9  345   38
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0   21   21    34   12  124   120  431    4     9  345   38
Added Vol:       0   17   19    30    3   47    65  145    0    46  216   21
James/C Adj:     0  -38   38   -56  -15    0     0    0    0    15    0    0
Initial Fut:     0    0   78     0    0  171   185  576    4    13  561   59
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:      0    0   82     0    0  180   195  606    4    14  591   62
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:     0    0   82     0    0  180   195  606    4    14  591   62
------------|----------------|----------------|----------------|----------------|
Critical Gap Module:
Critical Gp:xxxxx  6.5  6.2   7.1  6.5  6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx  4.0  3.3   3.5  4.0  3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|----------------|----------------|----------------|----------------|
Capacity Module:
Cnflict Vol: xxxx 1759  608  1808 1789  622   653 xxxx xxxxx   611 xxxx xxxxx
Potent Cap.: xxxx   81  497    62   84  491   944 xxxx xxxxx   978 xxxx xxxxx
Move Cap.:   xxxx   57  497    40   60  491   944 xxxx xxxxx   978 xxxx xxxxx
Volume/Cap:  xxxx 0.00 0.16  0.00 0.00 0.37  0.21 xxxx  xxxx  0.01 xxxx  xxxx
------------|----------------|----------------|----------------|----------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.8 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.8 xxxx xxxxx   9.0 xxxx xxxxx
LOS by Move:     *    *    *     *    *    *     A    *    *     A    *    *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx  497  xxxx  491 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx  0.6 xxxxx  1.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx 13.6 xxxxx 18.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    B     *    C    *     *    *    *     *    *    *
ApproachDel:        13.6             18.5            xxxxxx           xxxxxx
ApproachLOS:          B                C                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************

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```
2030 Future No-Build        Thu Sep 6, 2012 14:17:31                  Page 6-1
--------------------------------------------------------------------------------
                             Silverton TSP Update
   2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
                                 PM Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #35 JAMES/WATER
********************************************************************************
Cycle (sec):               1               Critical Vol./Cap.(X):        0.322
Loss Time (sec):           0 (Y+R=4.0 sec) Average Delay (sec/veh):        8.9
Optimal Cycle:             0               Level Of Service:                 A
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:      0    0    0     0    0    0     0    0    0     0    0    0
Lanes:         0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------|
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:       12  150   18   161  142    1     8   12   10    17   12  140
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    12  150   18   161  142    1     8   12   10    17   12  140
Added Vol:       0  103    0    20   79    0     0    0    0     1    0   80
BrownReRout:     0  -38    0  -150  -71    0     0    0    0     0    0 -200
Initial Fut:    12  215   18    31  150    1     8   12   10    18   12   20
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:     13  234   20    34  163    1     9   13   11    20   13   22
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    13  234   20    34  163    1     9   13   11    20   13   22
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:    13  234   20    34  163    1     9   13   11    20   13   22
------------|----------------|----------------|----------------|----------------|
Saturation Flow Module:
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.05 0.88 0.07  0.17 0.82 0.01  0.27 0.40 0.33  0.36 0.24 0.40
Final Sat.:     40  725   61   138  658    4   183  274  228   252  167  278
------------|----------------|----------------|----------------|----------------|
Capacity Analysis Module:
Vol/Sat:      0.32 0.32 0.32  0.25 0.25 0.25  0.05 0.05 0.05  0.08 0.08 0.08
Crit Moves:   ****            ****                  ****        ****
Delay/Veh:     9.2  9.2  9.2   8.8  8.8  8.8   8.0  8.0  8.0   8.1  8.1  8.1
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:    9.2  9.2  9.2   8.8  8.8  8.8   8.0  8.0  8.0   8.1  8.1  8.1
LOS by Move:     A    A    A     A    A    A     A    A    A     A    A    A
ApproachDel:         9.2              8.8              8.0              8.1
Delay Adj:          1.00             1.00             1.00             1.00
ApprAdjDel:          9.2              8.8              8.0              8.1
LOS by Appr:          A                A                A                A
AllWayAvgQ:    0.5  0.5  0.5   0.3  0.3  0.3   0.0  0.0  0.0   0.1  0.1  0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.

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2030 Future No-Build        Thu Sep 6, 2012 14:17:31                  Page 7-1
--------------------------------------------------------------------------------
                             Silverton TSP Update
   2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
                                 PM Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #36 JAMES/PINE
********************************************************************************
Cycle (sec):               1               Critical Vol./Cap.(X):        0.658
Loss Time (sec):           0 (Y+R=4.0 sec) Average Delay (sec/veh):       14.9
Optimal Cycle:             0               Level Of Service:                 B
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:      0    0    0     0    0    0     0    0    0     0    0    0
Lanes:         0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0   0  0  1! 0  0
------------|----------------|----------------|----------------|----------------|
Volume Module: >> Count Date: 28 Sep 2006 << 4:20-5:20 PM
Base Vol:      131  165    3     1  108   43    73    8  186     1    6    2
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   131  165    3     1  108   43    73    8  186     1    6    2
Added Vol:     183    0    0     0   11   22    15    0   88     0    0    0
BrownReRout:  -160  -78    0    60  -61    0     0  160 -160     0  160   78
Initial Fut:   154   87    3    61   58   65    88  168  114     1  166   80
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    167   95    3    66   63   71    96  183  124     1  180   87
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   167   95    3    66   63   71    96  183  124     1  180   87
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   167   95    3    66   63   71    96  183  124     1  180   87
------------|----------------|----------------|----------------|----------------|
Saturation Flow Module:
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.63 0.36 0.01  0.33 0.32 0.35  0.24 0.45 0.31  0.01 0.67 0.32
Final Sat.:    336  190    [illegible]   114  108  [illegible]   145  278  188     [illegible]  389  185
------------|----------------|----------------|----------------|----------------|
Capacity Analysis Module:
Vol/Sat:      0.50 0.50 0.50  0.58 0.58 0.58  0.66 0.66 0.66  0.47 0.47 0.47
Crit Moves:             ****        ****      ****                   ****
Delay/Veh:    14.4 14.4 14.4  13.3 13.3 13.3  17.7 17.7 17.7  13.2 13.2 13.2
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   14.4 14.4 14.4  13.3 13.3 13.3  17.7 17.7 17.7  13.2 13.2 13.2
LOS by Move:     B    B    B     B    B    B     C    C    C     B    B    B
ApproachDel:        14.4             13.3             17.7             13.2
Delay Adj:          1.00             1.00             1.00             1.00
ApprAdjDel:         14.4             13.3             17.7             13.2
LOS by Appr:          B                B                C                B
AllWayAvgQ:    0.8  0.8  0.8   0.5  0.5  0.5   1.5  1.5  1.5   0.7  0.7  0.7
********************************************************************************
Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                          Silverton TSP Update
  2025 Conditions w/Updated Land Use and no Westside Connector, Brown Reroute
                              PM Peak Hour
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #42 "C"/McCLAINE
******************************************************************************
Cycle (sec):             90              Critical Vol./Cap.(X):        0.780
Loss Time (sec):         12 (Y+R=4.0 sec) Average Delay (sec/veh):      27.0
Optimal Cycle:           70              Level Of Service:                 C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------|----------------|----------------|----------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include            Ovl            Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        1  0  0  1  0   1  0  1  0  1   1  0  0  1  0   1  0  0  1  0
------------|----------------|----------------|----------------|----------------|
Volume Module: >> Count Date: 2 Sep 2008 << 4:30-5:30 PM
Base Vol:      95  206   37    22  185  257   265  273   60    42  201   11
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   95  206   37    22  185  257   265  273   60    42  201   11
Added Vol:     75   69   27     1  163   89   107   61   49     6   75    1
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  170  275   64    23  348  346   372  334  109    48  276   12
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:   179  289   67    24  366  364   392  352  115    51  291   13
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  179  289   67    24  366  364   392  352  115    51  291   13
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:  179  289   67    24  366  364   392  352  115    51  291   13
------------|----------------|----------------|----------------|----------------|
Saturation Flow Module:
Sat/Lane:    1800 1800 1800  1800 1800 1800  1800 1800 1800  1800 1800 1800
Adjustment:  0.36 0.97 0.97  0.37 1.00 0.85  0.95 0.96 0.96  0.95 0.99 0.99
Lanes:       1.00 0.81 0.19  1.00 1.00 1.00  1.00 0.75 0.25  1.00 0.96 0.04
Final Sat.:   644 1415  330   664 1800 1530  1710 1307  427  1710 1715   75
------------|----------------|----------------|----------------|----------------|
Capacity Analysis Module:
Vol/Sat:     0.28 0.20 0.20  0.04 0.20 0.24  0.23 0.27 0.27  0.03 0.17 0.17
Crit Moves:  ****                            ****                   ****
Green/Cycle: 0.36 0.36 0.36  0.36 0.36 0.65  0.29 0.46 0.46  0.05 0.22 0.22
Volume/Cap:  0.78 0.57 0.57  0.10 0.57 0.37  0.78 0.58 0.58  0.58 0.78 0.79
Delay/Veh:   41.5 24.7 24.7  19.6 24.7  7.5  36.8 19.1 19.1  51.7 43.0 43.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  41.5 24.7 24.7  19.6 24.7  7.5  36.8 19.1 19.1  51.7 43.0 43.0
LOS by Move:    D    C    C     B    C    A     D    B    B     D    D    D
HCM2kAvgQ:      7    9    9     1    9    5    12   10   10     2   10   10
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```
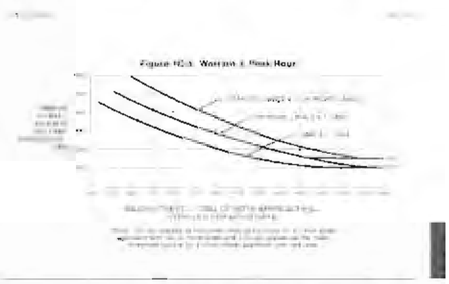


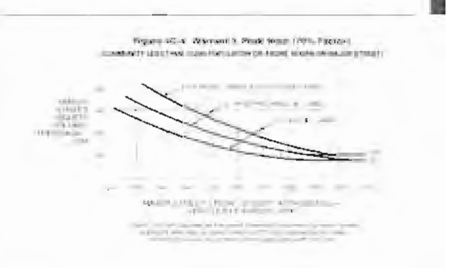
Traffic Signal Warrant for James Street/Pine Street
PM Peak Hour
Major Street Total of Both Approaches 688
Minor Street Higher Volume Approach 283
1 Lane & 1 Lane
Does Not Warrant

AM Peak Hour
Major Street Total of Both Approaches 712
Minor Street Higher Volume Approach 419
1 Lane & 1 Lane
Does Warrant

	NB				SB				EB				WB		
	L	T	R		L	T	R		L	T	R		L	T	R
PM	195	83	3		60	64	74		93	193	123		1	[illegible]	[illegible]
AM	253	160	6		83	93	83		86	143	184		1	[illegible]	107

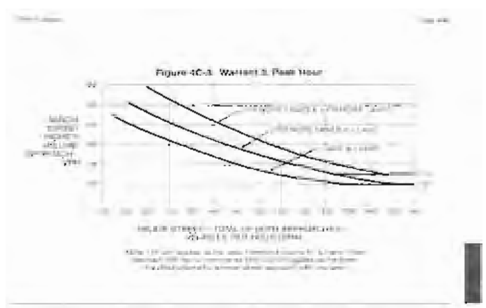
Source: Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration (FHWA), 2009

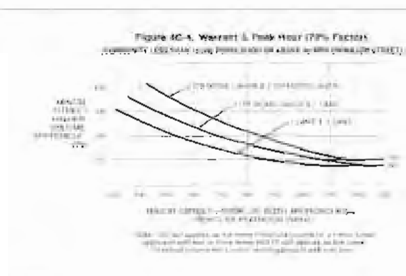




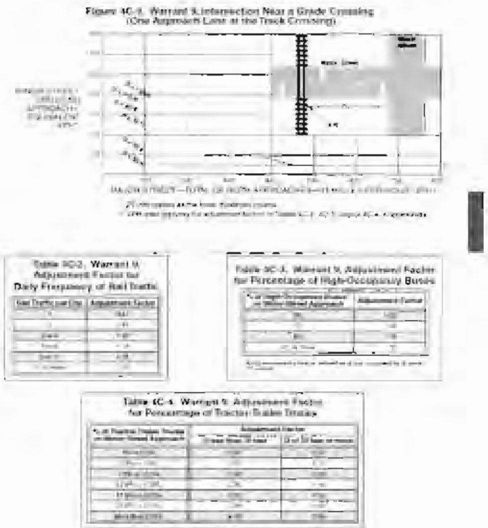
Traffic Signal Warrant for Silverton Road/North-South Connector
PM Peak Hour Warrant
Major Street Total of Both Approaches 1815
Minor Street Higher Volume Approach 70
1 Lane & 1 Lane

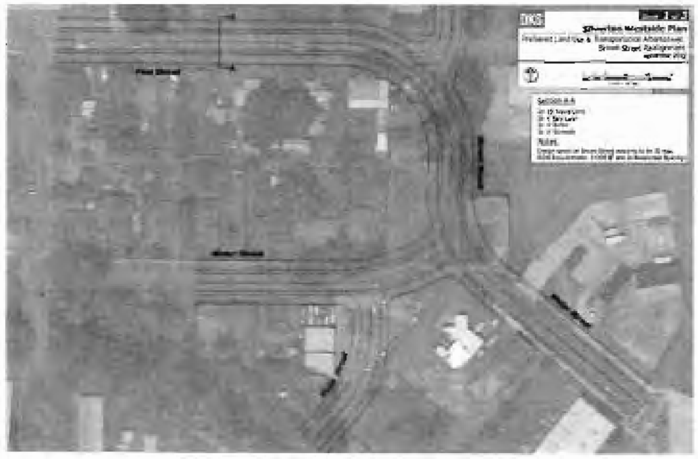
Does Not Meet Peak hour warrant

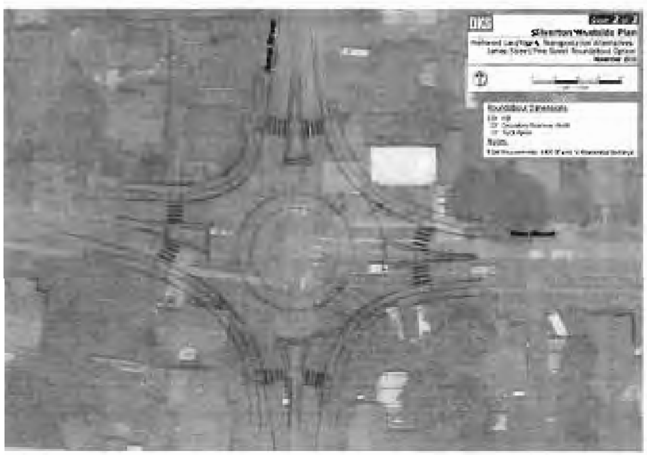




Traffic Signal Warrant for Silverton Road/North-South Connector
Intersection Near a Grade Crossing Warrant
Major Street, Total of Both Approaches 1815
Minor Street Crossing Approach - Equivalent vph 48 (Assuming rail frequency of 2 per day and 3% Tractor Trailer Trucks)
1 Lane & 1 Lane
Does meet warrant







Silverton Westside Land Use and Transportation Plan
Cost Estimate Summary

PROJECT ELEMENT: Brown Street Realignment

Project Description:

This project includes realaignment of Brown Street and Pine Street. The new alignment is designed to arterial standards and includes 2x 12' travel lanes, 2x 5' bike lanes, 2x 6' buffer and 2x 6' sidewalks. The total cross-section width is 60'.

	UNITS	UNIT COSTS	ESTIMATED COST
Remove Pavement	35000 SF	$ 0.33	$ 11,550
Clear & Grub	39150 SF	$ 0.25	$ 9,788
Remove Curb	0 LF	$ 10.00	$ -
Remove Sidewalk	7550 SF	$ 1.50	$ 11,325
Grading	39150 SF	$ 1.25	$ 48,938
Pavement	46300 SF	$ 8.00	$ 362,400
Pavement Elevated/Subgrade	0 SF	$ 200.00	$ -
Sidewalk	16340 SF	$ 4.00	$ 65,360
Curb and gutter	2800 LF	$ 14.00	$ 39,200
Landscaping	2800 LF	$ 12.00	$ 33,600
Wall	0 LF	$ 120.00	$ -
Lighting	1400 LF	$ 105.00	$ 147,000
Full Drainage	1400 LF	$ 100.00	$ 140,000
Drainage Modifications	0 LF	$ 25.00	$ -
Driveway Adjustments	15 Driveways	$ 2,000.00	$ 30,000
Traffic Signal Modification	0 Unit	$ 50,000.00	$ -
Signing and Striping	0 EA	$ 500.00	$ -
Signing and Striping	7000 LF	$ 5.00	$ 35,000
SUBTOTAL			$ 934,160
Traffic Control		5%	$ 46,708
Mobilization		10%	$ 93,416
Design/Administration/Management		15%	$ 140,124
Contingency		30%	$ 280,248
Project Development		5%	$ 46,708
Sales Tax		0.0%	$ -
	SubTotal		$ 1,541,364
Right of Way Cost			
Area	14280 SF	$10	$ 142,800
Building (Residential)	2 Unit	$250,000	$ 500,000
	Total Cost		$ 2,184,164

DKS Associates
11/13/2012

Silverton Westside Land Use and Transportation Plan
Cost Estimate Summary

PROJECT ELEMENT: Signal and NB/SB Turn Lanes at James/Pine

Project Description:

This project includes upgrading the Pine Street/ James Street intersection to a signalized intersection. Design includes a traffic signal and 14' turn lanes on James Street.

	UNITS	UNIT COSTS	ESTIMATED COST
Remove Pavement	11160 SF	$ 0.33	$ 3,683
Clear & Grub	12950 SF	$ 0.25	$ 3,238
Remove Curb	0 LF	$ 10.00	$ -
Remove Sidewalk	4650 SF	$ 1.50	$ 6,975
Grading	12950 SF	$ 1.25	$ 16,188
Pavement	15325 SF	$ 8.00	$ 122,600
Pavement Elevated/Subgrade	0 SF	$ 200.00	$ -
Sidewalk	5580 SF	$ 4.00	$ 22,320
Curb and gutter	930 LF	$ 14.00	$ 13,020
Landscaping	930 LF	$ 12.00	$ 11,160
Wall	0 LF	$ 120.00	$ -
Lighting	465 LF	$ 105.00	$ 48,825
Full Drainage	465 LF	$ 100.00	$ 46,500
Drainage Modifications	0 LF	$ 25.00	$ -
Driveway Adjustments	11 Driveways	$ 2,000.00	$ 22,000
Traffic Signal	1 Unit	$ 225,000.00	$ 225,000
Signing and Striping	8 EA	$ 500.00	$ 4,000
Signing and Striping	1860 LF	$ 1.50	$ 2,790
SUBTOTAL			$ 548,298
Traffic Control		5%	$ 27,415
Mobilization		10%	$ 54,830
Design/Administration/Management		15%	$ 82,245
Contingency		30%	$ 164,489
Project Development		5%	$ 27,415
Sales Tax		0.0%	$ -
	SubTotal		$ 904,691
Right of Way Cost			
Area	6045 SF	$10	$ 60,450
Building (Residential)	0 Unit	$250,000	$ -
	Total Cost		$ 965,141

DKS Associates
11/13/2012

Silverton Westside Land Use and Transportation Plan
Cost Estimate Summary

PROJECT ELEMENT: James/Pine Roundabout

Project Description:

This project includes upgrading the Pine Street/ James Street intersection to a roundabout. Design includes a roundabout with 120' ICD, 20' circulatory roadway, and 10' truck apron, 6' buffer and 6' sidewalk is also included.

	UNITS	UNIT COSTS	ESTIMATED COST
Remove Pavement	11040 SF	$ 0.33	$ 3,643
Clear & Grub	57799 SF	$ 0.25	$ 14,450
Remove Curb	0 LF	$ 10.00	$ -
Remove Sidewalk	4000 SF	$ 1.50	$ 6,000
Grading	57799 SF	$ 1.25	$ 72,249
Pavement	13483 SF	$ 8.00	$ 107,865
Pavement Elevated/Subgrade	0 SF	$ 200.00	$ -
Sidewalk	2160 SF	$ 4.00	$ 8,640
Apron/Concrete	2200 SF	$ 5.00	$ 11,000
Curb and gutter	880 LF	$ 14.00	$ 12,040
Landscaping (Buffer)	860 LF	$ 12.00	$ 10,320
Landscaping (Cuntral Island and Spinter)	4020 SF	$ 2.50	$ 10,050
Wall	620 LF	$ 120.00	$ 74,400
Lighting	620 LF	$ 105.00	$ 65,100
Full Drainage	620 LF	$ 100.00	$ 62,000
Drainage Modifications	0 LF	$ 25.00	$ -
Driveway Adjustments	7 Driveways	$ 2,000.00	$ 14,000
Traffic Signal Control	0 Unit	$ 50,000.00	$ -
Signing and Striping	32 EA	$ 500.00	$ 16,000
Signing and Striping	2100 LF	$ 1.50	$ 3,150
SUBTOTAL			$ 490,907
Traffic Control		5%	$ 24,545
Mobilization		10%	$ 49,091
Design/Administration/Management		15%	$ 73,636
Contingency		30%	$ 147,272
Project Development		5%	$ 24,545
Sales Tax		0.0%	$ -
	SubTotal		$ 809,997
Right of Way Cost			
Area	6400 SF	$10	$ 64,000
Building (Residential)	7 Unit	$250,000	$ 1,750,000
	Total Cost		$ 2,623,997

DKS Associates
11/13/2012

Silverton Westside Land Use and Transportation Plan
Cost Estimate Summary

PROJECT ELEMENT: Silver Creek Bridge (N-S Connector)

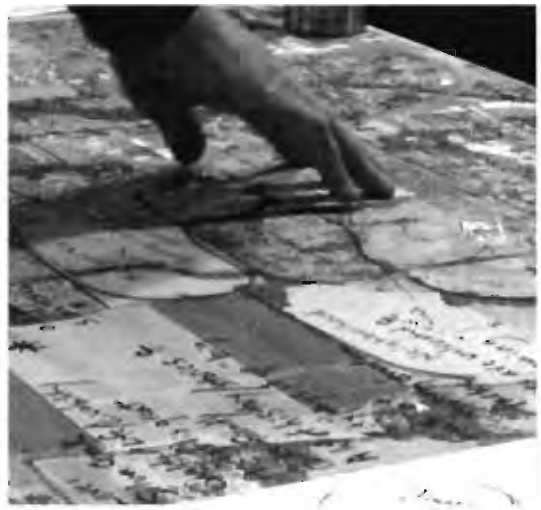
Project Description:

This project includes the construction of the North South Connector bridge across Silver Creek. The 46' cross section includes 2x 12' travel lanes, 2x 5' bike lanes and 2x 6' sidewalks

	UNITS	UNIT COSTS	ESTIMATED COST
Remove Pavement	0 SF	$ 0.33	$ -
Clear & Grub	0 SF	$ 0.25	$ -
Remove Curb	0 LF	$ 10.00	$ -
Remove Sidewalk	0 SF	$ 1.50	$ -
Grading	0 SF	$ 1.25	$ -
Pavement	0 SF	$ 8.00	$ -
Pavement Elevated/Subgrade	11500 SF	$ 200.00	$ 2,300,000
Sidewalk	3000 SF	$ 4.00	$ 12,000
Curb and gutter	500 LF	$ 14.00	$ 7,000
Landscaping	0 LF	$ 12.00	$ -
Wall	0 LF	$ 120.00	$ -
Lighting	250 LF	$ 105.00	$ 26,250
Full Drainage	250 LF	$ 100.00	$ 25,000
Drainage Modifications	0 LF	$ 25.00	$ -
Driveway Adjustments	0 Driveways	$ 2,000.00	$ -
Traffic Signal Modification	0 Unit	$ 50,000.00	$ -
Signing and Striping	0 EA	$ 500.00	$ -
Signing and Striping	1250 LF	$ 5.00	$ 6,250
SUBTOTAL			$ 2,376,500
Traffic Control		5%	$ 118,825
Mobilization		10%	$ 237,650
Design/Administration/Management		15%	$ 356,475
Contingency		30%	$ 712,950
Project Development		5%	$ 118,825
Sales Tax		0.0%	$ -
	SubTotal		$ 3,921,225
Right of Way Cost			
Area	0 SF	$10	$ -
Building (Residential)	0 Unit	$250,000	$ -
	Total Cost		$ 3,921,225

DKS Associates
11/13/2012

West Side Land Use and Transportation Plan


PAC Meeting/Community Forum
November 27, 2012

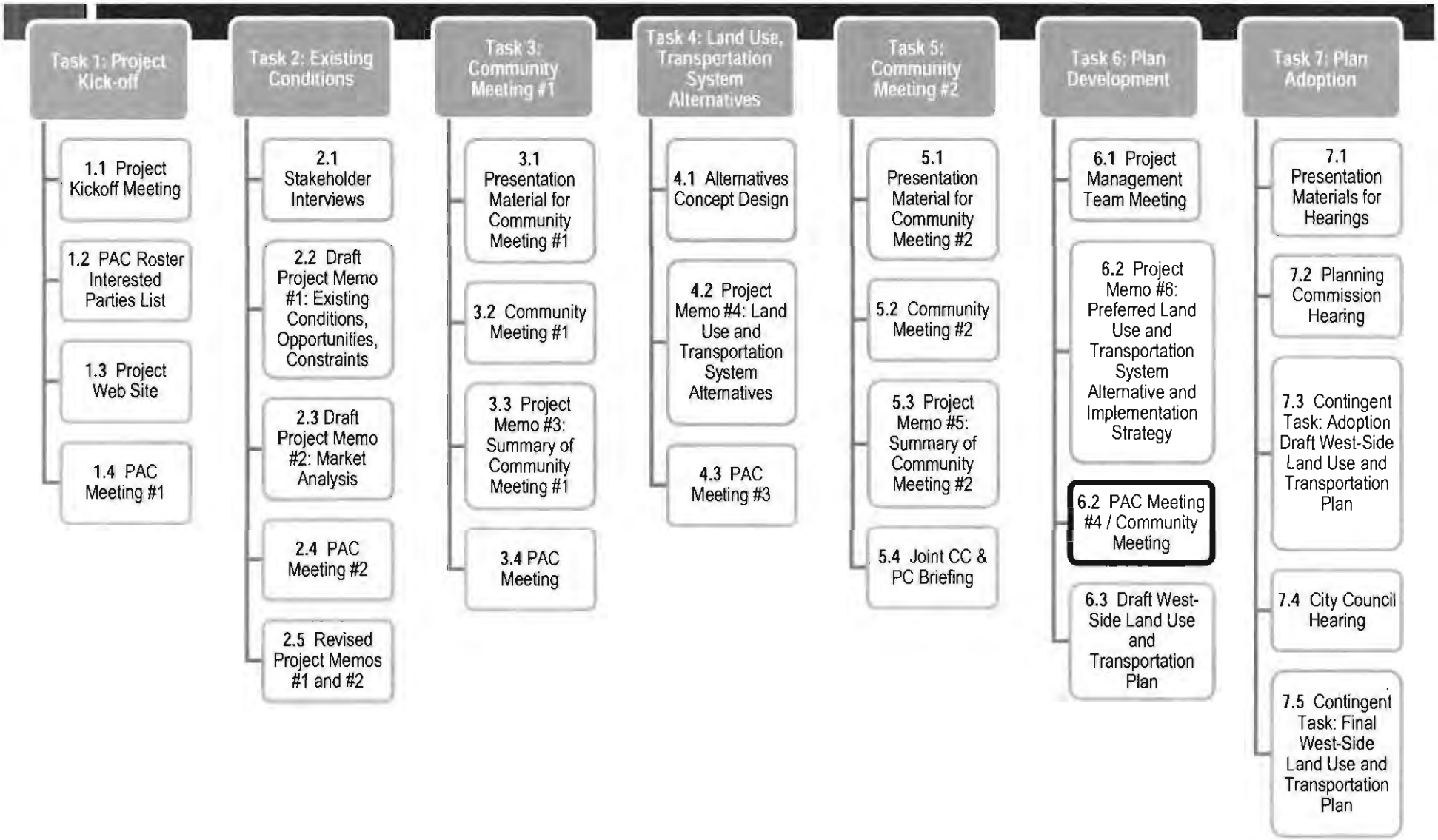
Agenda

Presentation

- Process to Date
- Preferred Land Use Concept
- Implementation Recommendations
- Transportation Analysis
- Implementation Recommendations

Questions & Comments

West-Side Planning Process



Community Forum #1 – January 2012

Plan purpose

Vision exercise

West-Silverton Study Area

Why is Silverton looking at this area?

- A gateway to the city
- A wealth of community amenities
- Within the Urban Growth Boundary
- Large undeveloped lands that could be developed
- Prevent piecemeal development
- Ensure it develops in character with Silverton

What is the "Plan"?

- A community dialogue *before* development
- Based on state policies and previous city planning efforts
- A process that culminates in a Plan document:

1. vision
2. alternatives
3. preferred alternative
4. details
5. strategies

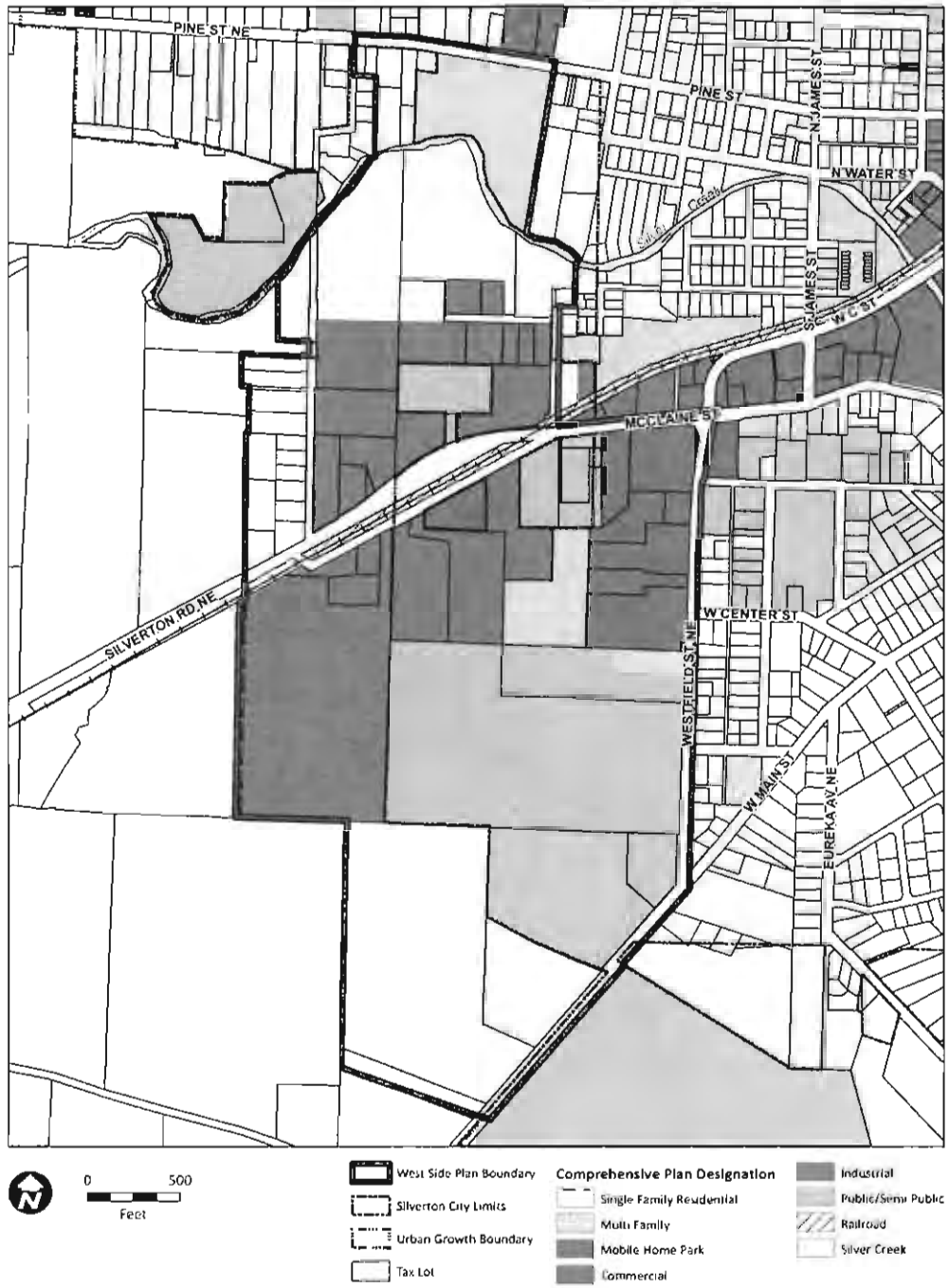
What are the state policies and city plans?

- Statewide Planning Goals
  - To achieve Oregon´s statewide goals, State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect.
  - Extent of the Comprehensive Plan is the Urban Growth Boundary (required by Goal 14)
- Oregon Transportation Planning Rule (TPR)
  - Requires local Transportation System Plans (TSP)
- Silverton Zoning and Development Code
  - Implements the Comprehensive Plan and provides design and development standards for the city

Comprehensive Plan

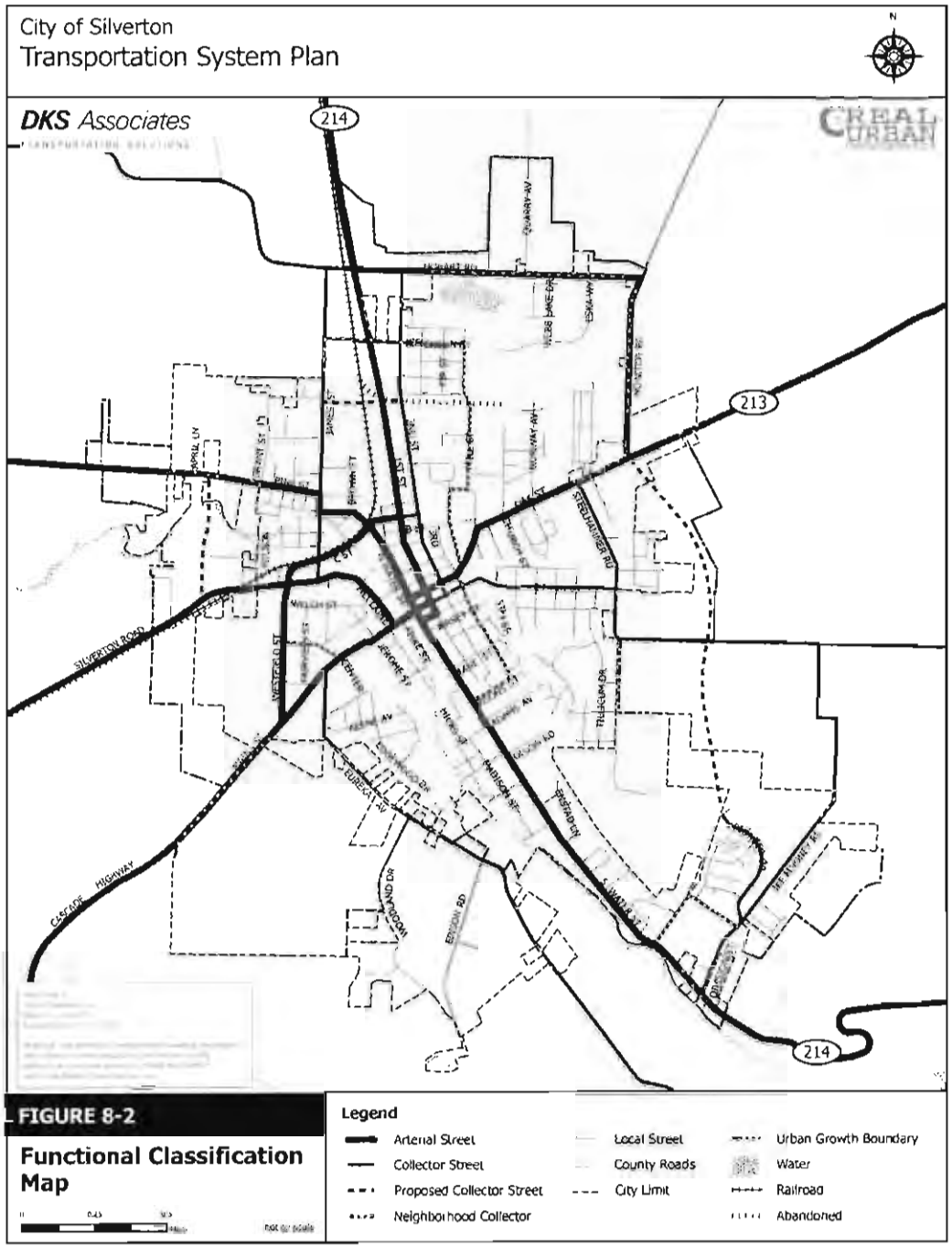
- Adopted in 1979
- Revised 4 times
- Last updated in 2002

- Single Family Residential
- Multiple Family Residential
- Industrial
- Commercial
- Public/Semi Public



TSP

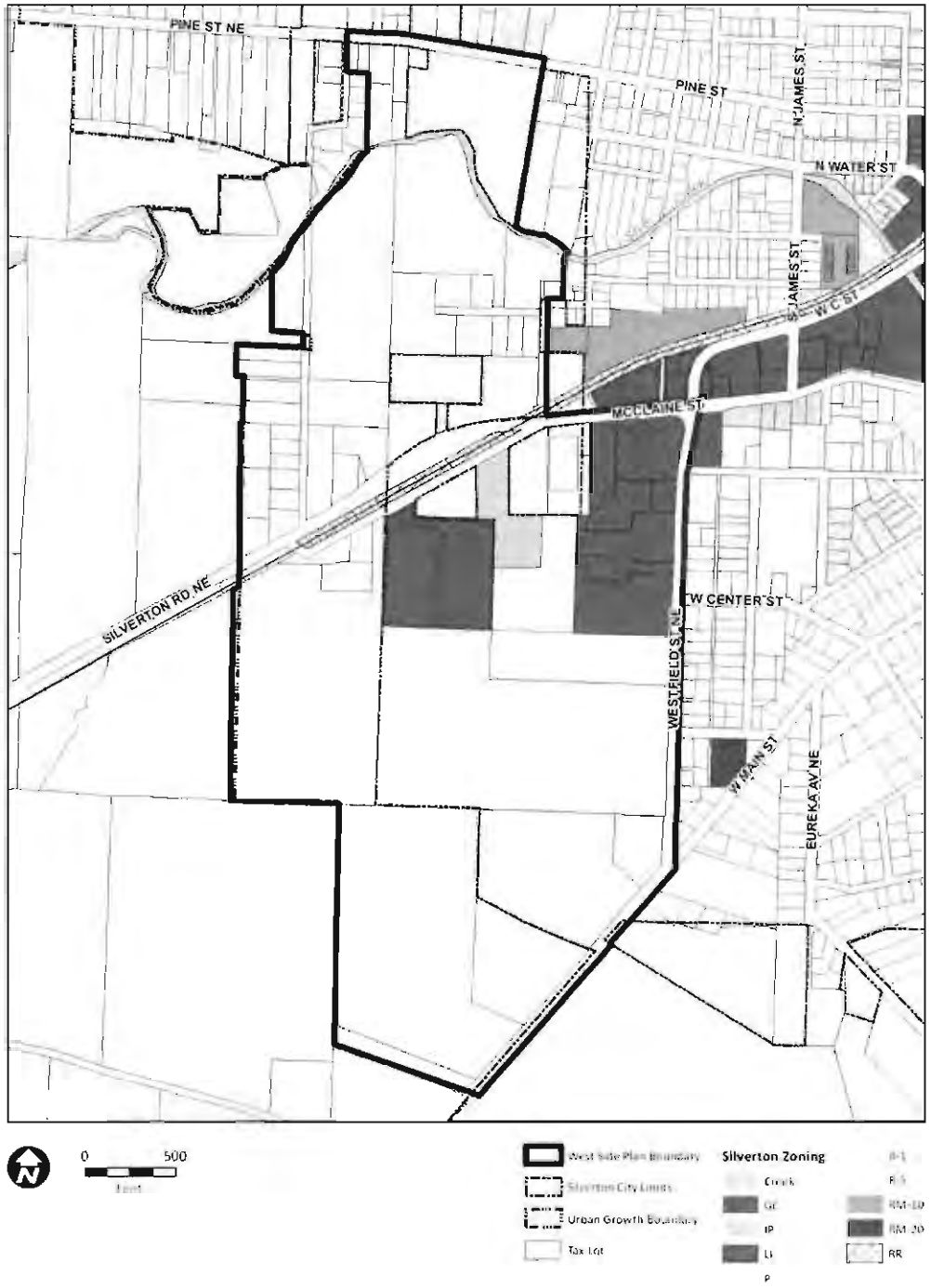
- Provides access options for the adopted Comprehensive Plan
- Adopted in 2000 & 2008
- Provides circulation and improved emergency access for West Silverton



Zoning

- Within city limits

- Single Family Residential
- Multiple Family Residential
- Industrial Park
- Light Industrial
- Commercial
- Public/Semi Public



Planning Principles to Consider

- Integrate with Greater Silverton
- Create a Complete Community
- Plan for All Modes of Travel
- Connect Streets to Connect the Community
- Integrate Nature Features
- Provide Parks and Greenways
- Require Good Design for Multi-Family Dwellings
- Integrate Neighborhood Activity Centers
- Mix Uses
- Create Complete Streets

What is your vision?

- Hop in your time machine and set it 20 years ahead.
- The City's vision for the West-Side has been fully realized. You really like what you see.
- What do you see?



Community Forum #2 – March 2012

Presentation of vision concepts

Discussion of alternatives

Vision Concepts

Continue to contribute to the small town character of Silverton.

Vision Concepts

Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.

Vision Concepts

Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.

Vision Concepts

Fill out the existing shopping center at the corner of Westfield and Silverton Road.

Vision Concepts

Provide local employment opportunities through light-industrial uses that are attractive and well designed.

Vision Concepts

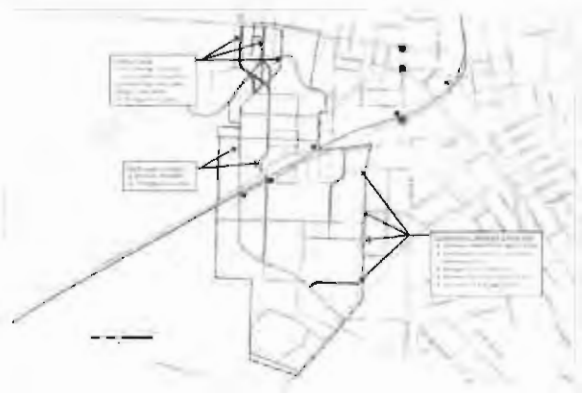
Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.

Vision Concepts

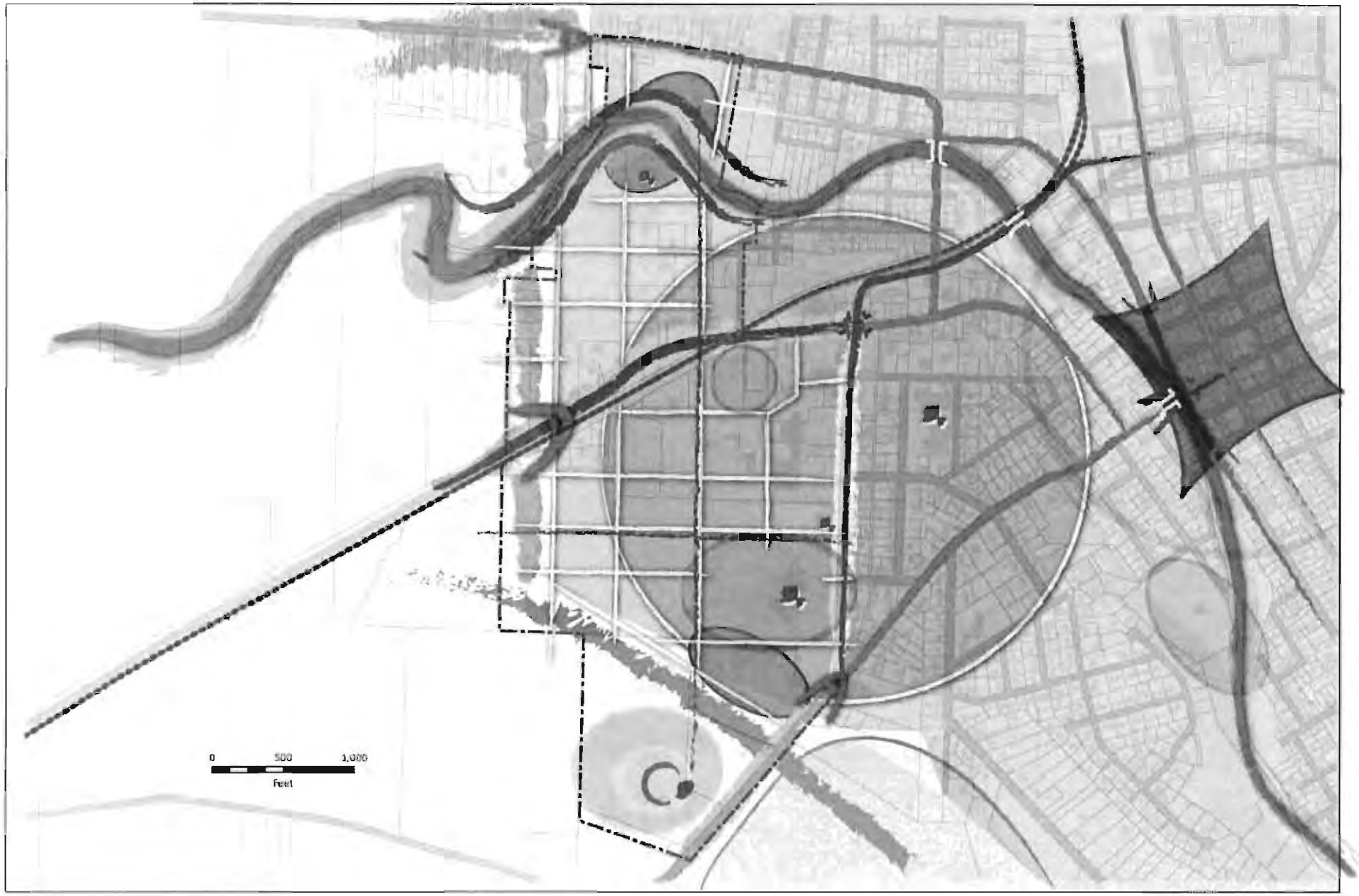
Provide strong connectivity throughout the area for all modes of transportation.

Building on the Vision

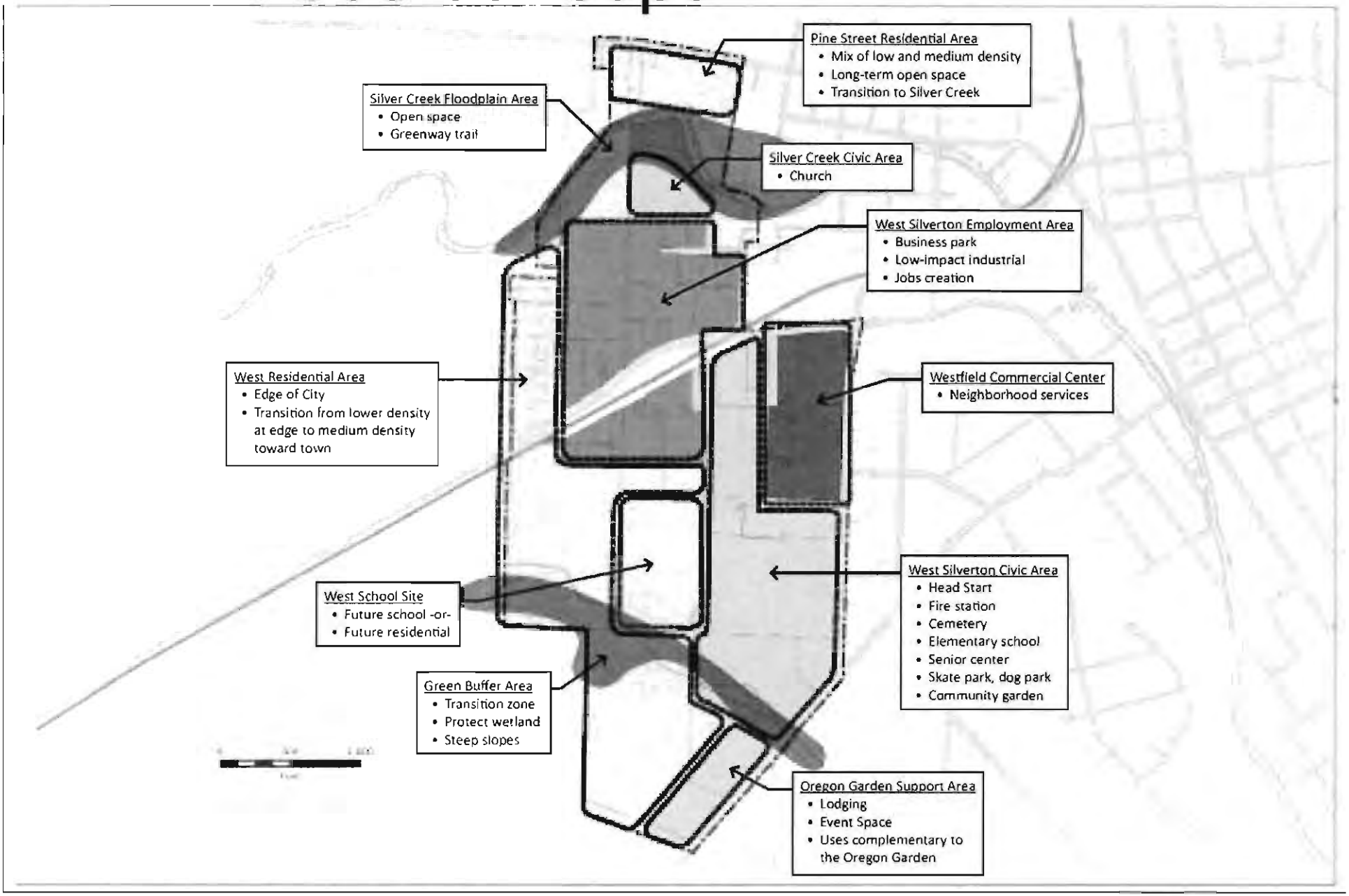
- Framework of "big ideas"
- Land use concept
- Transportation system options



The Framework



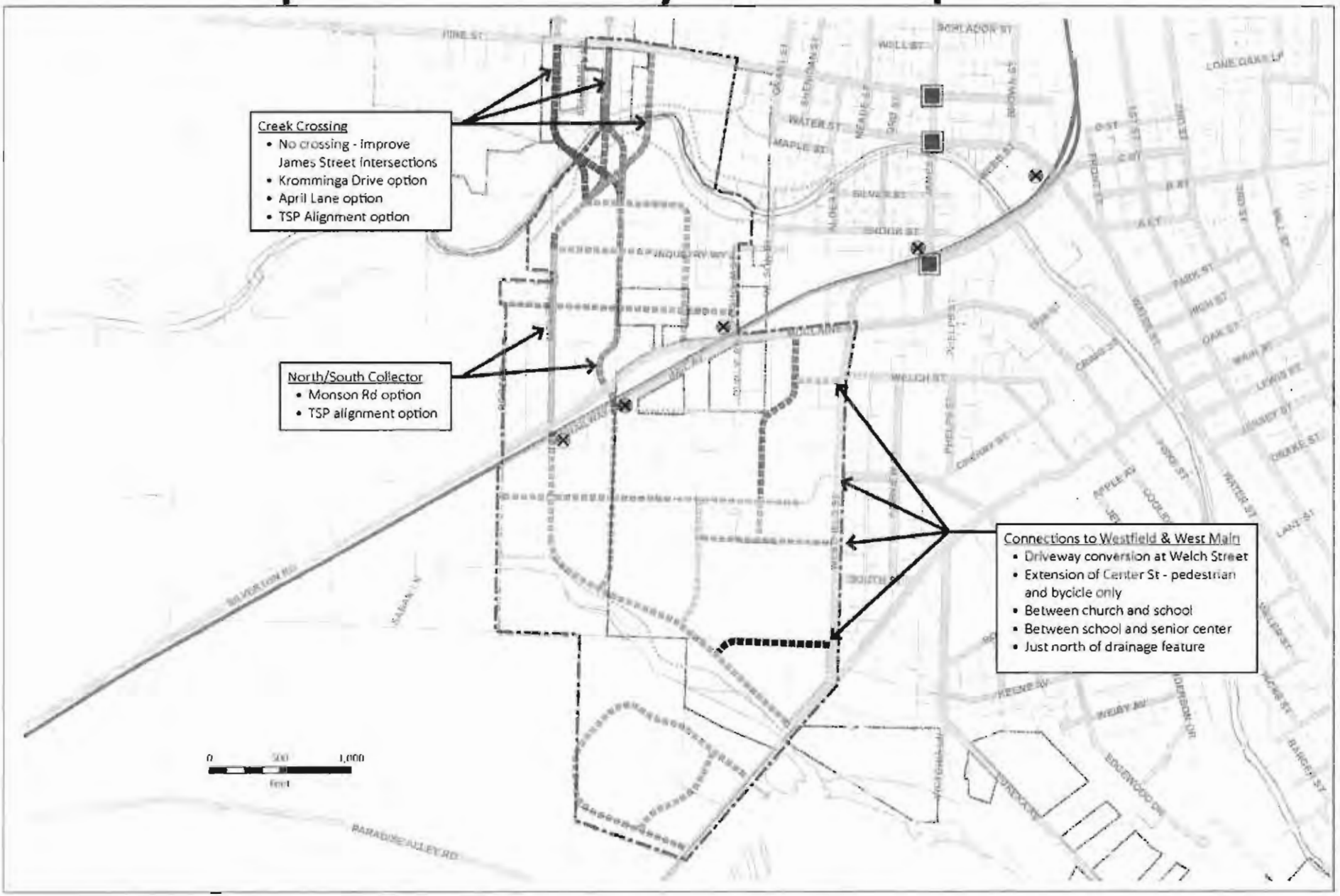
Land Use Concept



Development Program

Land Use	Acres	Amount	Notes
Gross Developable Area	142.0		
less 20% for ROW	-28.4		
less 20% for Open Space	-28.4		
Net Developable Area	85.2		
Housing			
Apartments	5.2	130	2-3 apartment sites
Townhomes	8.0	128	2-3 townhome neighborhoods
Senior Housing	5.0	150	1-2 senior housing developments
Cottage Housing	15.0	180	Several cottage communities
Single Family Housing	8.0	64	Traditional single family homes
Housing subtotal	***41.2***	***652***	
Light Industrial	25.0	327,000	Small manufacturers, food processors
Commercial/Retail	12.0	183,000	Hotel, restaurants, services
Civic	7.0	91,000	Education, library, cultural
Total	**126.4**		

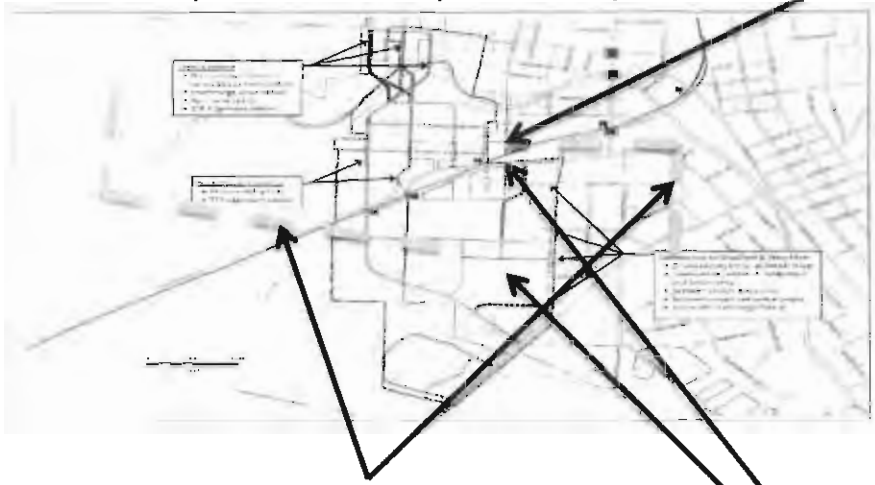
Transportation System Options



James Street Improvement Needs?

Potential Long-Term Needs without Westside Collector adopted in the TSP

Transportation System Options



Upgrade local streets to arterials?

- Divert some traffic from James Street
- Could include road closures to reroute traffic

Roundabout?

Traffic Signals at Pine and Water?

- Would require turn lanes at Pine
- May not be warranted based on traffic volume (delay and safety considerations)

Land Use Conclusions

- General acceptance of the concept.
- Extend housing north of an extended Industrial Way to connect with the housing west of Monson.
- Transition to single family along Pine Street.
- No commercial in the “knoll” area.
- Multi-family housing types should be integrated throughout the area and not clustered in one location.

Transportation System Conclusions

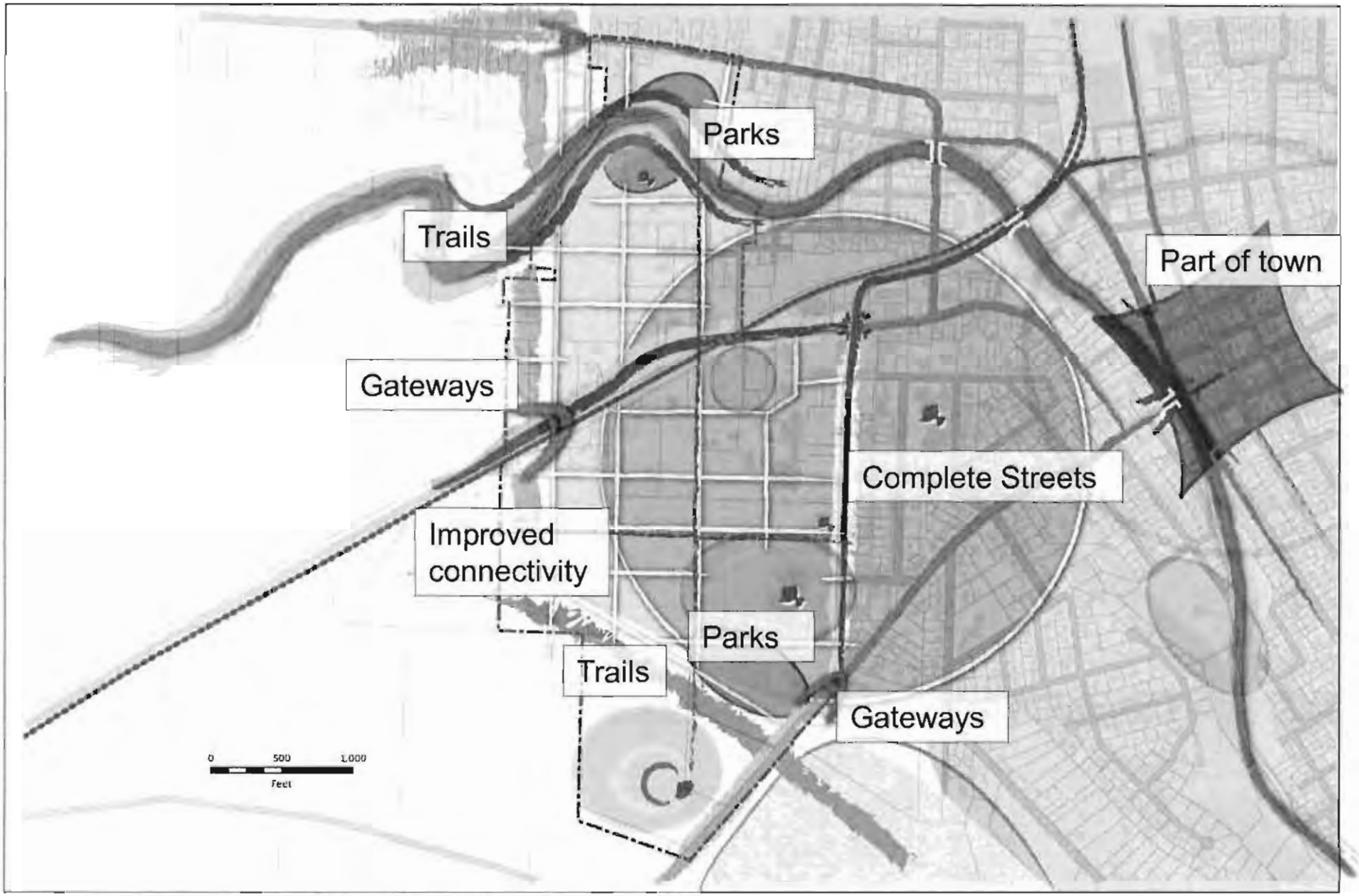
- Cost of bridging the drainage area not justified due to no commercial activity.
- Upgrading the Pine Street to Brown Street connection in lieu of a bridge crossing is a viable option.
- If there is to be a creek crossing, Kromminga is the preferred location.
- At a minimum, a pedestrian and bicycle bridge across the creek should be provided for connectivity to the schools.

City Council & Planning Commission Direction

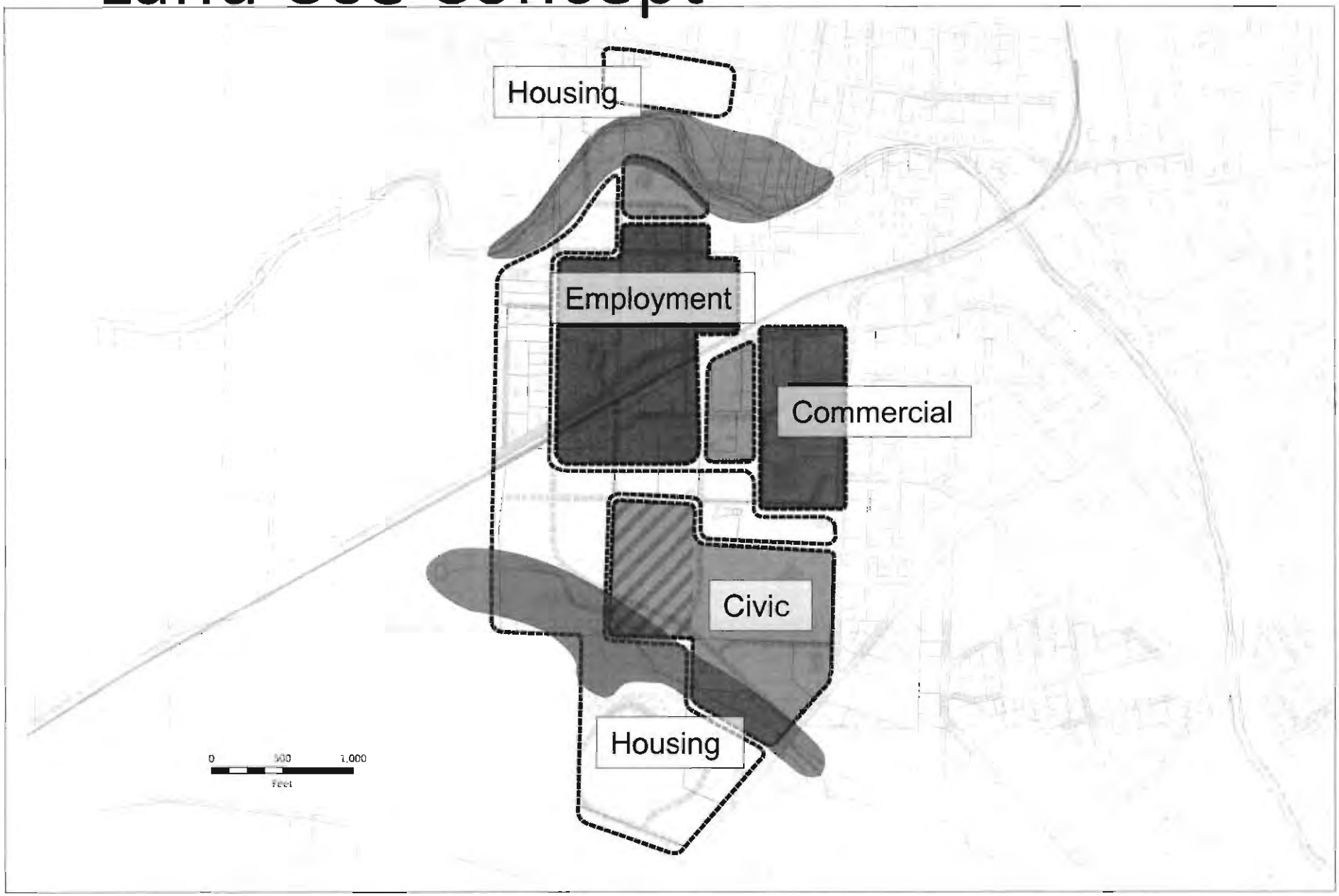
- Reviewed diagrams and conclusions of the community meeting
- Agreed with land use concept
- Indicated further analysis was needed on the transportation system:
  - If a new bridge crossing is needed, then approximately when is it needed?
  - Do the improvement alternatives in the James Street/Pine Street/Brown Street/Water Street area delay the need for a bridge?
  - If there is no bridge, what improvements to the James Street/Pine Street /Brown Street/Water Street area could provide adequate mobility?

Preferred Land Use and Transportation System Alternatives

The Framework



Land Use Concept



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Commercial/Retail	12.0	183,000	Hotel, restaurants, services
Civic	7.0	91,000	Education, library, cultural
Total	**126.4**		

Housing Types

Cottage Housing

- 8 – 14 du/acre
- 1 to 2 stories
- On-street parking, clustered in shared lot, or garages in alleys

Townhouse

- 12 – 20 du/acre
- 2 to 3 stories
- Surface parking or parking within each unit

Wood Frame Apartments

- 20 – 35 du/acre
- 2 to 3 stories
- Surface, garage, or tuck under parking

Senior Housing

- 25 – 35 du/acre
- 2 to 4 stories
- Surface, garage, or tuck under parking

Employment

Flexible Open Space
3,000 to 15,000 SF

Warehouse with office or showroom

Production, transportation or distribution

Employment

Hotel

75 to 100 units

Restaurant

2,000 to 4,000 SF

Services

1,000 to 3,000 SF

Salon, dry cleaners, etc.

Retail

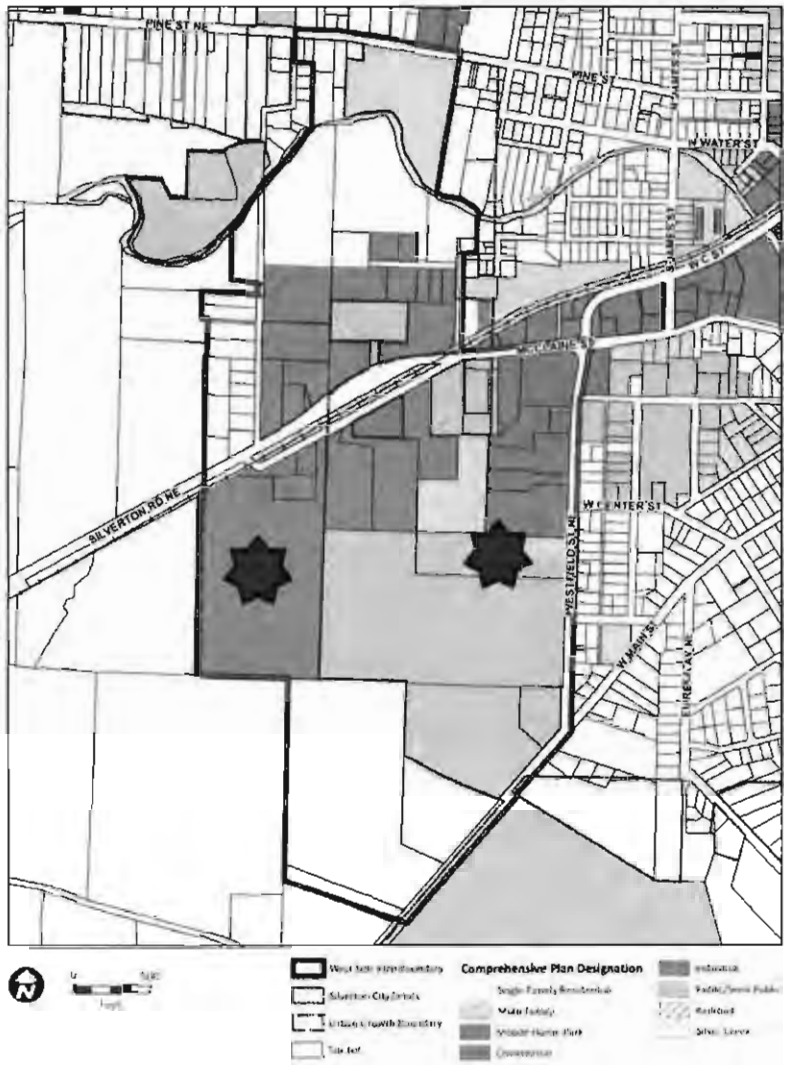
Larger footprint

Noncompetitive with downtown

Implementation Recommendations

Comprehensive Plan Amendments

- Adopt as a refinement plan
- West-Side vision statement serves as the specific policies
- Two specific map designation changes



Implementation Recommendations

Mix of housing types

- Keep base zone requirements
- Require different housing types based on size of property
- R-1 base zone allows only single-family homes and duplexes
- Planned Development Overlay requirement for large parcels

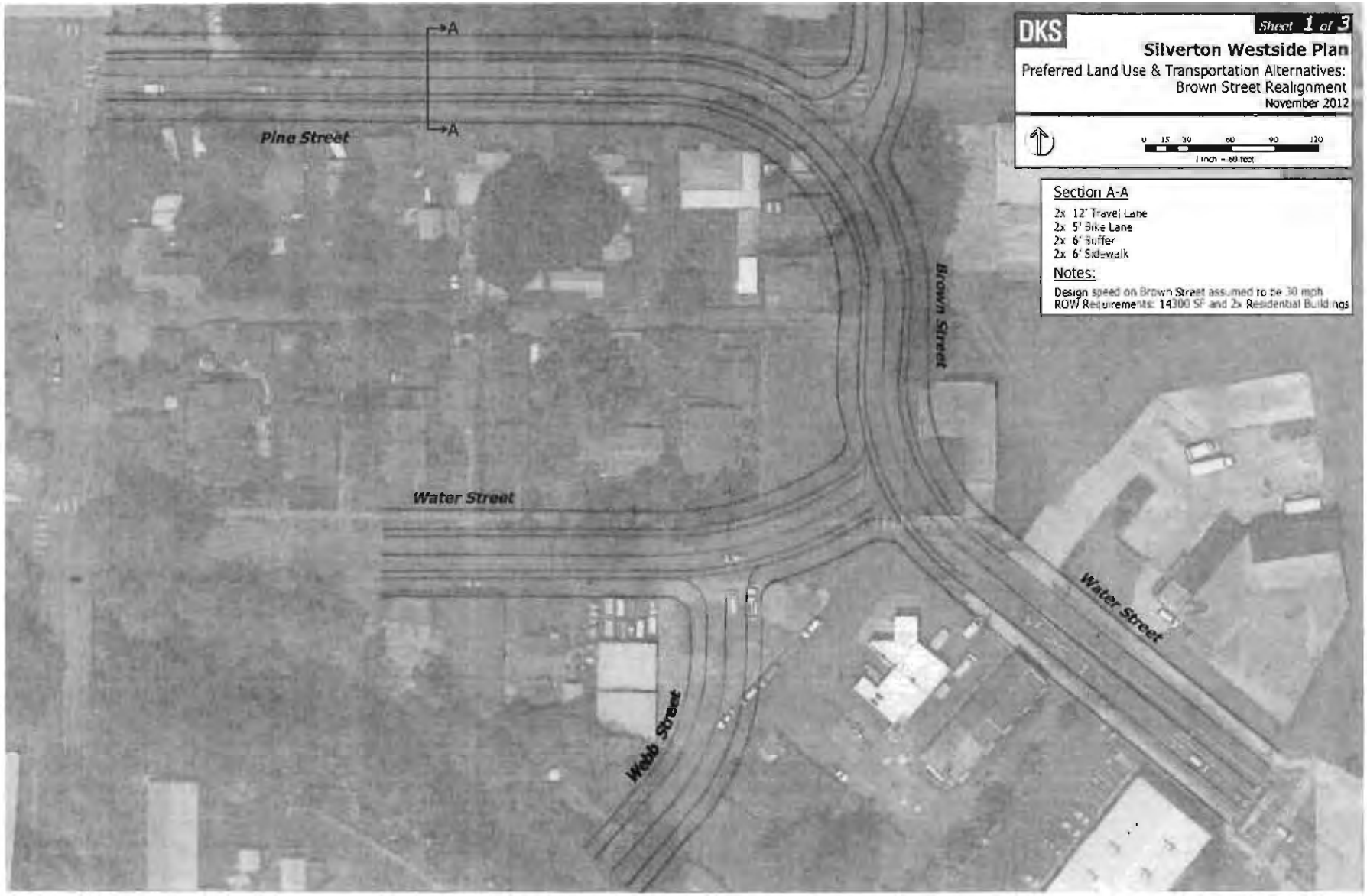
Implementation Recommendations

Trails

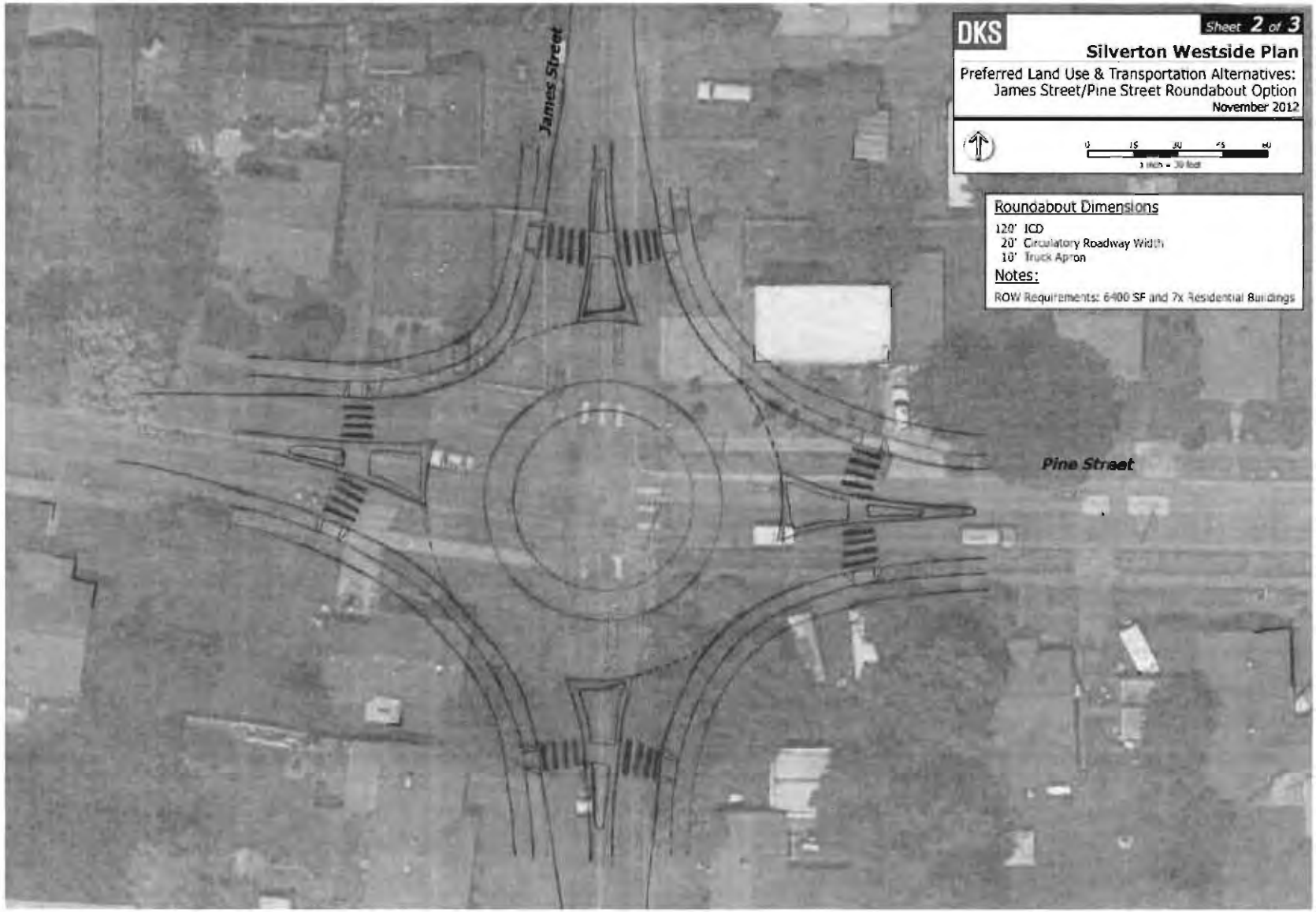
- Two trail areas
- Covered by floodplain and/or hillside overlays
- Planned Development Overlay requirement for large parcels
- Evaluation criteria would be the West-Side Plan vision and objectives

Transportation System

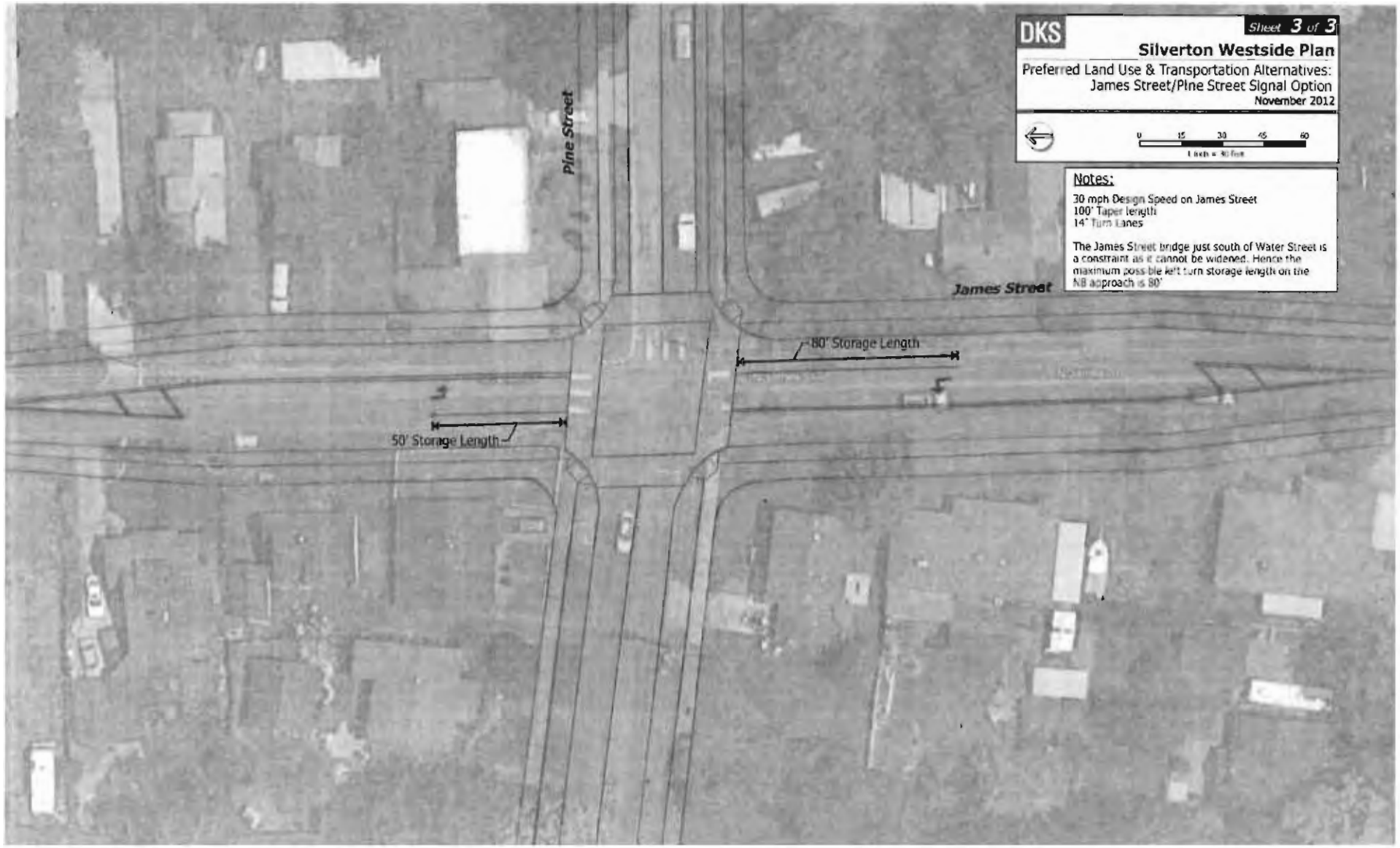
Transportation System



Transportation System



Transportation System



Transportation System

Table 8: Concept-Level Preliminary Cost Estimates for Brown Street Realignment

Project	Description	Estimated Cost
Brown Street Realignment	Includes realignment of Brown Street and Pine Street. The new alignment is designed to arterial standards and includes 2x 12' travel lanes, 2x 5' bike lanes, 2x 6' buffer and 2x 6' sidewalks. The total cross-section width is 60'.	$2,185,000
Roundabout at James Street/Pine Street	Includes upgrading the Pine Street/ James Street intersection to a roundabout. Design includes a roundabout with 120' ICD, 20' circulatory roadway, and 10' truck apron. 6' buffer and 6' sidewalk is also included	$2,624,000
Signal and NB/SB Turn Lanes at James Street/Pine Street	Includes upgrading the Pine Street/ James Street intersection to a signalized intersection. The cross-section includes 2x 12' travel lanes, 1x 14' turn lane, 2x 5'buffer and 2x 6' sidewalks. The turn lane storage length is 80' for the NB approach and 50' for the SB approach	$966,000
North-South Connector Bridge	Includes the construction of the North South Connector bridge across Silver Creek. The 46' cross section includes 2x 12' travel lanes, 2x 5' bike lanes and 2x 6' sidewalks	$3,922,000

Source: DKS Associates, 2012

Transportation System

To implement these changes, the following amendments would be need for the City's TSP:

- Remove the North-South Connector Project (replaced as local street connections)
- Add the Brown Street reroute as a new arterial corridor and improvement project
- Add the James Street/Pine Street intersection improvements, which could have an option as either a signal or roundabout configuration to be determined through a design process
- Consider changing the functional classification of Water Street between Brown Street and James Street to a local roadway (if Brown Street becomes the arterial corridor through the area). This could also include removing of pedestrian and bicycle improvement projects along this portion of Water Street.

What's next?

- Record the input received tonight
- Prepare the Draft Plan
- Planning Commission and City Council hearings

Thank you for participating!

25. Extension of City Services. The City of Silverton will not extend city service outside the city limits unless waivers for future annexation are obtained.

26. Urban Growth Boundary Management. Marion County will submit to the City of Silverton for review any proposals for partitions, subdivisions, comprehensive plan, or zone changes within the urban growth boundary. Management of the area between the city limits and the urban growth boundary is views as a joint City/County responsibility. Decisions will be governed by policies of the jointly adopted Urban Growth Boundary and Policy Agreement and the Silverton Comprehensive Plan (included as part of the Marion County Comprehensive Plan).

27. Areas of Special Mutual Concern. Management of the areas of special mutual concern will also be governed by the policies of the City/Council Urban Growth Boundary and Policy Agreement. The County will retain responsibility for land use decisions in the areas of special mutual concern, but will see the City's comments on proposed land use actions affecting these areas, and especially in areas near the Oregon Garden. As lands which are designated areas of Mutual Concern become annexed into the city they shall no longer be considered within the Area of Mutual Concern. At some point, as these properties become part of the City it may be appropriate for both the City and the County to reevaluate the continued appropriateness of this designation.

28. Plan Review. The Comprehensive Plan will be reviewed at a minimum of 10-year intervals throughout the planning period. Special attention will be directed toward population increase and the projection of future land requirements.

29. Urban Growth Boundary Change Criteria. U.G.B. changes to expand or reduce will be based upon consideration of the following factors:
- Accommodation of additional population
- Housing and employment opportunities
- Orderly and economical provision of public facilities and services
- Maximum efficiency of land uses
- Retention of agricultural land
- Compatibility of the proposed urban use with nearby agricultural activities
- Improvements of the area's environmental, energy, economic, and social well being

Special Districts

30. West Side Land Use and Transportation Plan

Preserve and enhance the character and livability of the West Side Area of Silverton by including the West Side Land Use and Transportation Plan as a part of this Comprehensive Plan.

Objectives:

A. Continue to contribute to the small town character of Silverton.
B. Provide a beautifully landscaped entrance that recalls Silverton's agrarian heritage and "Garden City" culture.
C. Include a mixture of single-family and cottage style multi-family and senior housing that is well connected to schools, parks, and other amenities.
D. Fill out the existing shopping center at the corner of Westfield and Silverton Roads.

E. Provide local employment opportunities through light-industrial uses that are attractive and well designed.
F. Create a network of open space, parks, and trails, including a greenway along Silver Creek to build upon and enhance the natural beauty of the area.
G. Provide strong connectivity throughout the area for all modes of transportation.

IMPLEMENTATION

Residential Development

1. The Planning Commission and the City Council will apply comprehensive plan policies in the review of the development applications.
2. The City and Marion County will apply policies established in the Joint Urban Growth Management Policy Agreement in the review of land development applications.

Special Districts

1. In addition to the policies stated in Special District Plans, city-wide goals and policies throughout the Comprehensive Plan also apply in the Districts. Where there is inconsistency, the District Plan policies take precedence over the application of other Comprehensive Plan policies.

Future Actions

1. The City will revise parking regulations, and review other regulations affecting the central Business district, and investigate use of incentives or other strategies to facilitate the CBD development and redevelopment efforts.

2. The City will develop a program for parkland acquisition in newly developing areas, including possibly dedication of land or contribution to a parkland fund by subdivision developers. The program will be consistent with the Parks Master Plan adopted in 2001.

3. The City will adopt standards for new development along major western and northern entrance ways to the City to improve aesthetics in these areas.

4. The City periodically will review design review and other administrative, legislative and quasijudicial procedures to ensure that standards used are as clear and objective as possible and that their application is consistent and fair.

5. The City will investigate the use of performance based zoning for incorporation in selected portions of the City's zoning ordinance (e.g., as density and commercial development targets for activity nodes and corridors, regulations for environmentally sensitive areas, and/or standards for planned unit developments).

6. The City will periodically review population projections, which do not anticipate significant increases in population growth in Silverton related to impacts of the Oregon Garden. In the future, if the Gardens appear to be significantly impacting local growth rates, growth rates will be modified.

7. The City will refine policies toward commercial development and other land uses within and outside the CBD in a separate downtown area plan.

CHAPTER 1 : EXECUTIVE SUMMARY

OVERVIEW

This Silverton Transportation System Plan (TSP) identifies projects and programs needed to support the City's goals and policies and to serve planned growth through the TSP horizon year (2030). The TSP builds on the previous plan that was developed in 2000 for the City, and addresses changes in local and regional growth patterns and new transportation planning policies adopted by the state, among other issues. This document presents the recommended investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems in the City of Silverton along with new transportation programs to correct existing deficiencies and enhance services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. The most critical elements of these Master Plans are referred to as Action Plans. The final chapter identifies the estimated plan costs and makes recommendations about potential new funding sources to support the plan.

PLAN PROCESS AND COMMITTEES

The plan was developed in close coordination with Silverton City staff and a formal committee that included agency staff from Oregon Department of Transportation, Marion County, and Silverton as well as citizen representatives that included city council and planning commission members, local business owners, and other volunteers. Several of these members participated in reviewing the technical methods and findings of the study. They helped to consider consistency with the plans and past decisions in adjoining jurisdictions, and reach consensus on new recommendations. Additionally, a public open house was held, allowing citizens to comment on the plan, make suggestions and provide feedback.

The Silverton Transportation System Plan process included the following steps:

- Inventory/Data Collection for year 2006 baseline
- Update Goals and Policies
- Evaluate Existing Conditions and Future Travel Needs Through Forecasting
- Update Needs by Mode, Consider Alternatives and Prioritize Improvement Projects
- Refine Improvement Lists to Mitigate Deficiencies by Mode For 2030 Conditions
- Determine Planning and Cost Estimates of Improvements
- Identify Financing Sources
- Draft TSP

PLAN ORGANIZATION

This document is divided into ten chapters and a separate Technical Appendix. The title and focus of each chapter is summarized below:

- **Chapter 1: Summary:** This chapter provides a brief overview of the plan and presents the estimated funding needed to implement it.

- **Chapter 2: Transportation Policies:** This chapter presents the recommended goals and policies related to transportation.
- **Chapter 3: Existing Conditions:** This chapter examines the current transportation system in terms of the built facilities, how well they perform and comply with existing policies, and where outstanding deficiencies exist.
- **Chapter 4: Future Demands:** This chapter presents the details of how the City of Silverton is expected to grow under through 2030, and how travel demands on the city and regional facilities will change from general growth in the region.
- **Chapter 5: Pedestrian Plan:** This chapter presents strategies and plan recommendations to enhance pedestrian facilities and focus new improvements in areas with the highest concentration of activity.
- **Chapter 6: Bicycle Plan:** This chapter presents strategies and plan recommendations to enhance bicycle facilities and focus new improvements in areas with the highest concentration of activity.
- **Chapter 7: Transit:** This chapter makes recommendations to be considered by CARTS and the City of Silverton for their future enhancements to transit services.
- **Chapter 8: Motor Vehicles**
  This chapter presents strategies and plan recommendations to provide adequate mobility and access to the city, county and state facilities as travel demands grow to 2030 levels. This chapter also addresses street design standards, access spacing standards, functional class designations, and other programs to monitor and manage the street system.
- **Chapter 9: Other Modes:** This chapter discusses transportation issues related to rail, air, water, and pipeline transportation.
- **Chapter 10: Financing and Implementation:** This chapter presents the complete estimated revenues and costs for the transportation projects and programs developed in the plan. New funding alternatives are presented to bridge the gaps between the two. New funding programs and implementation measures will be required to put this updated transportation plan into action.
- **Technical Appendix:** The appendices contain detailed information regarding traffic volumes, street and intersection operational analysis, land use forecasts and other background materials.

GOALS AND POLICIES

The proposed goals and policies pertaining to Transportation are presented in Chapter 2. Goals are defined as brief guiding statements that describe a desired result. Policies associated with each of the individual goals describe the actions needed to move the community in the direction of completing each goal. These goals and policies were applied in the development of this Transportation System Plan to develop strategies and implement measures for each of the travel modes applied in the City of Silverton. The goals include:

- Develop a transportation system to enhance Silverton's livability through proper location and design of multi-modal transportation facilities, including streets, sidewalks, bicycle lanes, trails and transit.
- Create a balanced transportation system for all modes and reduce the number of trips by single occupant vehicles.
- Improve the safety of the transportation system.
- Develop an efficient transportation system that will handle future traffic growth.
- Provide a transportation system that is accessible to all members of the community.

- Develop a transportation system to provide for efficient freight movement.
- Develop a transportation system that is consistent with the adopted plans of state, local, and regional jurisdictions.
- Create a funding system to implement the recommended transportation system improvement projects.

TRANSPORTATION PLANS

The Silverton TSP update identifies projects and programs needed to support the City's goals and policies and to serve planned growth over the next 20 years. This document presents the recommended investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems along with new transportation programs to enhance critical transportation services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. The Master Plan represents a complete "wish" list of projects identified for the next 20 years; the Action Plan projects are a smaller subset of the Master Plan. The Action Plans for each travel mode only include projects that are expected to be reasonably funded within the time frame of the plan (generally the high priority projects). A table has been prepared for each travel mode that includes the Master Plan and Action Plan projects for implementation within the City of Silverton. The following sections summarize the plans for each mode.

Pedestrian

The existing pedestrian system in Silverton has significant needs. Sidewalks are provided downtown and in many newer residential neighborhoods, but have limited connections to other neighborhoods and other pedestrian generators such as schools, shopping and recreational facilities. Gaps within the sidewalk and trail system and facility barriers (e.g. railroad, Silver Creek) discourage pedestrian travel and put pedestrians at an increased safety risk by requiring them to share the roadway with vehicles in certain locations.

Based on these needs, a Pedestrian Master Plan (Figure 5-1) was developed and is outlined in Table 5-1. The Pedestrian Master Plan costs are estimated to be $9.6 million. The Pedestrian Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. The pedestrian goals and input from the TAC were reviewed to create a Pedestrian Action Plan, which includes high priority projects that are reasonably expected to be funded by the year 2030. The Pedestrian Master Plan and Action Plan project list is shown in Table 1-1.

Table 1-1: Pedestrian Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Sidewalks on Existing Arterials and Collectors						
High	Oak Street	Both	Steelhammer Road	City limits	Action	$357
High	Pine Street (gap infill)	Both	Grant Street	City limits	Action	$164
High	South Water Street	Both	Smith Street	City limits	Action	$945
High	C Street	Both	McClaine Street	James Street	Action	$157
High	Steelhammer Road	Both	Oak Street	Evans Valley Road	Action	$388
High	C Street	South	Front Street	2nd Street	Action	$26

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
High	James Street	East	C Street	North Water Street	Action	$53
High	James Street	West	C Street	Brooks Street	Action	$16
High	Westfield Street	Both	Main Street	Existing section	Action	$21
High	Main Street	Both	3rd Street	Steelhammer Road	Action	$567
Med	Oak Street	South	Mill Street	Steelhammer Road	Master	$283
Med	Brown Street	East	North Water Street	Pine Street	Master	$30
Med	North Water Street	South	Brown Street	C Street	Master	$23
Med	North Water Street	East	C Street	A Street	Master	$41
Med	C Street	North	James Street	North Water Street	Master	$195
Med	James Street	Both	Florida Street	City Limits	Master	$164
Med	Westfield Street	East	Main Street	McClaine Street	Master	$252
Med	B Street	Both	1st Street	Mill Street	Master	$130
Med	1st Street	Both	Hobart Road	Existing section	Master	$483
Med	Jefferson Street	Both	2nd Street	James Street	Master	$210
Med	West Main Street	North	Westfield Street	City limits	Master	$95
Med	Keene Avenue	Both	Eureka Avenue	Coolidge Street	Master	$315
Med	Ike Mooney Road	Both	Existing section	City limits	Master	$172
Med	2nd Street	Both	Whittier Street	Hobart Road	Master	$483
Low	McClaine Street	North	Craig Street	Phelps Street	Master	$37
Low	Fiske Street	Both	Main Street	Charles Avenue	Master	$199
Low	2nd Street (gap infill)	East	Whittier Street	D Street	Master	$61
Low	Eureka Avenue	Both	Main Street	Bee Lane	Master	$525
Low	Monitor Road	West	Hobart Road	Oak Street	Master	$335
Low	Hobart Road	North	1st Street	Monitor Road	Master	$578
Low	Hobart Road	South	1st Street	Lanham Lane	Master	$389
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	$338
High	Off-street path #2		Charles Avenue	Peach Street	Action	$262
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	$150
Med	Pedestrian Stairway Connection		Coolidge Park	Anderson Drive	Master	$60
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	$263
Med	Pedestrian Bridge		Cowing Street		Master	$80
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	$188

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Low	Pedestrian Bridge		Peach Street		Master	$80
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	$173
Low	Off-street path #7		Jefferson Street	Eska Way	Master	$48
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	$143
Low	Off-street path #9		Pine Street	Silver Creek	Master	$462
Low	Off-street path #10		Wilson Street	Monson Road	Master	$240
Low	Off-street path #11		Water Street	Rogers Lane	Master	$518
Low	Off-street path #12		McClaine Street	Railway Street	Master	$165
Low	Off-street path #13		Westfield Street	New local roadway	Master	$46
Low	Off-street path #14		West edge of West Side area	Main Street	Master	$285
Sidewalks on New Arterials/Collectors						
Westside Connector #2		North/South	Silverton Road	Main Street	Master	**
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	**
Northside Connector #5		East/West	James Street	2nd Street	Master	**
				Sidewalks on Existing Arterials and Collectors		$7,351
				Local Multi-Use Trail		$1,806
				*Pedestrian Crossing Improvements**		$142
				ADA Safety Audit and Annual Improvement Program		$330
				Total Pedestrian Action Plan Cost		**$3,679**
				Total Pedestrian Master Plan Cost		**$11,335**

Notes: *Pedestrian Crossing Improvement locations outlined in Pedestrian Plan (Chapter 5)
**Project costs are included in a Motor Vehicle Plan (Chapter 8)

Bicycle

The existing bike lane system on arterial and collector streets in Silverton does not provide adequate connections from neighborhoods to schools, parks, retail centers or downtown. Continuity and connectivity are key issues for bicyclists and the lack of facilities (or gaps) cause significant problems for bicyclists. Without connectivity of the bicycle system, this mode of travel is severely limited.

A Bicycle Master Plan (Figure 6-1) was developed based on these identified needs. The Bicycle Master Plan costs are estimated to be $6.9 million. The Bicycle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. The bicycle goals and input from the TAC were reviewed to create a Bicycle Action Plan, which includes high

priority projects that are reasonably expected to be funded by the year 2030. The Bicycle Master Plan and Action Plan project list is shown in Table 1-2.

Table 1-2: Bicycle Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Bike Lanes on Existing Arterials & Collectors						
High	1st Street	Both	Hobart Road	B Street	Action	$68
High	Oak Street	Both	Steelhammer Road	East City limits	Action	$255
High	North Water Street	Both	Brown Street	C Street	Action	$70
High	South Water Street	Both	Lane Street	Pioneer Drive	Action	$500
High	Pine Street	Both	West City limits	Brown Street	Action	$418
High	Silverton Road	Both	West City limits	Existing section	Action	$262
High	2nd Street	Both	Bow Tie Lane	Oak Street	Action	$5
Med	Oak Street	Both	Norway Street	Steelhammer Road	Master	$14
Med	Eureka Avenue	Both	Main Street	South City limits	Master	$645
Med	Main Street	Both	Westfield Street	Water Street	Master	$465
Med	Oak Street	Both	3rd Street	Church Street	Master	$192
Med	McClaine Street	Both	Existing section	Main Street	Master	$255
Med	Monitor Road	Both	Oak Street	Hobart Road	Master	$480
Med	Ike Mooney Road	Both	Pioneer Drive	East City limits	Master	$340
Med	Pioneer Drive	Both	South Water Street	Ike Mooney Road	Master	$36
Med	Evans Valley Road	Both	Steelhammer Road	East City limits	Master	$270
Med	Steelhammer Road	Both	Oak Street	Evans Valley Road	Master	$420
Low	2nd Street	Both	Hobart Road	Bow Tie Lane	Master	$287
Low	Brown Street***	Both	James Street	Pine Street	Master	$45
Low	James Street	Both	Hobart Road	Pine Street	Master	$600
Low	Hobart Road	Both	James Street	Monitor Road	Master	$825
Bike Lanes on New Arterials & Collectors						
Westside Connector #2		North/South	Silverton Road	Main Street	Master	*
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	*
Northside Connector #5		East/West	James Street	2nd Street	Master	*
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	**
High	Off-street path #2		Charles Avenue	Peach Street	Action	**
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	**
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	**
Med	Pedestrian Bridge		Cowing Street	Hobart Road	Master	**
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	**
Low	Pedestrian Bridge		Peach Street	Existing Church Street alignment	Master	**
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	**
Low	Off-street path #7		Jefferson Street	Eska Way	Master	**
Low	Off-street path #8		Lincoln Street	East side of Webb	Master	**

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
				Lake		
Low	Off-street path #9		Pine Street	Silver Creek	Master	**
Low	Off-street path #10		Wilson Street	Monson Road	Master	**
Low	Off-street path #11		Water Street	Rogers Lane	Master	**
Low	Off-street path #12		McClaine Street	Railway Street	Master	**
Low	Off-street path #13		Westfield Street	New local roadway	Master	**
Low	Off-street path #14		West edge of West Side area	Main Street	Master	**
Regional Bikeway						
Regional bikeway connection			Silverton City Limits	Stayton	Master	-
Regional bikeway connection			Silverton City Limits	Salem	Master	-
Regional bikeway connection			Silverton City Limits	Mt. Angel	Master	-
Regional bikeway connection			Silverton City Limits	Wayside Park	Master	-
Regional bikeway connection			Silverton City Limits	Reservoir	Master	-
Other Bicycle Projects						
Bicycle Route Signage (shared bicycle facilities)				Throughout Silverton	Master	$25
Bicycle Parking				Downtown locations and key destinations	Master	$20
				Bike Lanes on Existing Arterials & Collectors		$6,452
				Other Bicycle Projects		$45
				Total Bicycle Action Plan Cost		**$1,578**
				Total Bicycle Master Plan Cost		**$6,497**

Notes: *Project costs are included in the Motor Vehicle Plan (Chapter 8)
**Project costs are included in the Pedestrian Plan (Table 5-1)
***May consider providing bicycle facilities on parallel routes due to limited right-of-way

Transit

A number of strategies were identified for transit improvements in Silverton, including extended dial-a-ride services for the Silver Trolley, an express commuter connection to Salem, and transit amenities (e.g. park-and-ride lot). Coordination with local transit service providers will be required to implement these improvements. A need for improvements to the existing transit facilities was identified to support the future household and employment growth within the study area. Based on these needs, a Transit System Master Plan was created and is shown in Figure 7-1. A Transit Action Plan was developed to identify high priority projects that are reasonably expected to be funded by the year 2030. The Transit Master Plan and Action Plan project list is shown in Table 1-3.

Table 1-3: Transit Master Plan and Action Plan Projects

Priority	Project	Description	Plan	Cost ($1,000s)
High	Commuter Connection to Salem	Develop fixed route commuter connection to and from Salem. One new bus stop location will be added in downtown Silverton.	Action	$100/Year
High	Bus shelters	Install bus shelters at the two existing commuter	Action	$20

Priority	Project	Description	Plan	Cost ($1,000s)
		connections at Roth's Grocery Store and the Silver Falls Library		
High	Park-and-Ride Lot	Implement west-side park-and-ride lot to serve transit and carpool users. Specific location to be determined.	Action	$350
Medium	Bicycle Parking	Install secure bicycle parking at Park-and-Ride Lot	Master	$10
Medium	Dial-a-ride services	Enhance dial-a-ride services, including hours of operation and expanded service, and one additional vehicle.	Master	$52/Year
Low	Local Fixed Route Transit Feasibility Study	Future population growth will dictate when this project will occur (generally 25,000 people).	Master	$50
		Transit Action Plan Project Cost (for 23 years)		**$2,670**
		Transit Master Plan Project Cost (for 23 years)		**$3,926**

Motor Vehicle

A comprehensive evaluation of the 2030 motor vehicle needs for City streets and affected state highway facilities was performed to understand how well current plans will serve long-term growth within the City of Silverton. Several new projects were developed to maintain mobility standards or improve safety on city and state facilities. Without a significant investment in Transportation System Management (TSM), Travel Demand Management (TDM), and roadway improvements, several key facilities in the City would operate with congested conditions in the future.

The following sections summarize the recommended motor vehicle system plans that meet the demands of future growth and comply with local and regional planning requirements.

Transportation System Management (TSM)

Transportation System Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that are recommended for use in Silverton which include:

Neighborhood Traffic Management (NTM)

Silverton should consider traffic calming measures as appropriate and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Table 8-1 lists common NTM applications and suggests which devices may be supported by the Silverton Fire Department. Any NTM project should include coordination with emergency agency staff to assure public safety.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to individual properties. Proper implementation of access management techniques should guarantee reduced congestion, reduced accident rates, less need for

roadway widening, conservation of energy, and reduced air pollution.

Access management is the control or limiting of vehicular access on arterial and collector facilities to maintain the capacity of the facilities and preserve their functional integrity. Access management strives to strike a balance between maintaining the integrity of the facility and providing access to adjacent parcels. Numerous driveways can erode the capacity of arterial and collector roadways. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Numerous driveways or street intersections increase the number of conflicts and potential for collisions and decrease mobility and traffic flow. Silverton, like every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve access and mobility in Silverton:

- Work with land use development applications to consolidate driveways, provide crossover easements, and take access from lower class roads where feasible. Existing, non-conforming accesses would only be subject to review and revision upon site improvement or a land use application.
- Establish City access spacing standards for new developments and construction, including the prohibition of new single family residential access on arterials and collectors
- Access to arterial roadways should only be permitted for public roads. However, parcels must not be landlocked by access spacing policies.
- Establish City access spacing standards to prohibit the construction of access points within the influence area of intersections. The influence area is that area where queues of traffic commonly form on the approach to an intersection (typically within 150 feet). In a case where a project has less than 150 feet of frontage, the site would need to explore potential shared access, or if that were not practical, place driveways as far from the intersection as the frontage would allow (permitting for 5 feet from the property line). However, full access may not be permitted in these conditions (e.g. restriction to right-in/right-out access)
- Implement City access spacing standards for new construction on County facilities within the urban growth boundary
- Meet ODOT access requirements on State facilities
- Establish maximum access spacing standards to promote connectivity.

New development and roadway projects located on City street facilities should meet the recommended access spacing standards summarized in Table 1-4.

Table 1-4: Recommended Access Spacing Standards for City Street Facilities

Street Facility	Maximum spacing* of roadways	Minimum spacing* of roadways	Minimum spacing** of roadway to driveway***	Minimum Spacing* driveway to driveway***
Arterial	1,000 feet	500 feet	250 feet	250 feet or combine
Collector:	500 feet	250 feet	150 feet	150 feet or combine
Neighborhood/Local	500 feet	250 feet	10 feet	10 feet

Notes: * Measured centerline to centerline
** Measured near street curb to near driveway edge
*** Private access to arterial roadways shall only be granted through a requested variance of access spacing policies (which shall include an access management plan evaluation)

Traffic Signal Spacing

Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. A minimum traffic signal spacing of 1,000-feet should be required for arterial and collector facilities outside of the Special Transportation Area (STA). Different signal spacing standards may be applied to lower classifications of roadways. ODOT identifies ½ mile as the desirable spacing of signalized intersections on regional and statewide highways but recognizes that shorter signal spacing may be appropriate due to a number of factors including existing road layout and land use patterns. Signal spacing below these standards should be studied in detail to consider traffic signal coordination and the impacts of vehicle flow and queuing within the area.

Local Street Connectivity

Much of the local street network in Silverton is built but is not well connected. Multiple access opportunities for entering or exiting neighborhoods are limited. There are a number of locations where neighborhood traffic is funneled onto one single street. This type of street network results in out-of-direction travel for motorists and an imbalance of traffic volumes; both factors have impacts on residential frontage.

A Local Street Connectivity Plan is shown in Figure 8-1. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways should incorporate neighborhood traffic management into their design and construction. All stub streets should have signs indicating the potential for future connectivity.

Additionally, new development that constructs new streets, or street extensions, should meet the following connectivity standards:

- Provide full street connections with spacing of no more than 500 feet between connections except wbere prevented by barriers.
- Provide bike and pedestrian access ways with spacing of no more than 300 fcet except where prevented by barriers.
- Limit use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Include no close-end street longer than 200 feet or having no more than 10 dwelling units.
- Include street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits.

The arrows shown on Figure 8-1 indicate priority local and neighborhood connections only. Other stub end streets in the City's road network may become cul-de-sacs, extended cul-de-sacs or provide local connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac should be considered mandatory as future development occurs. The goal shall continue to be improved city connectivity for all modes of transportation.

Functional Classification

The proposed functional classification (shown in Figure 8-2) was developed following detailed review of the existing Silverton TSP and Marion County RTSP. The key changes include increasing the number of arterial roadways to create a connected network that serves regional trips at key gateways into the City, maintaining and updating the collector system to reflect changing land uses, and providing neighborhood routes that serve clear connections from neighborhoods and feed into the collector and arterial network.

Roadway Cross-Section Standards

The City of Silverton has current standards for street cross sections that apply citywide to residential, neighborhood, collector and minor arterial roadways. The TSP update includes several revisions and additions to the street cross-section standards. Arterial street cross sections have been designated for state highway segments both inside and outside of the Special Transportation Area (STA). Cross-sections were also added for a standard residential collector and alleyway. The local street cross-section was revised to include the option of either parking on both sides of the street with a 34-foot curb-to-curb width or parking on one side of the street with a 28-foot curb-to-curb width. The recommended roadway cross-sections are shown in Figures 8-3 through 8-5.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. Generally, TDM focuses on reducing vehicle miles traveled and promoting alternative modes of travel for large employers of an area.

Many of the TDM strategies are tailored towards urban applications, where there are major employment generators and transit opportunities. TDM measures for more rural communities require special development, as compared to those that are implemented in urban areas. TDM measures in rural environments should focus on increasing travel options and creating an environment that is supportive for walking and cycling. The most effective TDM measure for Silverton includes elements related to increased parking management (parking time limits and pricing) downtown, carpools, improved services for alternative modes of travel and employer incentives for the hospital schools and BrucePak.[1] The City of Silverton and Marion County shall coordinate to implement the pedestrian, bicycle, and transit system improvements, which offer alternative modes of travel.

Roadway Improvements

The extent and nature of the recommended street improvements for Silverton are significant. The forecasted 2030 land use indicates significant growth in both housing and employment within the TSP study area.

There are a number of locations in Silverton where, due to the lack of alternative routes, there is an imbalance of traffic volumes that load onto one street. A well connected transportation system limits out of direction travel for motorists, bicycles and pedestrians and reduces vehicle miles traveled within the study area. Roadway extension projects are needed to improve citywide connectivity for all modes of travel.

The 2030 analysis found that significant improvements would be required at the majority of the study intersections to accommodate the forecasted growth. These improvements include traffic signal control and the construction of additional turn lanes. Based on these needs, a Motor Vehicle Master Plan was created that is shown in Figure 8-10. The updated Motor Vehicle Master Plan costs are estimated to be $29.9 million. The Motor Vehicle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. In addition to the intersection improvements, three collector roadways were also identified as Master Plan projects that would enhance the circulation and connectivity throughout Silverton.

[1] TriMet Employer Commute Options (employer survey information available online: http://www.trimet.org/employers/ecosrvy.htm

Westside North-South Connector #2: This potential roadway provides a connection from Silverton Road to Main Street. As a stand-alone project, the amount of vehicles that would utilize the connection is limited. However, it would likely connect to North-South Connector #1 and North-South Connector #3 to provide a complete north-south connection that would provide access to the Oregon Garden and destinations both north and south of downtown. The proposed alignment will be along the south and west edge of the Silverton school district property and would accommodate west side access without requiring travel through the downtown area.

Eastside North-South Connector #4: This potential roadway provides a parallel route that connects Silverton on the eastside of downtown. The alignment will tie into Monitor Road at Oak Street and connect to Pioneer Drive to the south. Generally, the east-side connector relieved trips through downtown that have origins/destinations on the east and south sides of Silverton. The proposed roadway is expected to carry approximately 1,900 vehicles in the future year (2030). This connection was also identified in the 2000 TSP. A key issue with this connection is the project limits outside of the adopted Urban Growth Boundary (UGB). This portion of the project would need to go through a Goal Exception analysis consistent with State of Oregon statutes in order to be designated in the TSP for funding or carried forward to project implementation.

The proposed alignment of the connector crosses Evans Valley Road which is a likely location to break the construction of the connector into two phases: north of Evans Valley Road and south of Evans Valley Road. Phase 1 should be constructed first to connect the rapidly developing Pioneer neighborhood to Evans Valley Road, from there motor vehicle trips destined to Monitor Road or Highway 213 could be served by existing surface streets (until Phase 2, north of Evans Valley Road) is constructed.

Northside East-West Connector #5: This potential roadway connects James Street and 2nd Street south of Jefferson Street. The primary purpose of this roadway is to provide another connection north of C Street for trips destined on the east or west side of 1st Street (Hwy 214). The forecasted future daily volume on this roadway is approximately 900 vehicles. It does not have significant impacts on the adjacent intersections, although it does improve the connectivity and circulation north of downtown. A key issue with this roadway is the proposed railroad crossing. It is likely that ODOT Rail may not approve a new at-grade rail crossing within this City, and this connection would be required to be grade separated.

The motor vehicle goals and input from the TAC were reviewed to create a Motor Vehicle Action Plan, which are high priority projects that are reasonably expected to be funded by the year 2030. The collector roadways are not included in the Action Plan and are not expected to be funded over the next 20 years. The Motor Vehicle Master Plan and Action Plan projects are included in Table 1-5.

Table 1-5: Motor Vehicle Master Plan and Action Plan Projects

Location	Description	Plan	Cost ($1,000)
Intersection Improvements			
McClaine Street/Main Street	Install traffic signal and construct westbound right turn lane	Action	$600
1st Street (Hwy 214)/Hobart Road	Install traffic signal	Action	$250
Oak Street (Hwy 213)/2nd Street	Install traffic signal	Action	$250

Location	Description	Plan	Cost ($1,000)
Oak Street (Hwy 213)/Water Street	Install traffic signal	Action	$250
Oak Street(Hwy 213)/1st Street	Install traffic signal	Action	$250
1st Street (Hwy 214)/Lewis Street	Close the south leg of intersection	Action	$10
Main Street/1st Street	Install traffic signal	Action	$250
Main Street/1st Street	Construct an eastbound left turn lane	Action	$250
Main Street/Water Street	Install traffic signal	Action	$250
Main Street/Water Street	Construct a southbound right turn lane	Action	$250
Oak Street/2nd Street	Restrict eastbound and westbound left turns (signing)	Action	$5
C Street/McClaine Street	Construct southbound right turn lane	Action	$420
James Street/C Street**	Restrict northbound and southbound left turns	Action	-
Highway 213/Steelhammer Road	Construct left turn pocket with median treatment	Action	$250
Pioneer Drive/Evans Valley Road	Construct roundabout	Action	$750
Highway 213/Monitor Road	Construct roundabout	Action	$2,300
James Street/Pine Street	Install traffic signal and northbound and southbound turn lanes (may consider roundabout instead of traffic signal)	Master	$966
Arterial Corridor Improvements			
Brown Street Reroute	Upgrade Brown Street (From Water Street to Pine Street) and Pine Street (from Brown Street to James Street) to arterial standards and reroute traffic between Water Street and Pine Street via the new arterial link	Master	$2,185
Roadway Connections[2]			
Eastside North-South Connector #4 (Phase 1)	Construct north-south connector roadway from Pioneer Drive to Evans Valley Road	Action	$3,750
Westside North-South Connector #2	Construct north-south connector roadway from Silverton Road to Main Street	Master	$5,950
Eastside North-South Connector #4 (Phase 2)	Construct north-south connector roadway from Evans Valley Road to Highway 213	Master	$8,250
Northside East-West Connector #5	Construct east-west connector roadway from James Street to 2nd Street (south of Jefferson Street)	Master	$2,500
	Total Motor Vehicle Action Plan Project Cost		**$10,085**
	Total Motor Vehicle Master Plan Project Cost		**$29,936**

Note: *Project is located outside of current UGB. See footnote for related information.
**The turn restrictions at C Street/James Street should be implemented after the C Street/Water Street

[2] This table identifies anticipated future roadway extensions outside of the UGB. These facilities are included in the master plan, but they will be authorized by subsequent land use decisions. These roadways are needed to support long term transportation needs and represent logical extensions and connections to meet future needs. These alignments are generalized recommendations for connectivity and will be refined when future land use decisions, such as UGB amendments, are considered. Designation of these projects as planned facilities or improvements will require an amendment to the Marion County TSP and/or a UGB amendment.

traffic signal has been constructed.

Other Modes

While auto, transit, bicycle and pedestrian transportation modes are the primary means of travel in Silverton, other modes of transportation must be considered and addressed. Future needs for rail, air and water infrastructure are identified and summarized below.

Rail

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch rail line service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. The following existing and forecasted needs have been identified within the City of Silverton:

Rail/Highway Grade Crossing Improvements

Three crossings have been identified for crossing improvements. The following crossings are currently controlled by stop signs and should be upgraded to crossing gates, flashers and pedestrian path features:

- 1st Street (Hwy 214)/Hobart Road
- 1st Street (Hwy 214)/Jefferson Street
- James Street/C Street

Rail Facility Upgrade

The existing rail facility is only used for freight rail service, in the future passenger rail (tourist-oriented) and/or commuter rail options may be introduced. The existing rail system will require facility improvements to accommodate these additional rail uses, as well as further coordination with the Oregon Department of Transportation.

Future Potential Rail Station

If commuter and/or passenger rail is introduced within the City of Silverton a centrally located rail station will be required. A potential, future station location has been identified on the northeast corner of C Street/Water Street. Future development in that area should not preclude this location as a potential station site.

Air

One private airfield facility is located northwest of Silverton. There are currently no existing or planned public airports within the Silverton TSP study area. Commercial passenger service in Silverton is provided at the McNary Field Airport, approximately 20 miles west of Silverton in Salem and at the Portland International Airport, approximately 60 miles north of Silverton. No major changes are expected to occur in the 24 year planning horizon. As such, no policies or recommendations in this area of transportation are provided for Silverton.

Water

No waterways are used for commercial transportation purposes within the Silverton TSP study area. Silver Creek and surrounding park areas and trails are used for recreation and Silver Creek was identified as a potential location for a recreational trail. No plans were identified for waterway infrastructure expansion. As such, no policies or recommendations in this area of transportation are provided for

Silverton.

Pipeline

All existing pipelines within and passing through Silverton are outside of the maintenance responsibilities of the City. As such, no policies or recommendations in this area of transportation are provided for Silverton.

FUNDING

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through property tax levies, traffic impact fees and fronting improvements to land development.

Assuming the renewable funding sources outlined in Chapter 10, the City of Silverton will collect approximately $611,100 for transportation operations and maintenance and $430,578 for capital improvements each year. This revenue will be generated from the state (fuel taxes and license fees), the Urban Renewal Fund, System Development Charges, and other revenue sources. Total revenues to be collected over 23 years between 2007 and 2030 would be $24 million with current funding sources and projected population and employment growth.

Table 1-6: Summary of Current Revenues for Transportation

Funding Category	Funding Allocation	Estimated Revenues Through 2030	Annual Amount
New Development (not SDC)	Operations and Maintenance	$143,000	$6,200
State Fuel Apportionment & Vehicle License Fee	Operations and Maintenance	$8,406,000	$365,500
ODOT Fund Exchange	Operations and Maintenance	$2,056,000	$89,400
Transit Operations Grant	Operations and Maintenance	$3,450,000	$150,000
Urban Renewal Fund	Capital Improvements	$2,300,000	$100,000
System Development Charge	Capital Improvements	$7,603,300	$330,578
	Total O&M Revenues	**$14,055,000**	**$611,000**
	Total Capital Revenues	**$9,903,300**	**$430,578**

Note: The annual amount indicates average annual totals over the last four years.

Source: City of Silverton, Adopted Budget, Fiscal Years 2003-2004 through 2006-2007

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Transit, Bicycles, and Pedestrians total $24.2 million, and several other recommended transportation operations and maintenance programs would add $13.5 million for a total cost over 23 years of $37.6 million. This total exceeds the expected 23-year revenue estimate of $24 million (see Table 10-1) by approximately $13.6 million.

Table 1-7: Silverton Transportation Action Plans Costs over 23 years (2007 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$10,085
Roadway Reconstruction	$8,452
Bicycle	$1,578
Transit	$370
Pedestrian	$3,679
Total Capital Projects	**$24,164**
Operations and Maintenance Programs and Services	
Roadway Maintenance ($378,000 per year)	$8,693
Local Transit Operations ($150,000/yr)	$3,450
Gravel Street Paving ($58,000/yr)	$1,334
Total Operations and Maintenance Programs	**$$13,477**
23 YEAR TOTAL in 2007 Dollars	**$37,641**

It is recommended that the City consider establishing a transportation utility fee as the backbone of its operations and maintenance funding approach. Street utility fees can provide a stable source of dedicated revenue useable for transportation system operations and maintenance and/or capital construction. Rate revenues can also secure revenue bond debt if used to finance capital improvements. Transportation utilities can be formed by Council action, and billed through the City utility billing system (e.g. water bills).

The City should also review the Development Code to allow development exactions to fund TSP projects (Action Plan or Master Plan). An SDC update study is also recommended to re-calculate the growth share based on revised population estimates and generate additional revenue for capital improvement projects. In addition, the City should actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction. The estimated 23 year total estimate of funds that could be generated from a transportation utility fee and the enforcement of development exactions are shown in Table 1-8. These additional funds would be expected to generate sufficient revenues to fully fund the Action Plan projects and maintenance programs.

Table 1-8: Recommended New Funding Sources for Transportation Programs

Transportation Funding Source	Estimated Revenue ($1,000)
Transportation Utility Fee*	$10,060
Development Exactions	$2,200
SDC Update-Revised Growth Share (35%)	$1,360
20 YEAR TOTAL in 2004 Dollars	**$13,620**

Notes: * Assumes utility fee corresponding to $41 per capita per year (a typical single family household may be charged approximately $5 per month).

CHAPTER 2 : TRANSPORTATION POLICIES

These goals and policies have been developed to guide the City's twenty-year vision of transportation system needs. There are eight transportation goals with related policies organized under each goal. The goals and policies are not prioritized.

The goals are brief guiding statements that describe a desired result. The policies describe the actions needed to move the community toward the goal. To implement these policies there can be numerous actions, programs, projects and/or regulations. Some of these are existing activities while additional actions may need to be considered in the future to meet identified needs. Below some of the policies, italic text provides details of potential implementing actions. Some typical implementing actions include transportation improvement projects, ordinance provisions, Development Code regulations, and Public Works design standards.

GOALS AND POLICIES

Goal #1: Develop a transportation system to enhance Silverton's livability through proper location and design of multi-modal transportation facilities, including streets, sidewalks, bicycle lanes, trails, and transit.

Policies:

a) Streets and highways shall be designed to respect the characteristics of the surrounding land uses, natural features, and other community amenities.

b) The City shall strive to identify and address deficiencies with the existing transportation facilities.

c) As appropriate, the City shall require design plans, transportation impact analyses studies and/or other information to ensure that transportation facilities do not negatively impact aesthetic, environmental, functionality, safety and/or other factors that effect livability.

d) Consider noise impacts in the design, redesign, and reconstruction of arterial streets immediately adjacent to residential neighborhoods.

e) The City shall protect neighborhoods from excessive through traffic and travel speeds while providing reasonable access to and from residential areas. Streets shall be designed to minimize speeding.

f) The City shall develop and maintain street design standards and neighborhood traffic management criteria. These regulations will be used in the design of new development and addressing neighborhood traffic concerns.

Action: Develop neighborhood impact thresholds and mitigation plan requirements that utilize traffic calming policies.

g) The City shall ensure that parking is effectively regulated through the development, adoption, and implementation of off-street parking requirements for all uses outside of the downtown area.

h) Within the downtown area, parking shall be evaluated periodically to ensure that parking needs are adequately met.

i) On-street downtown parking shall be managed to promote customer use and discourage employee parking.

j) New development shall be reviewed to ensure that the streets minimize cut-through traffic on residential streets.

Goal #2: Create a balanced transportation system for all modes and reduce the number of trips by single occupant vehicles.

Policies:

a) The City shall implement street design standards that recognize the multi-purpose nature of the street right-of-way for utility, pedestrian, bicycle, truck, transit, and vehicle traffic.

b) The City shall strive to provide or ensure connectivity to each area of Silverton for all modes of travel (pedestrian, bicycle, and vehicles) focusing on access to schools, parks, employment and recreational areas.

c) The City shall promote neighborhood and local connections for all modes of travel to provide adequate circulation to, through, and between neighborhoods.

d) The City shall strive for the development of a pedestrian system of sidewalks and pathways to provide safe, attractive, efficient, and accessible routes that allows pedestrians to travel from residential areas to schools, parks, commercial areas and major employment centers (with new construction or reconstruction projects).Facilities shall be designed to consider direct/shortest-path walking routes.

e) All new streets shall be constructed with sidewalks. Bicycle lanes shall be constructed on arterial and collector streets as noted within the Silverton Transportation Plan (with new construction or reconstruction projects).

f) The City shall promote a bikeway system of on-street bike lanes, shared roadways, and multi-use paths that allows bicyclists to travel from residential areas to schools, parks, commercial areas and major employment centers.

g) The City shall support efforts to implement regional off-street connections between Silverton, surrounding communities, and the greater area.

h) The City shall continue to support efforts to expand transit services within the City of Silverton and to maintain and expand regional transit services to surrounding communities.

i) As population growth warrants, undertake a transit feasibility study to consider fixed-route transit service. In the meantime adopt street design standards that maintain transit vehicle mobility on key potential transit routes.

j) Support demand management programs such as park-and-ride lots, van pools, and car pools to reduce single-occupancy auto trips.

k) Consider other actions to support multi-modal transportation.

Goal #3: Improve the safety of the transportation system.

Policies:

a) The City shall strive to improve traffic safety through a comprehensive program of engineering, education, and enforcement.

b) Where on-street pedestrian and bicycle facilities cannot reasonably be provided on highways and arterials, the City shall identify parallel routes that comply with state and city planning and design standards.

c) The City shall enhance safety by prioritizing and improving high accident locations within the City.

d) The City shall work with other agencies (e.g. ODOT, Marion County, etc) to review information and conditions in an effort to remedy safety issues.

e) The City shall work with area schools and the community to ensure that there are safe pedestrian, bicycle and bus routes to schools and work to communicate these routes to the community.

Action: The City shall work with area schools and the community in developing safe pedestrian, bicycle and bus routes to schools. Communicate selected safe school route program to community. Improvement projects near schools shall consider school access and safety during project development.

f) Enhance pedestrian safety by filling network gaps to provide continuous pedestrian facilities.

g) The City shall develop and maintain access management standards for streets, consistent with the City, County, and State standards, to reduce conflicts between vehicles and trucks, and between vehicles and bicycles and pedestrians.

h) The City shall ensure that adequate primary and secondary access for emergency services vehicles is provided throughout the City.

Action: Develop traffic calming standards based on functional classification to preserve response routes.

i) The City shall meet federal and state safety standards for rail crossings.

j) The City shall comply with safe routing of hazardous materials consistent witb federal guidelines.

Action: Work with federal agencies, the Public Utility Commission, the Oregon Department of Environmental Quality, public safety providers, and ODOT to assure consistent routes, laws, and regulations for the transport of hazardous materials.

Goal #4: Develop an efficient transportation system that will handle future traffic growth.

Policies:

a) The City shall designate roadway functional classifications that reflect the desired function and characteristics of different roadways, including access management policies.

Action: Maintain a functional classification system that meets the City's needs and respects the needs of other agencies including, but not limited to, Marion County and ODOT.

b) Land use development standards shall consider impacts on transportation facilities, reduce travel demand, and encourage all modes of transportation.

c) Capital improvement projects shall be designed to serve travel demands consistent with the forecast year of the current Transportation System Plan or a 20-year horizon, whichever is greater.

d) The City shall encourage development that effectively mixes land uses to reduce reliance on vehicles.

e) The City shall assist in maintaining acceptable levels of service on state roads consistent with the Oregon Transportation Plan. Where appropriate, the City shall support reducing traffic congestion and enhancing traffic flow through such measures as intersection improvements, intelligent transportation systems, signal synchronization, and other similar measures.

f) The City shall implement performance standards for use in evaluating new development proposals.

Action: City performance standards shall be used to evaluate developments impacting City or County facilities. The level of service standard shall be LOS D based on the Highway Capacity Manual methodology and a v/c ratio of 0.85 for signalized and all-way stop controlled intersections. For unsignalized intersection, the level of service standard shall be LOS D based on the Highway Capacity Manual and a v/c ratio of 0.90. ODOT v/c ratio standards shall apply to ODOT facilities.

Within the downtown core area, including:

- *Main Street/Oak Street*
- *Water Street/Oak Street*
- *1st Street/Oak Street*
- *Water Street/Main Street*
- *1st Street/Main Street*
- *Main Street/McClaine Street*
- *2nd Street/Oak Street*
- *Lewis Street/1st Street*
- *Lewis Street/Water Street*

- *Main Street/2nd Street*

Intersections must be analyzed using microsimulation software (e.g. Synchro/SimTraffic) as a system. The simulated intersection delay must not exceed 55 seconds at any of the aforementioned intersections

g) The City shall review comprehensive plan amendments and zone changes for their impacts on transportation facilities. Proposals that are determined to have an impact shall be required to demonstrate that the proposed changes will not significantly affect the transportation system and are consistent with the identified function, capacity, and performance standards of the transportation facility.

Goal #5: Provide a transportation system that is accessible to all members of the community.

Policies:

a) The City shall require all new transportation facilities be constructed to meet the requirements of the Americans with Disabilities Act (ADA).

b) Existing transportation facilities that do not meet tbe ADA standards shall be retrofitted when improvements are being made to that facility or through City transportation improvement projects.

c) The City shall support services to respond to the needs of all groups of transportation system users, including disadvantaged[3] individuals.

d) The City shall develop a plan to upgrade existing public facilities that are non-compliant with accessibility standards.

Goal #6: Develop a transportation system to provide for efficient freight movement.

Policies:

a) The City shall recognize designated truck routes and the need for highway access as essential for efficient movement of goods and these facilities and adjaeent land uses shall be designed to reflect the needs of freight movement.

b) The City shall consider the impact of railroad facilities on land use decisions.

c) The City shall consider utilization of appropriate controls for all railroad crossings.

d) As part of future roadway improvements, the City shall eonsider impacts to pipeline facilities.

Goal #7: Create a funding system to implement the recommended transportation system improvement projects.

Policies:

a) The City shall coordinate with ODOT and other jurisdictions to develop a long-range financial strategy to make needed improvements to the transportation system and support operational and maintenance requirements.

Action: The financial strategy should consider the appropriate elements. View the process of improving the transportation system as that of a partnership between the public (through fees and taxes) and private sectors (through exactions and conditions of development approval), each of which has appropriate roles in the financing of these improvements to meet present and projected needs.

b) The City shall seek adequate funding for maintenance of transportation facilities, including consideration of alternate funding opportunities.

Action: Develop a long-term financing program that provides a stable source of funds to ensure cost-effective maintenance of transportation facilities and efficient effective use of public funds.

c) The City shall maintain a funding program that requires development to pay for its fair share of transportation improvements as well as mitigate for impacts to the transportation system so that there are no reductions in the level of service, functionality or carrying capacity.

d) The City shall establish rights-of-way at the time of site development and to officially secure them by dedication of property.

e) The City shall monitor and update the Transportation System Plan so that issues and opportunities are addressed in a timely manner.

f) The City shall prepare and maintain a current capital improvement program that establishes the City's construction and improvement priorities, and allocate the appropriate level of funding.

Goal #8: Develop a transportation system that is consistent with the adopted plans of the state, local, and regional jurisdictions.

Policies:

a) The City shall coordinate with the Oregon Department of Transportation (ODOT) and other governmental agencies to improve and maintain Highway 213 and Highway 214 consistent with the *Oregon Highway Plan* (OHP); including participation on ODOT project development teams for improvements that affect the City.

b) The City shall cooperate with surrounding counties (Marion County, Linn County, etc.) to maintain and improve county roads consistent with each County's Transportation System Plan.

c) The City shall notify ODOT, DLCD, Marion County, and other governmental agencies that rely on the transportation system when changes are proposed to the Silverton Transportation System Plan.

d) The City shall participate with the Mid-Willamette Valley Area Commission on Transportation (MWACT) and identify opportunities for enhanced coordination and assistance with City projects.

e) The City shall identify an elected official to join and participate in the Mid-Willamette Valley Area Commission on Transportation (MWACT).

CHAPTER 3 : EXISTING CONDITIONS

This chapter presents the existing condition of the transportation network in the Silverton transportation system plan (TSP) study area. The purpose of this chapter is to document existing transportation facilities in the study area. The findings will provide the basis for determining the existing transportation needs and developing future transportation projects within the study area.

OVERVIEW

Existing transportation conditions were evaluated as part of the City of Silverton TSP Update. An analysis of current conditions provides an understanding of facility development, service and performance. This chapter summarizes existing transportation operation in the City for all travel modes including pedestrians, bicycles, transit, motor vehicles, freight, water and air, as applicable. To understand existing travel patterns and conditions, multiple aspects of the City's transportation system were considered. An inventory was conducted in the fall of 2006 to establish base year conditions for the TSP. Much of this data provides a basis of comparison for future assessment of transportation performance in Silverton relative to desired policies.

The study area includes the City of Silverton and the surrounding transportation system network. The study area for this TSP update is shown in Figure 3-1.

Twenty-one intersections within the study area were selected for focused operational analysis. Data was gathered at these locations to evaluate traffic conditions including vehicle delays and levels of service. The following sections review the existing transportation systems including pedestrian, bicycle, transit, motor vehicle and other modes (such as heavy vehicle, rail, water, etc.) and their performance within the City.

Figure 3-1: Study Area

PEDESTRIANS

Facilities

Creating a safe, convenient pedestrian system includes a variety of different components. Generally, interconnected sidewalk facilities on both sides of the street on all arterials and collectors is desirable, as well as safe convenient on or off street connections to all major pedestrian generators, such as schools, parks, and retail centers. Street lighting and pedestrian crossing facilities also make up the pedestrian environment.

The existing sidewalk inventory was obtained from existing data compiled by the City of Silverton combined with a limited field inventory. Sidewalks are generally present on both sides of the street in the central downtown area, but further from the city center the arterial and collector streets only have intermittent sidewalks. In many cases, sidewalks are provided on one side of the street only, preventing continuity and a convenient safe path to the pedestrian generators within the City. The railroad and Silver Creek also present barriers to pedestrian connectivity from the areas north and west of downtown. Figure 3-2 shows the existing sidewalk inventory within the City of Silverton.

Activity Levels

Pedestrian counts were conducted during the PM peak hour at the study intersections. These counts represent a sample of the existing pedestrian activity based on one evening peak period. Pedestrian activity is influenced by factors such as time of year and weather conditions; variations would be expected with data collection over time based on these factors. Generally, the proximity to adjacent land uses (i.e. schools, parks, commercial developments) are the most significant predictors of pedestrians and thus represent key areas for sidewalk placement and connectivity.

Pedestrian crossing volumes at the study intersections were counted during the weekday vehicular PM peak hours and have been provided in Table 3-1. This table represents volumes collected during a peak period (4:00-6:00 p.m.) that cross all four (or three as applicable) legs of the intersection. Although, the vehicular peak period occurs from 4 to 5 PM, some areas, especially those near schools, see higher pedestrian volumes earlier in the day. Pedestrian crossing volumes are shown in Table 3-1.

Table 3-1: Pedestrian Crossing Volumes (PM Peak Period 4:00-6:00)

Intersection	Pedestrian Crossing Volume
Oak Street (Hwy 213)/Steelhammer Road	0
Oak Street (Hwy 213)/Monitor Road	0
Oak Street (Hwy 213)/1st St (Hwy 214)	77
Oak Street (Hwy 213)/2nd Street	47
Oak Street(Hwy 213)/Water Street	267
1st Street (Hwy 214)/C Street	25
1st Street (Hwy 214)/Hobart Street	2
1st Street (Hwy 214)/Main Street	114
1st Street/Lewis Street	46
Water Street/Lewis Street	67
Water Street (Hwy 214)/Main Street	94
Water Street (Hwy 214)/Pioneer Drive	1
Water Street (Hwy 214)/Park Street	4
Water Street/C Street	37
Front Street/C Street	42
McClaine Street/Main Street	16
Westfield Street/Main Street	0
C Street/McClaine Street	23
C Street/James Street	74
James Street/Pine Street	44
James Street/Water Street	50

The highest pedestrian volumes were observed at Oak Street (Hwy 213) and Water Street, with 267 PM peak period crossings. Typically, most significant pedestrian movements occur near retail, recreational, and educational facilities. This trend is present in Silverton, as the table shows significant pedestrian volumes near the downtown core and near the schools along James Street, Water Street, and Church Street.

Existing Issues

- *Lack of connectivity of sidewalk network to retail centers/schools/downtown-specifically residential developments to the east and west of downtown*
- *Lack of pedestrian crossing enhancements at uncontrolled or high volume locations*
- *Significant barriers to pedestrian connectivity (e.g. railroad and Silver Creek)*

Figure 3-2: Existing Pedestrian Facilities

BICYCLES

Facilities

The arterial and collector roadway system within the study area has intermittent bicycle facilities. Striped bike lanes are present along C Street, Westfield Avenue and sections of Main Street. This interconnected series of bike lanes provides an adequate connection from north of downtown to the west portion of Silverton. Additional striped bicycle lanes are present on Oak Street (Hwy 213) east of Steelhammer Road on one side of the street as well as portions of South Water Street (Hwy 214) near Pioneer Drive where the bike lanes were added with new development. Many arterial and collector streets do not have striped bike lanes but have wide shoulders that facilitate bicycles sharing the road with motor vehicles. The existing bike routes were built according to the bicycle system plan in the Silverton TSP. Figure 3-3 illustrates the existing bicycle facilities within the City of Silverton.

Activity Levels

Bicycle counts were conducted during the weekday evening peak period (4:00 to 6:00 PM) at the study intersections in Silverton and are shown in Table 3-2. Volumes were highest along C Street, downtown and near the schools on James Street, Water Street, and Church Street.

Table 3-2: Bicycle Crossing Volume (Weekday PM Peak Period 4:00-6:00)

Intersection	East/West Bike Volume	North/South Bike Volume
Oak Street (Hwy 213)/Steelhammer Road	0	0
Oak Street (Hwy 213)/Monitor Road	0	0
Oak Street (Hwy 213)/1st St (Hwy 214)	4	2
Oak Street (Hwy 213)/2nd Street	2	2
Oak Street(Hwy 213)/Water Street	10	2
1st Street (Hwy 214)/C Street	8	4
1st Street (Hwy 214)/Hobart Street	1	2
1st Street (Hwy 214)/Main Street	0	5
1st Street(Hwy 214)/Lewis Street	4	1
Water Street(Hwy 214)/Lewis Street	2	1
Water Street (Hwy 214)/Main Street	0	0
Water Street (Hwy 214)/Pioneer Drive	0	0
Water Street (Hwy 214)/Park Street	0	0
Water Street/C Street	9	5
Front Street/C Street	0	0
McClaine Street/Main Street	1	0
Westfield Street/Main Street	0	0
C Street/McClaine Street	2	0
C Street/James Street	0	3
James Street/Pine Street	6	5
James Street/Water Street	5	4

Existing Issues

- *Lack of bicycle parking*
- *Lack of off-street bike path*
- *No signed/marked bikeways or bicycle routes*
- *Lack of a complete, connected bicycle feeder system into downtown*

Figure 3-3: Existing Bicycle Facilities

TRANSIT

Facilities

The existing transit service within the City of Silverton is limited to one regional service provider and four demand-responsive dial-a-ride services.

Chemeketa Area Regional Transportation System (CARTS) provides a weekday fixed-route public transit service to Gates, Gervais, Aumsville, Silverton, Woodburn, Mt. Angel, Hubbard and Salem. CARTS operates North County routes that provide a total of 6 stops per day in Silverton at Roth's Family Market, Riteaid/Safeway and Downtown. The hours of operation are 6:00 AM to 5:00 PM. This route connects to Cherriots, the primary public transportation service in Salem. In addition to the fixed-route service, CARTS provides Dial-a-Ride service throughout the rural areas of Marion County. Clients may call one day or two weeks ahead and schedule curb-to-curb transportation service.

The City of Silverton owns and operates the Silver Trolley, which provides limited general public transportation services. The trolley operates as a dial-a-ride service on weekdays between 8:30 AM and 3:30 PM. The recommended donation is $1.00 per ride; however no one is turned away for lack of payment.

Wheels Community Transportation provides service for elderly citizens in need of transportation for medical appointments, employment, education purposes and nutritional shopping. Non-emergency medical transportation to Portland and other nearby communities is provided on a space available basis. Reservations for the dial-a-ride service must be made in advance; service is provided on weekdays from 7:00 AM to 5:30 PM.

The Silverton Hospital also provides medical transportation transit services for seniors over the age of 55 and disabled citizens. Seniors Plus is a service that provides medical transportation to Silverton Hospital and Silverton Hospital medical staff offices between the hours of 8:30 AM and 4:30 PM.

Existing Issues

- *Lack of regional connections to major employment areas (e.g. Salem)*
- *Lack of local service for citizens within the community that do not have automobile access, including senior citizens, disabled and youth*
- *Limited connections to other provider's services*

MOTOR VEHICLES

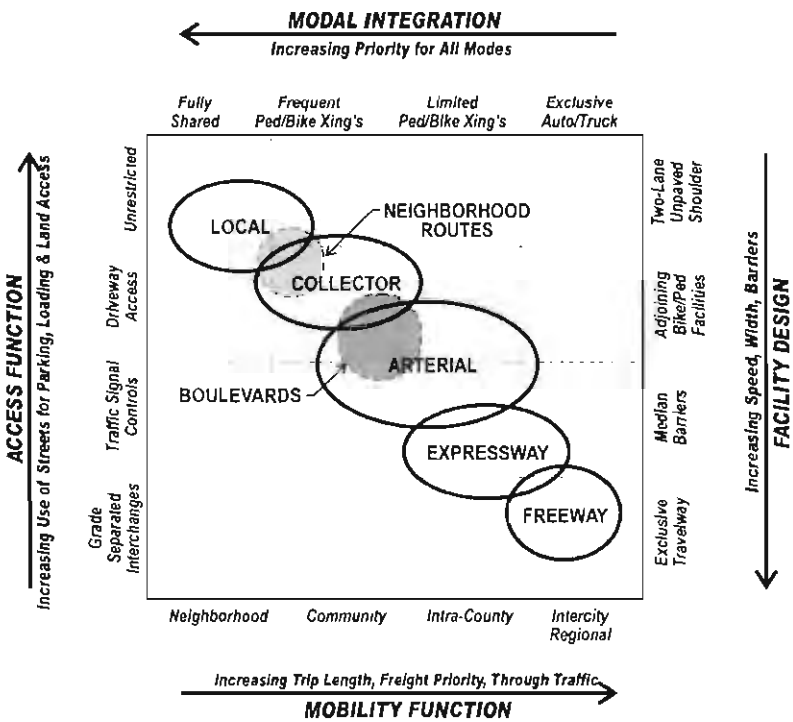
The motor vehicle system within the City of Silverton includes city streets, county roadways, and state highways. The following section describes the current system and how it functions.

Functional Classification

Functional classification is the grouping of roadways by the character of service they provide. The functional classification system is designed to serve transportation needs within the community. The schematic diagram below shows the competing functional nature of roadway facilities as it relates to access, mobility, multi-modal transport, and facility design. The diagram is useful to understand how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for non-motor vehicle modes (top axis) is decreased accordingly. Similarly, as access increases (left axis); the facility design (right axis) dictates slower speeds, narrower roadways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these four competing objectives.

The diagram shows that as street classes progress from local to freeway the following occurs:

- Mobility Increases – Longer trips between destinations, greater proportion of freight traffic movement, and a higher proportion of through traffic.
- Integration of Pedestrian and Bicycle Decreases – Provisions for sidewalks and bike facilities are required up through the arterial class, however, the frequency of intersection or mid-block crossings for non-motorized vehicles steadily decreases with higher functional classes. The expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway and crossings are grade-separated to enhance mobility and safety.
- Access Decreases – The shared uses for parking, loading, and direct land access is reduced. This occurs through parking regulation, access control and spacing standards (see opposite axis).



- Facility Design Standards Increase – Roadway design standards require increasingly wider, faster facilities leading to exclusive travel ways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders.

Two additional areas are noted on the diagram for **Neighborhood Routes** and **Boulevards** that span two conventional street classes.

The existing functional classifications from the 1999 Silverton Transportation System Plan are shown in Figure 3-4. Four categories were identified including: arterial roadways, collector streets, neighborhood collector streets, and local streets.

The *Oregon Highway Plan* identifies Highway 213 and Highway 214 as District Highways. District highways often function as county and city arterials or collectors and provide connections between small urbanized areas, rural centers and urban hubs, while also serving local access and traffic. The management objective for District highways is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas and moderate to low-speed operation for traffic flow and pedestrian/bicycle movements in urban areas.

This TSP update should address the limitations of the existing functional class and establish a system that meets City needs and addresses regional issues. A functional class system based primarily on connectivity would allow the design flexibility to handle each of the issues identified above.

Roadway Jurisdiction

Roadway ownership and maintenance responsibilities of the various roads in the TSP study area are identified in Figure 3-5. Generally, arterial and collector roadways on the outskirts of the Silverton city limits are under the jurisdiction of Marion County. The City is responsible for the remainder of the roads within the city limits with the exception of Highway 213 and Highway 214 which fall under the jurisdiction of the Oregon Department of Transportation (ODOT). Within the City there are also designated private roadways; on these roadways it is the owner's responsibility for roadway maintenance and improvement.

Access Management Standards

The ODOT access management standards, as defined in OAR 734-051, call for minimum distances between access points on the same side of District Highways. Access management benefits typically include improved traffic flow, fewer vehicle conflicts, and reduced collisions. The standards vary depending on posted speed on the roadway, as shown in Table 3-3.

Table 3-3: ODOT Access Management Standards

	Posted Speed (MPH)				
Facility	**55 or greater**	**50**	**40,45**	**30,35**	**20 or less**
District Highway (feet)	700	550	500	350	350

Source: Oregon Highway Plan 1999

Marion County also identified access management standards in the Marion County Transportation System Plan. The standards are outlined in Table 3-4.

Table 3-4: Marion County Access Management Standards

Functional Class	Access Spacing Requirements
Arterial	500' from any intersection with a state highway, arterial or major collector
	400' from any other intersection (including private access)
Major Collector	400' from any intersection with an arterial or state highway
	300' from any other intersection (including a private access)
Minor Collector	300' from any intersection with an arterial or state highway
	150' from any other intersection (including a private access)
Local Street	200' from any intersection with an arterial or state highway
	100' from any intersection with a major collector, minor collector, or local road
	50' from any intersection with a private access

Source: Marion County RTSP, 2005

Special access management strategies for Silverton Road and north Highway 214 are recommended in the existing Silverton TSP that are consistent with Marion County and ODOT access spacing standards. The TSP recommends that ODOT access spacing standards be reviewed on a case by case basis for the south section of Highway 214 (South Water Street), and the east section of Highway 213 (Oak Street) for new development or redevelopment. On local City streets and on County roadways within the City, access spacing standards are recommended and shown in Table 3-5.

Table 3-5: City of Silverton Access Management Standards

	Minimum Access Spacing between Streets or Driveways (centerline to centerline)	Signal Spacing
Arterial	400 feet +/- 20% (existing developed areas)	½ mile
Collector	150 feet +/- 20 % (existing developed areas)	¼ mile

Source: City of Silverton TSP, 1999

Figure 3-4: Existing Functional Classification

Figure 3-5: Existing Roadway Jurisdiction

ROADWAY CHARACTERISTICS

A field inventory was conducted to determine existing characteristics of collectors and arterials within the TSP study area. Data collected included posted speed limits, roadway lanes and intersection controls. These characteristics define roadway capacity and operating speeds through the street system, which affects travel path choices for drivers in Silverton.

Pavement Conditions

Figure 3-6 depicts the general pavement conditions of the roadways within the City of Silverton and an existing inventory of gravel streets. Pavement conditions were classified into the following three categories, including: good-fair, fair-poor, very poor. Generally most street segments were good-fair or fair-poor with the exception of the following five street segments that were identified as very poor and in need of improvement including:

- Adams Street (Water Street to the end of the road)
- Welch Street (Westfield Street to Main Street)
- Hazel Street (Keene Avenue to Ross Avenue)
- Chester Street (2nd Street to Mill Street)
- North Second Street (Whittier Street to Lincoln Street)

Several gravel street segments have been identified by the City as priority streets; these streets have through traffic, are mostly developed and are longer than two lots. This type of use makes them more of a priority for City participation in their improvement. The priority gravel streets include:

- Brooks Street
- Hill Street
- Lane Street
- Park Street
- Rock Street
- Short Street
- North 3rd Street
- Wall Street
- Wilson Street
- Olson Road
- Elm Street
- Meade Street
- Ord Street
- Sherman Street
- Willow Street

Vehicle Speeds

Figure 3-7 shows an inventory of the posted speeds in Silverton. The majority of streets within the City have posted speed limits of 25 miles per hour (mph) or are not posted and assumed to be 25 mph. Arterial roadways outside of the central grid have higher speeds, ranging from 35 mph to 45 mph. The highest posted speed limit within the study area is on Highway 214 near Hobart Road. The speed limit decreases towards the City to 25 mph at C Street.

Roadway Cross-section

The number of travel lanes on key roadways in Silverton is shown in Figure 3-7. The majority of the roadways in Silverton are two-lane facilities. The exceptions are Highway 214 north of the downtown, which has a center turn-lane for an extended section, McClaine Street between C Street and Fossholm Road, and Westfield Street from McClaine Street to West Center Street. The remaining roads in Silverton are two-lane roadways.

Additionally, there is a couplet downtown between C Street and Lewis Street. Water Street (southbound) and First Street (northbound) are one-way facilities.

Figure 3-6: Existing Pavement Conditions

Figure 3-7: Vehicle Speed Limits

Intersection Control

The only traffic signal located within the urban growth boundary is at the intersection of C Street and McClaine Street. Other intersection controls (stop signs or flashing lights) are depicted at all of the study area intersection in Figure 3-8.

On-Street Parking

On-street parking is concentrated in downtown Silverton. Most of the streets in the downtown network have parking on both sides of the street. Parking meters are located along segments of High Street, Oak Street, Main Street, Water Street, First Street and Lewis Street in the downtown core area. Outside of downtown, there is limited on-street parking along arterials and collectors, generally on one side of the street. The existing on-street parking inventory is shown in Figure 3-9.

Emergency Response Routes

The primary emergency response routes include the major arterial street system exiting each quadrant. These arterial routes include South Water Street to the south, Cascade Highway to the east, Highway 214 to the north, and Silverton Road and West Main Street to the west. There are three critical creek crossings at Main Street, C Street, and James Street.

Figure 3-8: Intersection Control

Figure 3-9: Existing Parking Inventory

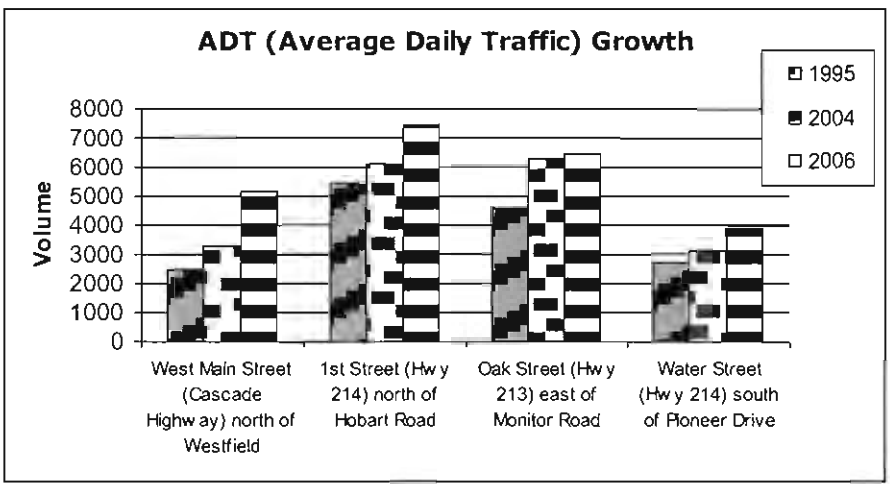
MOTOR VEHICLE VOLUMES

The average daily traffic (ADT) volumes were surveyed in the fall of 2006 at eight different locations in the City of Silverton over a 24-hour period to determine existing daily traffic volumes by direction. The count locations included:

- Highway 213 west of C Street
- Highway 213 east of Monitor Road
- Highway 214 north of Pioneer Drive
- Highway 214 north of Hobart Road
- Cascade Highway south of Westfield Street
- Pine Street west of Grant Street
- Eureka Avenue west of Woodland Drive
- Steelhammer Road south of Reserve Street

Other ADT volumes were estimated based on PM peak hour counts and the assumption that the PM peak hour is approximately 11% of the daily traffic volumes[4]. Typically, PM peak hour traffic is between 8 and 12 percent of daily traffic. The average daily traffic volumes are shown in Figure 3-10.

Historic average daily traffic (ADT) counts were also obtained from a database maintained by Marion County to compare general daily volume growth within the City of Silverton. The historical ADT counts were analyzed from 1994-2002 at several locations, primarily on the outer edges of the City. The percentage of growth over the eight year time period ranged from 7% to 26%, with each entrance/exit to Silverton experiencing an average growth of about 14%. The highest percentage of growth was on Main Street, southwest of the downtown grid with 24% growth and further south along Cascade Highway (an extension of West Main Street) with a growth of 26% over the specified time frame. The lowest percentage of growth was found north of Silverton on Hobart Road, east and west of Highway 214. The growth trends are shown at select locations within the City of Silverton in the figure below.



[4] Five different locations with current ADT counts and turn movement counts were evaluated and averaged to determine the 11% value including: C Street/McClaine Street, Monitor Road/Oak Street (Hwy 213), Pioneer Street/Water Street (Hwy 214), Hobart Road/1st Street (Hwy 214), and Westfield Street/Cascade Hwy

PM peak hour traffic turn movement counts were collected for all of the study area intersections. New counts were conducted at several intersections in September 2006 during the PM peak hour (4:00 – 6:00 PM). The count locations included:

- C Street/McClaine Street
- Highway 213/Steelhammer Road
- Highway 213/Monitor Road
- Highway 214/Pioneer Drive
- James Street/Water Street
- James Street/Pine Street
- Westfield Street/Main Street
- C Street/James Street

The remaining study area intersection turn movement counts were provided by the Oregon Department of Transportation (ODOT) over the same PM time period. These counts were used to provide a basis for analyzing existing problem areas as well as establishing a base condition for future comparisons. Generally, the PM peak occurred between 4:45 and 5:45 PM, with some intersections exhibiting variations.

Figure 3-10: Existing Average Daily Traffic (ADT) Volumes

TRAFFIC OPERATIONS

Definition of Traffic Levels of Service

Level of Service (LOS) is used as a measure of effectiveness for intersection operation. It is similar to a "report card" rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where demand has exceeded capacity. This condition is typically evident in long queues and delays.

The unsignalized intersection level of service calculation evaluates each movement separately to identify problems (typically left turns from side streets). The calculation is based on the average total delay per vehicle for stop-controlled movements (typically on the minor side street or left turn movements). Level of service (LOS) F indicates that there are insufficient gaps of suitable size to allow minor street traffic to safely enter or cross the major street. This is generally evident by long delays and queuing on the minor street. Level of service F may also result in more aggressive driving, with side street vehicles accepting shorter gaps. It should be noted that the major street traffic moves without delay and the LOS F is for side-street or left turns, which may be only a small percentage of the total intersection volume. It is for these reasons that level of service results must be interpreted differently for signalized and unsignalized locations. A summary of the descriptions for level of service will be provided in the TSP technical appendix.

The volume to capacity ratio (v/c) is used as a measure of effectiveness for signalized and unsignalized intersection operation. The v/c calculated by dividing the volume entering the intersection by the total capacity (maximum volume the intersection could serve). The v/c describes the amount of intersection capacity that is utilized by the volume. A v/c of 1.0 suggests there is no available capacity at that intersection and not one more vehicle could be accommodated.

ODOT Standard — ODOT operating standards[5] for District Highways inside a UGB call for the maximum volume to capacity ratio for peak hour operating conditions to vary depending on speed, as shown in Table 3-6.

Marion County Standard— Marion County operating standards for unsignalized intersections is level of service E. For signalized intersections, the standard is level of service D with v/c ratio 0.85.

Table 3-6: ODOT Operating Standards

Posted Speed (MPH)	>=45	40	<=35	STA
Volume to Capacity Ratio (v/c)	0.80	0.85	0.90	0.95

No standards for traffic operations are included in the City of Silverton TSP or Comprehensive Plan, although generally level of service D or better is used for both signalized and unsignalized intersections.

[5] *1999 Oregon Highway Plan - Amendment*, Oregon Department of Transportation, July 2005.

Existing Operating Conditions

The PM peak hour intersection counts were used to determine the existing level of service based on the *2000 Highway Capacity Manual* methodology. Traffic counts and level of service calculation sheets are provided in the TSP appendix. Table 3-7 summarizes the existing weekday PM peak hour study intersection operation conditions.

Table 3-7: Existing Weekday Intersection Level of Service (PM Peak Hour)

Intersection	LOS	Delay (sec)	V/C	Jurisdiction	Standard Met
Signalized Intersection					
C Street/McClaine Street	B	21.0	0.75	Marion County	Yes
All-Way Stop Intersection					
James Street/Pine Street	B	11.0	0.48	Silverton	Yes
James Street/Water Street	B	10.3	0.46	Silverton	Yes
Oak St(Hwy 213)/1st Street (Hwy 214)	B	11.3	0.42	ODOT	Yes
1st Street(Hwy214)/Main Street	B	12.0	0.52	ODOT	Yes
Water Street/Main Street	C	18.1	0.68	ODOT	Yes
Oak Street(Hwy 213)/Water Street	B	11.7	0.45	ODOT	Yes
McClaine Street/Main Street	C	17.9	0.77	Silverton	Yes
1st Street(Hwy214)/C Street	D[6]	26.0	0.86	ODOT	No
Unsignalized Intersection					
Westfield Street/Main Street	A/A	9.6	0.12	Marion County	Yes
Oak St(Hwy 213)/Steelhammer Road	A/B	13.3	0.10	ODOT	Yes
Oak St(Hwy 213)/Monitor Road	A/C	16.2	0.10	ODOT	Yes
1st Street(Hwy214)/Pioneer Drive	A/A	9.2	0.05	ODOT	Yes
1st Street(Hwy214)/Hobart Street	A/C	16.4	0.23	ODOT	Yes
Oak St(Hwy 213)/2nd Street	A/E	37.0	0.29	ODOT	Yes
1st Street(Hwy 214)/Lewis Street	A/C	24.5	0.27	ODOT	Yes
Water Street/Lewis Street	A/A	9.2	0.06	ODOT	Yes
Front Street/C Street	A/D	34.1	0.10	Marion County	Yes
Water Street/Park Street	A/B	10.6	0.04	ODOT	Yes
Water Street/C Street	A/F	>80	0.78	Marion County	No
James Street/C Street	A/C	24.4	0.21	Marion County	Yes

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay

The intersections at 1st Street (Hwy 214)/C Street and Water Street /C Street do not meet the jurisdictional operation standards under existing conditions. Traffic signals for these two intersections are being designed.

[6] Due to queuing impacts from 1st Street/Water Street this unsignalized intersections fails to meet operational standards, though the HCM analysis methodology indicates LOS D for the minor street movement.

TRAFFIC SAFETY

Collision data was also obtained from the Oregon Department of Transportation for the period from 2003 through 2006 for each of the study area intersections. Table 3-10 includes collision data for each of the study intersections that had incidents, classified by fatal, non-fatal, and property damage only incidents. The accident rate was also calculated to standardize the existing data. The equivalent accident rates per million entering vehicles (MEV) are shown in Table 3-8. A collision rate greater than 1.0 generally indicates a safety-related problem that should be evaluated further.

Table 3-8: Intersection Collision Classification

Intersection	Fatal	Non-Fatal	Property Damage Only	Total	Accident Rate*
James Street/Pine Street	0	2	0	2	0.25
Westfield Street/Main Street	0	0	1	1	0.19
C Street/McClaine Street	0	3	4	7	0.38
Highway 213/Steelhammer Road	0	0	1	1	0.13
Oak Street(Hwy213)/1st Street(Hwy 214)	0	2	3	5	0.53
Water Street/Main Street	0	2	2	4	0.27
Oak Street(Hwy 213)/2nd Street	0	1	2	3	0.30
Front Street/C Street	0	0	1	1	0.08
Water Street/C Street	0	3	2	5	0.35

Note: *Accidents per million entering vehicles
Source: Oregon Department of Transportation (data from 2003-2006)

Overall, the collision rates at the study area intersections were relatively low. The highest collision rate occurred at Oak Street (Hwy 213) and 1st Street (Hwy 214) located in the downtown core. The intersection is an all-way stop.

Additionally, the intersection of Water Street/Main Street had two collisions involving bicycles/pedestrians that resulted in non-fatal injuries. One of these bicycle/pedestrian collisions occurred under dark conditions.

TRUCKS

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Marion County identifies a truck route on the north side of Silverton within the urban growth boundary and includes Hobart Road, Monitor Road and Mt. Angel Highway. Additionally, the City of Silverton has designated freight routes along First Street, Silverton Road, Westfield Street and Cascade Highway. These routes are shown in Figure 3-11, along with corresponding freight activity. ODOT[7] does not identify any freight routes within the City of Silverton. Trucks are prohibited on West Main Street, east of Westfield Street.

Heavy vehicle volumes and percentages were collected at study intersections as part of the turn movement counts and were included in the level of service calculations. Table 3-9 lists the approximate percentage of trucks traveling along key corridors (arterials and major collectors) in Silverton during the PM peak hour.

Table 3-9: Heavy Vehicle Activity on Key Corridors

Location	PM Peak Hour Truck Percentage	# of Trucks
Westfield Street/ Main Street	7%	34
C Street/McClaine Street	4%	66
Oak Street (Hwy 213)/Steelhammer Road	4%	27
1st Street (Hwy 214)/Pioneer Drive	4%	14
1st Street (Hwy 214)/Hobart Drive	3%	28
James Street/C Street	5%	57
Oak Street (Hwy 213)/Monitor Road	5%	34

[7] *1999 Oregon Highway Plan*, Oregon Department of Transportation. May 1999.

Figure 3-11: Existing Truck Routes

RAIL

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch line rail service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. This line connects to the rail line in Woodburn to the north and terminates in Stayton to the south.

There are six existing railroad/highway grade crossing within the City of Silverton:

- Fossholm Road, north of Silverton Road
- Hobart Road, west of Highway 214
- James Street, north of C Street
- Jefferson Street, west of Highway 214
- Silverton Road, west of C Street, and
- Water Street, north of C Street

Gates and flashers are provided at the rail crossings on Water Street and Silverton Road, while the other four crossings Fossholm Road, Hobart Road, James Street and Jefferson Street are only controlled by stop signs. The existing railroad and crossings are shown in Figure 3-12.

No Passenger rail transportation service directly serves the City of Silverton. AMTRAK service is available in Salem and Portland, Oregon.

Existing Issues

The primary issue with rail service in the City of Silverton is related to the adequacy of rail crossings. Three of the rail crossings currently have crossing amenities including gates and flashing lights; enhancements for the remaining crossings should be explored.

AIR

Silverton does not currently have a publicly-owned or operated airport. The Salem Airport-McNary Field is the closest public general aviation facility. It is classified as a Category 2 airport in the Oregon Aviation Plan and serves corporate aviation activity, general aviation and commercial passenger service. Other passenger and freight air transportation is available in Portland at the Portland International Airport (PDX), located approximately 60 miles to the northwest.

PIPELINE

The existing pipeline facilities in Silverton include transmission lines and pipelines. Transmission lines carry electricity, cable television and telephone service. Pipelines transport water, sanitary, storm sewer and natural gas throughout the City.

WATER

There are no commercial waterways within the City of Silverton's Urban Growth Boundary. The Silverton Reservoir (located outside of the City limits) and the Pettit Reservoir are owned by the City and serves as recreation waterways. Silver Creek runs from the south to northwest through the City of Silverton, providing recreational and aesthetic opportunities.

Figure 3-12: Rail Lines and Rail Crossing Locations

CHAPTER 4 : FUTURE NEEDS

The purpose of this chapter is to summarize the land use and travel demand component of the future conditions analysis and introduce the projected motor vehicle needs and deficiencies. The following sections describe the forecasting process including key assumptions, forecasted land use growth and model application for the City of Silverton.

TRAVEL DEMAND AND LAND USE

The Silverton Transportation System Plan (TSP) update addresses existing system needs and additional facilities that are required to serve future growth beyond the 2015 forecast year of the existing TSP. A travel demand model was developed and used to determine future traffic volumes in Silverton for the forecast year 2030. This model translates projected land use growth into motor vehicle trips and assigns them to the roadway network. The resulting traffic volume projects form the basis for identifying potential roadway deficiencies and for evaluating alternative circulation improvements. This section describes the forecasting process, including key land use inputs.

Projected Land Use Growth

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses and how the land uses are mixed together have a direct relationship to the expected demands on the transportation system. Understanding the amount and type of land use is critical to taking actions to maintain or enhance the operation of the transportation system. Projected land uses were developed within the City's Urban Growth Boundary for the future year (2030). The following sections summarize the forecasted growth that will influence travel within Silverton. A detailed description of the land use forecasting is included in the technical appendix

For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. There are 34 TAZs within the Silverton TSP Update study area that represent land use and access to the transportation system in Silverton. The TAZs are shown in Figure 4-1. Table 4-1 summarizes the growth in the three key land use types (households, retail employees and other employees) for the TAZs included in the Silverton TSP update study area. This growth in land use corresponds to a year 2030 population projection of approximately 14,000 residents.

Figure 4-1: Transportation Analysis Zone (TAZ) Map

Table 4-1: Silverton TSP Study Area Land Use Summary

Land Use	2006-2030 Growth
Households	1,854
Retail Employees	296
Non-Retail Employees	1,287

As shown in Table 4-1, the future 2030 land use indicates significant growth in both housing and employment within the TSP study area. The most significant employment growth is located north and east of downtown. The most significant growth areas in housing are located to the east and to the south of downtown. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system capacity. This TSP balances needs with the forecasted land uses that will occur through 2030.

Travel Demand Forecast

A determination of future traffic system needs in Silverton requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City. The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made to the transportation system to meet future travel demand.

For the Silverton TSP Update, a model was developed following ODOT Procedures Manual Methodology[8] to determine forecasts for the future year (2030). In order to accurately forecast 2030 traffic volumes, future travel demand projections were based on adding three distinct segments of demand growth to the existing traffic volumes:

- *Internal-Internal* trips: Trips traveling within Silverton exclusively;
- *Internal-External and External-Internal* trips: Trips with either an origin or destination in Silverton with the opposite trip end in a location outside the Silverton TSP update study area; and
- *External-External* trips: Trips that do not have an origin or destination in Silverton (through traffic that does not stop in Silverton).

Internal trips are based on local trip generation which are trips resulting from the expected growth in employment and households in Silverton based on land use forecasts. External trips are based on forecasted growth at gateways to the City (Highway 214, Highway 213, and Silverton Road) External-external and internal-internal trips are calculated by distributing growth at gateways to the City (that is not a through trip) to origins or destinations within the City. By using this method, double counting of trips was avoided.

The combined local land use generated trips and external trip growth was then added to the existing 2006 Design Hour Volumes (DHV) to yield a future volume forecast. This future year 2030 volume forecast was analyzed to determine areas of performance deficiencies in the roadway network. The

[8] *Analysis Procedures Manual*, Oregon Dept. of Transportation: Transportation Development Division, April 2006, p. 4-21

methodology for determining forecasted 2030 traffic volumes in Silverton is described in further detail in the following sections.

Local Trip Generation

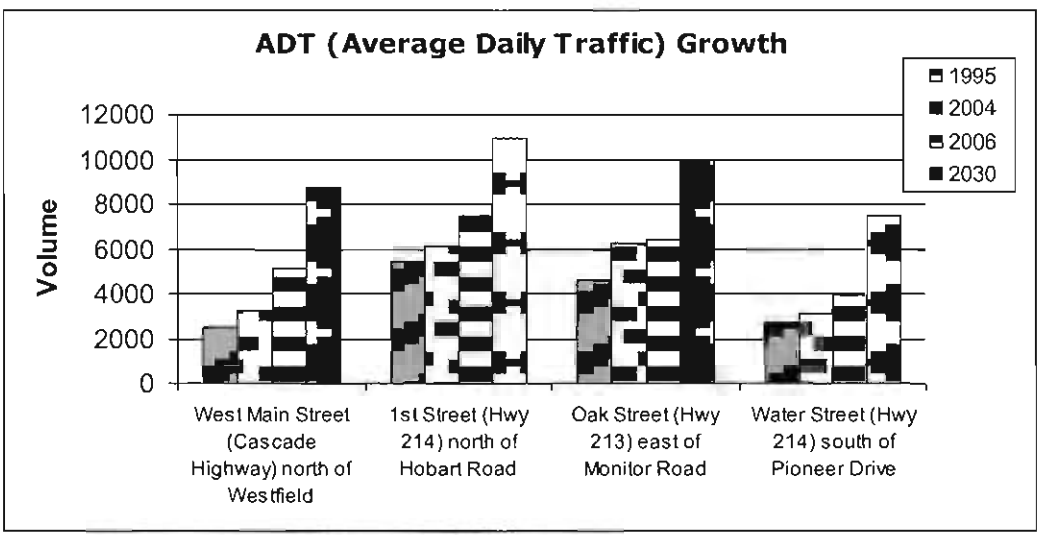
The trip generation process translates land use quantities (number of dwelling units, retail, and other employment) into vehicle trip ends (number of vehicles entering or leaving a TAZ) using trip generation rates established during the model verification process. The trip generation rates used for housing, retail employment and non-retail employment uses are based average trip rates for similar land use types in the Institute of Transportation Engineers (ITE) Trip Generation Manual[9]. Table 4-2 provides a listing of the weekday PM peak hour trip rates used in this analysis.

Table 4-2: Model Average Trip Rates

Land Use	In	Out	Total
Households	0.63	0.37	1.0
Retail Employees	3.0	3.0	6.0
Non-Retail Employees	0.15	0.35	0.5

External Trip Growth

In addition to growth resulting from forecasted land use changes within the City, growth of external traffic must also be accounted for. Six significant gateways to the community were identified as locations where the external growth was most likely to occur, including: Silverton Road, Highway 214, Highway 213, Pine Street and West Main Street (Cascade Highway). External growth along these six primary roadways was estimated based on historical growth data from Marion County, the inputs to the Salem-Keizer Area Transportation Study (SKATS) travel demand model, ODOT's future growth tables, and projected population within the City. The projected future year (2030) traffic volumes at four of the six external gateways are shown in the figure below.



[9] *Trip Generation Manual*, 7th Edition, Institute of Transportation Engineers, 2003.

To separate external-external traffic growth from traffic using external gateways with either a trip origin or destination in Silverton (internal-external and external-internal trips, respectively) the existing travel pattern probability of being an external-external trip was applied. Using this methodology, the external-external trip probability was estimated for travel to and from each end of the external gateways and applied to the forecasted trip growth at each location to yield the expected 2030 external-external trip growth. The remainder of growth at each gateway (total growth minus through trip growth) is the resulting forecast for external-internal and internal-external trips. The growth forecasted for external gateways was separated by type in Table 4-3.

Table 4-3: External Growth Forecast by Trip Type

					Growth Distribution	
Location	Existing 2-Way Volume	2006 External-External Trips	2006 External-Internal / Internal-External Trips	2006-2030 Projected Growth	2030 External-External Trip Growth	2030 External-Internal / Internal-External Trip Growth
Highway 214 (North of Hobart Rd)	694	299	395	422	181	241
Highway 213	589	227	131	358	138	220
South Water Street	311	238	73	189	145	44
West Main Street	461	217	244	477	225	252
Silverton Road	1047	436	611	637	265	372
Pine Street-Hazelgreen Street	415	186	229	253	113	140

Internal Trip Growth

In addition to external growth, internal growth is applied throughout the study area to determine the estimated future trips. The trip generation for each TAZ was estimated, as described previously. The Silverton study area generated a total of 4292 internal PM peak hour trips. The internal trip growth is determined by subtracting the internal-external trips and external-internal trips (as shown in Table 4-3) from the total internal trip generation.

Trip Distribution

Trip distribution estimates how many trips travel from one zone in the model to any other zone. Distribution was based on weighting the attractiveness of each zone by the number of trip ends generated. The relative attractiveness is applied to new trips in the study area while existing trips are assumed to maintain their current travel patterns.

Traffic Assignment

In this process, trips from one zone to another are assigned to specific travel routes in the network, and resulting trip volumes are accumulated on links of the network until all trips are assigned. The Traffix software package was used to model the transportation network and to assign the additional growth volume to the existing roadway and intersection volumes. In this assignment process, manual adjustments to trip patterns can be made if new roadways are anticipated to divert trips or if short-cut routes are expected to become more attractive as major roadways become congested.

MOTOR VEHICLE OPERATIONS

No-Build (2030) Scenario

The analysis for the forecasted 2030 growth was a No-Build scenario, including only transportation system improvements in Silverton that are already programmed and expected to be constructed with the current funding levels. These projects include the construction of traffic signals at C Street/1st Street (Hwy 214) and C Street/Water Street (Hwy 212). Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed, using the same methodology outlined in the existing conditions chapter to assess future operations. Table 4-4 shows the results of this analysis.

Table 4-4: 2030 Intersection Operations (PM Peak Hour)

Intersection		2006 Existing		2030 No-Build	
	Jurisdiction	LOS	V/C	LOS	V/C
Signalized Intersection					
C Street/McClaine Street	Marion County	B	0.75	**F**	**>1.0**
1st Street(Hwy214)/C Street	ODOT	**D**	**0.86**	**D**	**0.91**
Water Street/C Street	Marion County	**A/F**	**0.78**	C	0.68
All-way Stop Controlled Intersections					
Oak Street(Hwy 213)/Water Street	ODOT	B	0.45	D	0.85
McClaine Street/Main Street	Silverton	C	0.77	**F**	**>1.0**
James Street/Pine Street	Silverton	B	0.48	D	0.95
James Street/Water Street	Silverton	A	0.46	C	0.72
Unsignalized Intersections					
1st Street (Hwy 214)/Oak Street (Hwy 213)	ODOT	B	0.42	**E**	**> 1.0**
1st Street(Hwy214)/Main Street	ODOT	B	0.52	**F**	**> 1.0**
Water Street/Main Street	ODOT	C	0.68	F	> 1.0
Water Street/Lewis Street	ODOT	A/A	0.06	A	0.05
1st Street(Hwy 214)/Lewis Street	ODOT	A/C	0.27	**A/F**	**0.42**
Westfield Street/Main Street	Marion County	A/A	0.12	A/B	0.30
Oak St(Hwy 213)/Steelhammer Road	ODOT	A/B	0.10	**A/F**	**0.68**
Oak St(Hwy 213)/Monitor Road	ODOT	A/C	0.10	**A/E**	**0.37**
1st Street(Hwy214)/Pioneer Drive	ODOT	A/A	0.05	A/B	0.17
1st Street(Hwy214)/Hobart Street	ODOT	A/C	0.23	**A/F**	**0.91**
Oak St(Hwy 213)/2nd Street	ODOT	A/E	0.29	**A/F**	**>1.0**
Front Street/C Street	ODOT	A/D	0.10	A/D	0.90
Water Street/Park Street	ODOT	A/B	0.04	A/B	0.04
James Street/C Street	Marion County	A/C	0.21	**B/F**	**>1.0**

Note: Bold type indicates failure to meet adopted mobility standard.

The performance standards used to evaluate the existing conditions were also applied to the future No-Build scenario. As shown in Table 4-4, several of the study area intersections fall below the operational standards for the future year (2030). These intersections are located on the major roadways through the City that experience the most significant growth in traffic. While several intersections appear to need capacity enhancements, there are no major roadways that appear to need widening for additional through lanes in 2030. However, additional road extensions or capacity enhancements to minor roads that could divert traffic may be an alternative to constructing significant intersection improvements.

No-Build (2030) Financially Constrained Scenario

In addition to the No-Build scenario, another future year scenario was analyzed. The No-Build financially constrained scenario included planned transportation improvements from Silverton's current Capital Improvement Plan that would improve connectivity or add system capacity. Only projects that were assumed to be funded and constructed by the forecast year of 2030 were included in the analysis model. Key improvements affecting future traffic assignment and operations include:

Interseetion Improvements

- Main Street and Water Street (add traffic signal)
- Main Street and First Street (add traffic signal)
- Oak Street (Highway 213) and First Street (add traffic signal)
- C Street and Front Street (restricted to right in/out movements based on the latest design for C Street/Water Street and C Street/1st Street improvements)

New Roadways

- East Side Collector (Monitor Road extension to South Water Street)
- West Side Collector and Bridge (Pine Street to Silverton Road)

The new roadways were taken into account when assigning future trips in the transportation model. Generally, the west-side collector relieved trips on the C Street/James Street corridor and thc east-side collector relieved trips through downtown that have origins/destinations on the east and south sides of the City. The resulting estimated link volumes are shown on Figure 4-2 for the two new roadways along with key corridors throughout the City.

Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed, using the same methodology outlined in the existing conditions chapter to assess future operations. Table 4-5 displays the results of this analysis.

Table 4-5: 2030 Intersection Operations (PM Peak Hour)

Intersection		2030 No-Build		2030 No-Build Financially Constrained	
	Jurisdiction	LOS	V/C	LOS	V/C
Signalized Intersections					
C Street/McClaine Street	Marion County	**F**	**>1.0**	**F**	**>1.0**
1st Street(Hwy214)/C Street	ODOT	**D**	**0.91**	**D**	**0.91**

Intersection		2030 No-Build		2030 No-Build Financially Constrained	
	Jurisdiction	LOS	V/C	LOS	V/C
Water Street/C Street	Marion County	C	0.73	C	0.73
All-way Stop Controlled Intersections					
Oak Street(Hwy 213)/Water Street	ODOT	D	0.85	B	0.67
McClaine Street/Main Street	Silverton	**F**	**>1.0**	**F**	**>1.0**
James Street/Pine Street	Silverton	D	0.95	C	0.82
James Street/Water Street	Silverton	C	0.72	B	0.65
Unsignalized Intersections					
1st Street (Hwy 214)/Oak St (Hwy 213)	ODOT	**E**	**> 1.0**	B	0.70
1st Street(Hwy214)/Main Street	ODOT	**F**	**> 1.0**	**F**	**> 1.0**
Water Street/Main Street	ODOT	F	> 1.0	B	0.78
Water Street/Lewis Street	ODOT	A	0.05	A	0.07
1st Street(Hwy 214)/Lewis Street	ODOT	**A/F**	**0.42**	**A/E**	**0.38**
Westfield Street/Main Street	Marion County	A/B	0.30	A/B	0.16
Oak St(Hwy 213)/Steelhammer Road	ODOT	**A/F**	**0.68**	**A/F**	**>1.0**
Oak St(Hwy 213)/Monitor Road	ODOT	**A/E**	**0.37**	**A/F**	**0.49**
1st Street(Hwy214)/Pioneer Drive	ODOT	A/B	0.17	A/C	0.30
1st Street(Hwy214)/Hobart Street	ODOT	**A/F**	**0.91**	**A/F**	**0.89**
Oak St(Hwy 213)/2nd Street	ODOT	**A/F**	**>1.0**	**A/F**	**>1.0**
Front Street/C Street	ODOT	A/D	0.90	A/D	0.20
Water Street/Park Street	ODOT	A/B	0.04	A/B	0.04
James Street/C Street	Marion County	**B/F**	**>1.0**	**B/F**	**>1.0**

Note: Bold type indicates failure to meet adopted mobility standard.

Micro-simulation Analysis

In addition to the Highway Capacity Manual (HCM) based analysis that analyzes intersections in an isolated sense, a micro-simulation model was also utilized for the downtown core to evaluate the downtown grid as a network of roadways that interact with each other. SimTraffic was used to model the signal system network that was assumed as part of the planned improvements for the future year 2030. The simulation illustrates queuing effects and delay through the intersection. Table 4-6 compares the average delay at each of the signalized intersections for the two types of analysis.

Table 4-6: 2030 Average Intersection Delay Comparison (PM Peak Hour)

Intersection	HCM Delay / LOS	SimTraffic Delay / LOS
Oak Street(Hwy 213)/Water Street	16 seconds / B	826 seconds / F
1st Street (Hwy 214)/Oak St (Hwy 213)	15 seconds / B	20 seconds / C
1st Street(Hwy214)/Main Street	87 seconds / F	31 seconds / C
Water Street/Main Street	18 seconds / B	104 seconds / F

As illustrated in the Table 4-6, the Sim Traffic delay is significantly higher than what was calculated using the HCM methodology at Oak Street/Water Street and Main Street/Water Street. This trend generally indicates that the signals are operating worse than the level of service indicates due to queuing impacts, which is expected in a downtown environment with short block lengths. Intersections where simulated delays exceed 100 seconds are locations where drivers would have to wait through multiple traffic signal cycle phases before passing through the intersections, due to queues blocking traffic entering the intersection. Additional modifications (e.g. signal timing adjustments or the construction of turn lanes) to the signal system network will be required to mitigate the intersections that remain below the performance standards for operations. These modifications may include adjustments to signal timings or the construction of additional turn lanes.

Figure 4-2: Future (2030) Projected ADT Volumes

CHAPTER 5 : PEDESTRIAN

This chapter summarizes existing and future pedestrian needs in the City of Silverton, and outlines strategies and an Action Plan to effectively mitigate deficiencies. The criteria used in evaluating pedestrian needs and the strategies for addressing these needs were identified through work with the City's Technical Advisory Committee (TAC).

FACILITIES

Sidewalks shall be built to the City's current design standards and in compliance with the Americans with Disabilities Act (at least four feet of unobstructed sidewalk).[10] Wider sidewalks may be constructed in commercial districts or on arterial streets. On facilities under State jurisdiction (including 1st Street (Hwy 214) and Oak Street (Hwy 213)), the minimum sidewalk width allowed must be at least as wide as ODOT's design standards require. Additional pedestrian facilities may include accessways, pedestrian districts and pedestrian plazas.

- ***Accessway*** – A walkway that provides pedestrian and/or bicycle passage either between streets or from a street to a building or other destinations such as a school, park or transit stop.
- ***Pedestrian District*** – A plan designation or zoning classification that establishes a safe and convenient pedestrian environment in an area planned for a mix of uses likely to support a relatively high level of pedestrian activity.
- ***Pedestrian Plaza*** – A small, semi-enclosed area usually adjoining a sidewalk or a transit stop which provides a place for pedestrians to sit, stand or rest.

Sidewalks will be sized to meet the specific needs of the adjacent land uses. Guidance to assess capacity needs for pedestrians can be found in the *Highway Capacity Manual*.[11] Typically, the base sidewalk sizing for local streets should be six feet (clear of obstruction). The critical element is the effective width of the walkway. Because of street utilities and amenities (i.e. benches), a six-foot walkway can be reduced to three feet of effective walking area. This is the greatest capacity constraint to pedestrian flow.

As functional classification of roadways change, so should the design of the pedestrian facilities. Collectors shall have sidewalk widths of 5 to 8 feet and arterials should have sidewalk widths of 5 to 10 feet. Wider sidewalks may be necessary depending upon urban design needs and pedestrian flows (e.g. adjacent to storefront retail).

STRATEGIES

The existing conditions and future needs analysis identified pedestrian system issues within Silverton that include an incomplete arterial/collector sidewalk system, significant barriers to pedestrian

[10] *Americans with Disabilities Act*, Uniform Building Code.
[11] *Highway Capacity Manual*, Transportation Research Board, 2000; Chapter 18.

network (e.g. railroad and creek) and the need for enhanced crossing locations in downtown Silverton. These needs correspond with those identified previously in the 2000 TSP.

Several strategies were developed to address pedestrian system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser value. The improvement strategies were ranked by the Technical Advisory Committee (TAC) for use in this TSP[12].

The strategies for pedestrian facilities (listed in order of importance) are:

- Connect key pedestrian corridors to schools, parks, and activity centers
- Construct sidewalks to complete the pedestrian system (focus first on arterial and collector roadways)
- Fill in gaps in the network where some sidewalks exist to provide continuity
- Construct arterial crossing enhancements
- Improve/construct curb ramps for ADA
- Reconstruct all sidewalks to City of Silverton standards (width, safety, attractiveness, ADA compliance)
- Provide pedestrian corridors that connect neighborhoods
- Improve pedestrian corridors that connect to potential transit locations

NEEDS

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand throughout Silverton. Pedestrian travel in and around the study area needs to provide a safe, efficient and interconnected system that can afford users the ability to consider walking as a viable mode of travel for trips that are one mile in length or less. The following needs have been identified for pedestrian access and circulation within the City of Silverton:

Gaps in the Pedestrian Network

Arterial and collector streets in Silverton provide a limited sidewalk inventory (see Figure 3-2). Sidewalks are provided in the downtown grid and many newer residential neighborhoods, but there are limited connections and only intermittent sidewalks connecting into downtown. Additionally, the pedestrian system also has significant barriers (e.g. creek and railroad) that contribute to poor pedestrian connectivity throughout the City.

An important existing pedestrian need in Silverton is providing sidewalks on all arterial and collector roadways and providing a connection from residential areas to schools, parks and shopping centers. This includes the need for safe, well lighted arterial, collector, and local streets with suitable pedestrian amenities and crossing facilities to reduce barriers to pedestrian travel. Pedestrian facility needs in Silverton must consider the three most prevalent trip types:

- Residential based trips – home to school, home to home, home to retail, home to park, home to transit, home to entertainment
- Service based trips – multi-stop retail trips, work to restaurant, work to services, work/shop to transit
- Recreational based trips – home to park, exercise trips, casual walking trips

[12] Technical Advisory Committee Meeting, March 3, 2007.

Residential trips need a set of interconnected sidewalks radiating out from homes to destinations within one-half to one mile. Beyond these distances, walking trips of this type become substantially less common (over 20 minutes). Service based trips require direct, conflict-free connectivity between uses (for example, downtown with its main street that connects multiple destinations). Service based trips need a clear definition of connectivity. This requires mixed use developments to locate front doors which relate directly to the public right-of-way and provide walking links between uses within one-half mile. Recreational walking trips have different needs. Off-street trails, well landscaped sidewalks and relationships to unique environment (creeks, trees, and farmland) are important.

The most common need is to provide a safe and interconnected system that affords the opportunity to consider the walking mode of travel, especially for trips less than one mile in length

Development of Multi-use Trails

Multi-use trails can supplement the existing sidewalk system and provide connections where the existing pedestrian or bicycle system is deficient. Multi-use trails are typically off-street and are wider than a typical sidewalk to facilitate shared use with bicyclists. The abandoned rail lines in Silverton provide a good opportunity for available right-of-way to develop a several multi-use trails that will create a connected multi-use trail system throughout Silverton. Additionally, creek side trails adjacent to Silver Creek have been identified that provide connections to Coolidge McClaine Park, the Silverton Library and other recreational destinations.

Pedestrian Crossing Enhancements

Under future year conditions, many of the downtown intersections will remain unsignalized. Motor-vehicle volume and lane configurations at unsignalized intersections were examined and compared to the criteria[13] for considering marked crosswalks and other pedestrian enhancements. Generally, facilities with daily traffic volumes between 12,000 and 15,000 vehicles were used as the threshold for determining where enhanced crossings should be considered at uncontrolled intersections. Other considerations for pedestrian crossing enhancement locations and prioritization included: crossings identified in the City's Downtown Development Plan[14], existing pedestrian crossing volumes, and proximity to school facilities.

Other pedestrian enhancements include the construction of curb extensions to improve the safety at intersections by reducing the crossing distance. Curb extensions are also implemented to enhance the urban design and aesthetic value throughout downtown areas. Potential pedestrian enhancement locations include all unsignalized crossings of Water Street and 1st Street between Oak Street and C Street, Lewis Street/1st Street, Lewis Street/Water Street and C Street between 1st Street and McClaine Street. Crossing safety enhancements will be constructed as appropriate, including the following measures to help define the crossing area and improve driver yielding behavior:

- Delineation of the crossing area- this could be accomplished with improved visibility striping, pavement texturing, or brick inlay
- Curb extensions
- Pedestrian crossing signing at mid-block crossing locations
- Pedestrian level lighting at crossing location

The unsignalized intersections on Lewis Street present potential safety issues that are attributed to

[13] *Manual of Uniform Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001; Chapter 13, Table 13-2.
[14] Silverton Downtown Development Plan, July 2007.

the uncontrolled turning movements. As planned development continues and pedestrian volumes increase, pedestrian signals may be required to provide safe crossing opportunities at these two intersections. In the interim at Lewis Street/1st Street, the west leg pedestrian crossing may be closed. Currently, the volume is minimal on this intersection leg. A solution at Lewis Street/Water Street includes the construction of an island median to provide a safe refuge and reduce the pedestrian crossing distance on the east leg of the intersection (Refer to Silverton's Downtown Development Plan for specific project details)

Although sidewalks are generally well-connected downtown, pedestrian crossings at uncontrolled or high volume intersections pose additional safety issues to system users. Gaps, outside the downtown area, in the sidewalk and trail network discourage pedestrians and put them at an increased safety risk by requiring them to sbare the roadway with vehicles in certain locations.

PEDESTRIAN MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. The extent of the recommended multi-modal improvements for Silverton is significant. Future growth can be accommodated with significant investment in transportation improvements.

A list of potential pedestrian projects to meet the identified needs and achieve the City's goals and policies was developed into a Pedestrian Master Plan. The Pedestrian Master Plan identifies improvements to provide a connected pedestrian network within the City of Silverton, focusing on arterial and collector roadways and providing connections to high pedestrian activity areas. In addition, local streets should provide sidewalks where possible, and the City of Silverton Development Code regulations should require new developments to provide pedestrian infrastructure as part of the development costs. All new roadways constructed in the City shall include sidewalks. The Pedestrian Master Plan projects are shown in Figure 5-1 and summarized in Table 5-1.

Each pedestrian project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented. These priorities were used to create a Pedestrian Action Plan. The Action Plan consists of projects which are selected from the Master Plan to be funded and constructed over the next 20 years. The selection process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser values. As development occurs, streets are rebuilt and other funding opportunities (such as grant programs) arise, projects on the Master Plan could also be pursued and constructed, possibly before projects on the Action Plan.

A Pedestrian Action Plan project list was created to identify high priority pedestrian projects that are reasonably expected to be funded by the year 2030, which meets the requirements of the updated Transportation Planning Rule[15]. Table 5-1 shows the full Master Plan and Action Plan identified in the TSP update analysis. The Pedestrian Action Plan is shown in Figure 5-2.

The planning level cost estimates provided in Table 5-1 are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with other special design details as projects are pursued.

[15] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

Figure 5-1: Pedestrian Master Plan

Figure 5-2: Pedestrian Action Plan

Table 5-1: Pedestrian Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Sidewalks on Existing Arterials and Collectors						
High	Oak Street	Both	Steelhammer Road	City limits	Action	$357
High	Pine Street (gap infill)	Both	Grant Street	City limits	Action	$164
High	South Water Street	Both	Smith Street	City limits	Action	$945
High	C Street	Both	McClaine Street	James Street	Action	$157
High	Steelhammer Road	Both	Oak Street	Evans Valley Road	Action	$388
High	C Street	South	Front Street	2nd Street	Action	$26
High	James Street	East	C Street	North Water Street	Action	$53
High	James Street	West	C Street	Brooks Street	Action	$16
High	Westfield Street	Both	Main Street	Existing section	Action	$21
High	Main Street	Both	3rd Street	Steelhammer Road	Action	$567
Med	Oak Street	South	Mill Street	Steelhammer Road	Master	$283
Med	Brown Street	East	North Water Street	Pine Street	Master	$30
Med	North Water Street	South	Brown Street	C Street	Master	$23
Med	North Water Street	East	C Street	A Street	Master	$41
Med	C Street	North	James Street	North Water Street	Master	$195
Med	James Street	Both	Florida Street	City Limits	Master	$164
Med	Westfield Street	East	Main Street	McClaine Street	Master	$252
Med	B Street	Both	1st Street	Mill Street	Master	$130
Med	1st Street	Both	Hobart Road	Existing section	Master	$483
Med	Jefferson Street	Both	2nd Street	James Street	Master	$210
Med	West Main Street	North	Westfield Street	City limits	Master	$95
Med	Keene Avenue	Both	Eureka Avenue	Coolidge Street	Master	$315
Med	Ike Mooney Road	Both	Existing section	City limits	Master	$172
Med	2nd Street	Both	Whittier Street	Hobart Road	Master	$483
Low	McClaine Street	North	Craig Street	Phelps Street	Master	$37
Low	Fiske Street	Both	Main Street	Charles Avenue	Master	$199
Low	2nd Street (gap infill)	East	Whittier Street	D Street	Master	$61
Low	Eureka Avenue	Both	Main Street	Bee Lane	Master	$525
Low	Monitor Road	West	Hobart Road	Oak Street	Master	$335
Low	Hobart Road	North	1st Street	Monitor Road	Master	$578
Low	Hobart Road	South	1st Street	Lanham Lane	Master	$389
Local Multi-Use Trail						

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
High	Off-street path #1		C Street	Hobart Road	Action	$338
High	Off-street path #2		Charles Avenue	Peach Street	Action	$262
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	$150
Med	Pedestrian Stairway Connection		Coolidge Park	Anderson Drive	Master	$60
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	$263
Med	Pedestrian Bridge		Cowing Street		Master	$80
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	$188
Low	Pedestrian Bridge		Peach Street		Master	$80
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	$173
Low	Off-street path #7		Jefferson Street	Eska Way	Master	$48
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	$143
Low	Off-street path #9		Pine Street	Silver Creek	Master	$462
Low	Off-street path #10		Wilson Street	Monson Road	Master	$240
Low	Off-street path #11		Water Street	Rogers Lane	Master	$518
Low	Off-street path #12		McClaine Street	Railway Street	Master	$165
Low	Off-street path #13		Westfield Street	New local roadway	Master	$46
Low	Off-street path #14		West edge of West Side area	Main Street	Master	$285
Sidewalks on New Arterials/Collectors						
Westside Connector #2		North/South	Silverton Road	Main Street	Master	**
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	**
Northside Connector #5		East/West	James Street	2nd Street	Master	**
				Sidewalks on Existing Arterials and Collectors		$7,351
				Local Multi-Use Trail		$1,806
				*Pedestrian Crossing Improvements**		$142
				ADA Safety Audit and Annual Improvement Program		$330
				Total Pedestrian Action Plan Cost		**$3,679**
				Total Pedestrian Master Plan Cost		**$11,335**

Notes: * Pedestrian Crossing Improvements are included in Table 5-3
**Project costs are included in the Motor Vehicle Plan (Chapter 8)

The City Council has also set a goal to improve pedestrian facilities by constructing sidewalk and street lighting improvements to fill gaps in the existing system. To help attain this goal, several different funding options (in addition to what have been identified in Chapter 10 of this document)

should be used to complete these pedestrian projects identified in the Action Plan and Master Plan. Other potential funding sources for the construction of sidewalk infill locations include Local Improvement Districts (LID), street maintenance funds, and the 50/50 program. The 50/50 program is a match program for sidewalk infill projects. Property owners pay for ½ of a sidewalk improvement and the City matches the investment to complete the project. Priorities identified within Table 5-1 may change based on the availability of these supplemental funding sources for pedestrian projects and some of the lower priority projects may be implemented first. In addition, projects identified in the Action Plan or Master Plan may be constructed in incremental phases (gap-filling) instead of complete corridor improvements as funds become available.

Another pedestrian need that was identified includes ADA accessible curb cuts for all downtown streets and destinations (e.g. schools, hospital, and shopping). A citywide safety audit within Silverton is also needed to identify problem areas that do not currently meet ADA standards. The implementation of an ADA program would include provisions for undertaking this task, as well as the actual reconstruction of deficient curb locations. The priority locations will be determined after the inventory has been conducted. A phased construction plan, with specific priority given to key downtown locations will be included as part of the program. The list may be updated over time depending on current funding availability, but will provide a starting point for project selection. This project is included in the Action Plan shown in the table above.

ARTERIAL CROSSING ENHANCEMENTS

Pedestrian safety is another major issue; specifically pedestrian conflicts with motor vehicles. These conflicts can be reduced by providing direct links to buildings from public rights-of-way, considering neighborhood traffic management, providing safe roadway crossing points and analyzing/reducing the level of pedestrian/vehicle conflicts in every land use application.

Table 5-2 summarizes several potential crossing enhancements that can be applied within the City of Silverton. Each crossing location will be reviewed to determine the appropriate combination of improvements. For example, curb extensions are effective for reducing crosswalk lengths, and exposure to conflicting vehicles, but these are only reasonable where on-street parking is provided on both sides of the roadway. The curb extension 'shadows' the parked cars. A standard detail for curb extensions with on street parking is included in the technical appendix and should be followed for all new curb extension projects within the City. Another example includes pedestrian count down timers, which can only be applied at existing or new traffic signal controlled crossings. The examples shown in Table 5-2 represent a tool box of solutions for pedestrian enhancements.

Table 5-2: Potential Crossing Enhancement Tools

Improvement	Description	Illustration	Cost Range
Marked Crosswalk	White, thermoplastic markings at street corner. Alternative material could include non-white color or textured surfaces.		$500 to $1,000 each crossing

Improvement	Description	Illustration	Cost Range
Raised Crosswalk	Crosswalks that are level with the adjacent sidewalks, making pedestrians more visible to approaching traffic.		$4,000
New Corner Sidewalk Ramp	Construct ADA compliant wheelchair ramps consistent with city standards		$3,000 to $5,000 each corner
Median Refuge	Construct new raised median refuge area. Minimum width 6 feet, and minimum length of 30 feet. Curb can be mountable to allow emergency vehicles to cross, if required.		,000 to $10,000 g on overall length d amenities.
Pedestrian Count Down Timer Signal	Install supplemental pedestrian signal controls to indicate the time remaining before crossing vehicles get 'green' signal indication.		$500 each signal head
Curb Extensions	Construct curb extension on road segments with on-street parking. Reduces pedestrian crossing area, and exposure to vehicle conflicts.		$8,000 depending gn amenities and etic treatments.

Improvement	Description	Illustration	Cost Range
Mid-Block Pedestrian Signal and Crossing	Construct new pedestrian signal that is synchronized with major street traffic progression to reduce interruption of through traffic. Appropriate near high pedestrian generators.		$100,000 to $150,000

Several "pedestrian crossing enhancement" locations were identified. A screening evaluation was conducted for arterial streets within Silverton to identify roadway segments that should be considered for enhanced pedestrian crossing treatments. The criterion used was based on roadway daily volumes, posted speeds, and proximity to pedestrian generators based on published guidelines[16] in the *Traffic Control Devices Handbook*.

In setting priorities for the Pedestrian Action Plan, school access was given a high priority to improve safety. However, beyond simply building more sidewalks, school safety involves education and planning. Many cities have followed guidelines provided by Federal Highway Administration and the Institute of Transportation Engineers. Implementing plans of this nature has demonstrated accident reduction benefits in several cities in Oregon. However, this type of work requires staffing and coordination by the Silverton School District as well as the City to be effective.

Locations for crossing enhancements have been identified by the City as well as previous work conducted for the Silverton Downtown Development Plan[17]. The crossing locations are classified into three primary geographic districts, including: gateway, core, and civic areas.

Table 5-3 lists the Pedestrian Master Plan and Action Plan crossing improvements. The crossing enhancements are categorized by geographical area and given a general priority. One option for implementation includes the creation of a crossing enhancement that has a defined budget every year and implements one or two crossings as funding becomes available. The "safe routes to school" initiative also provides another avenue for partnerships or grants. Crossing enhancements projects will have $2,750 per year as a separate pool of money for distribution

[16] *Manual of Uniform Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001; Chapter 13, Table 13-2.
[17] Silverton Downtown Development Plan, City of Silverton July 2007

Table 5-3: Pedestrian Master Plan Crossing Improvements

Priority	Project	District	Location	Plan	Cost ($1,000s)
High	Crossing enhancements (North leg)	Gateway	1st Street/A Street	Action	$10
High	Crossing enhancements (North leg)	Civic	Water Street/A Street	Action	$10
High	Install median refuge, project to reduce crossing distance	Core	Water Street/Lewis Street	Action	$25
High	Crossing enhancements (Mid-block)	Civic	North Water Street/Eugene Field	Action	$10
Med	Crossing enhancements	n/a	Steelhammer Road	Master	$10
Med	Crossing enhancements (Mid-block/one side)	Core	1st Street/between Park Street and A Street	Master	$10
Med	Crossing enhancements (Mid-block)	n/a	North 1st Street/Bow Tie Lane	Master	$12
Med	Crossing enhancements (South leg)	Civic	South Water Street/Wesly Street	Master	$10
Med	Close crosswalk (West leg)	Core	1st Street/Lewis Street	Master	$5
Low	Crossing enhancements (North and South legs)	Core	1st Street/B Street	Master	$20
Low	Crossing enhancements (South leg)	Gateway	Water Street/Park Street	Master	$10
Low	Crossing enhancements (South leg)	Core	Water Street/High Street	Master	$10
			Total Pedestrian Crossing Enhancement Action Plan Cost		**$55**
			Total Pedestrian Crossing Enhancement Master Plan Cost		**$142**

CHAPTER 6 : BICYCLE

This chapter summarizes the existing and future bicycle facility needs in the City of Silverton, outlines the criteria to be used to evaluate needs, identifies improvement strategies, and recommends an Action Plan of bikeway projects to effectively mitigate deficiencies.

FACILITIES

There are three main bicycle route facility types: bike lanes, bicycle accommodation, or off-street bike paths/multi-use trails.

- ***Bike lanes*** are areas within the street right-of-way designated specifically for bicycle use. Federal research has indicated that bike lanes are the most cost effective and safe facilities for bicyclists when considering all factors of design. Bicycle lanes adjacent to the curb are preferred to bicycle lanes adjacent to parked cars or bicycle lanes combined with sidewalks. According to the Oregon Bicycle and Pedestrian Plan[18], on-street bike lanes should be six-feet wide. Provision of a bicycle lane not only benefits bicyclists but also motor vehicles which gain greater shy distance/emergency shoulder area. Additionally, pedestrians gain a buffer between walking areas and moving vehicles. On reconstruction projects, bicycle lanes of five feet may be considered due to right-of-way constraints.
- ***Bicycle accommodations*** are where bicyclists and autos share the same travel lane, including a wider outside lane and/or bicycle boulevard treatment (priority to through bikes on local streets). Widening the curb travel lane (for example, from 12 feet to 14 or 15 feet) can provide bicycle accommodations. This extra width is more accommodating to bicycle travel and provides a greater measure of safety.
- ***Multi-use paths*** are generally off-street routes (typically recreationally focused) that can be used by several transportation modes, including bicycles, pedestrians and other non-motorized modes (i.e. skateboards, roller blades, etc.). Wide sidewalks (greater than eight feet), can also be considered multi-use paths, however, the provision of wide sidewalks should not preclude the provision of on-street bike lanes. The shared space on the wide sidewalks can decrease pedestrian levels of service as well as pose adverse safety problems for both bikers and pedestrians. Off-street trails in the City of Silverton are planned for 10-12 feet in width[19], which is desirable for mixed-use activity (pedestrian and bike).

STRATEGIES

Bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, in additional to providing multi-modal links to improve livability. Several strategies were identified to address bicycle system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser value.

[18] Oregon Department of Transportation, *Oregon Bicycle and Pedestrian Plan*, Adopted June, 1995.

The strategies were ranked by the Technical Advisory Committee (TAC) for use in this TSP[20].The strategies for bicycle facilities (listed in order of importance) are:

- Construct bicycle lanes on all arterials and collectors to meet City of Silverton, Marion County or ODOT facilities
- Connect key bicycle corridors to schools, parks, and activity centers
- Fill in gaps in the network where some bikeways exist (arterials and collectors)
- Provide bicycle corridors that commuters might use
- Provide a regional pathway facility connecting to neighboring communities
- Provide bicycle corridors that access retail areas
- Provide bicycle corridors that connect to major recreational facilities
- Provide bicycle parking at key destinations
- Provide bicycle corridors that connect neighborhoods

NEEDS

Bicycle goals and policies for the area aim to provide safe, continuous, and accessible facilities. Striped bike lanes are present on a few roadways west and east of downtown in Silverton but have limited connectivity from the north and south.

Bicycle trips are different from pedestrian and motor vehicle trips. Common bicycle trips are longer than walking trips and generally shorter than motor vehicle trips. Where walking trips are attractive at lengths of a quarter mile (generally not more than a mile), bicycle trips are attractive up to three miles. Bicycle trips can generally fall into three groups: commuting, activity-based and recreational. Commuter trips are typically home/work/home (sometimes linking to transit) and are made on direct, major connecting roadways and/or local streets. Bicycle lanes provide good accommodations for these trips. Activity based trips can be home-to-school, home-to-park, home-to-neighborhood commercial or home-to-home. Many of these trips are made on local streets with some connections to arterials and collectors. Their needs are for lower volume/speed traffic streets, safety and connectivity.

Recreational trips share many of the needs of both the commuter and activity-based trips, but create greater needs for off-street routes, connections to rural routes and safety. Typically, recreational bike trips will exceed the normal bike trip length.

System continuity and connectivity, and safety are key issues for bicyclists. The lack of safe facilities and gaps in the system cause the most significant problems for bicyclists traveling to and from downtown Silverton. The following needs have been identified for bicycle access and circulation along within the City of Silverton.

Local/Regional Connectivity

The existing bicycle network includes a combination of striped bicycle lanes and shared facilities. There is limited signage and designation of through bicycle routes serving the gateways into downtown. The 2000 TSP identified several on-street facilities on existing arterial and collector roadways. Due to limited right-of-way availability and slow speeds through the downtown core, bicycle lanes are not appropriate or feasible. All of the local and regional bicycle lane connections that are identified will transition to shared facilities through downtown Silverton. The designation of through bicycle routes and shared facilities will require additional signage and will be included on the project list.

[20] Technical Advisory Committee Meeting, March 3, 2007.

Bicycle Parking

The existing bicycle parking is limited in downtown Silverton. To facilitate bicycle trips, bicycle parking should be provided with short-term and long-term spaces. Lack of proper storage facilities discourages potential riders from traveling by bicycle. Bicycle racks should be located at significant activity generator including schools, parks, and retail areas. The attractiveness of bike parking may also be improved by providing covered parking or secured facilities where bicycles may be locked away. To the extent possible, bike parking should be visible, inviting and integrated with building, street front and landscape design.

BICYCLE MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. The extent of the recommended multi-modal improvements for Silverton is significant. Future growth can be accommodated with significant investment in transportation improvements.

The Bicycle Master plan is an overall plan that summarizes the list of bicycle-related projects throughout Silverton, providing a long-term map for planning bicycle facilities. The Master Plan is shown in Figure 6-1 and summarized in Table 6-1. The Master Plan identifies improvements to provide a connected bicycle network within the City of Silverton along all arterial and collector roadways. Typically local streets do not require delineated bicycle lanes as traffic volumes and speeds are low enough that bicycles and motor vehicles can share the same right-of-way safely. As development occurs, streets are rebuilt, and other funding opportunities (such as grant programs) arise, projects on the Master Plan could also be pursued and constructed, possibly before projects on the Action Plan.

The planning level cost estimates provided are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued. Based on the City's input, the list of bicycle projects were reviewed to determine if any of the identified locations could restripe bicycle lanes with the existing cross-section if parking was removed on one side of the street. Three locations were identified that met the established cross-section criteria including:

- 1st Street (between Hobart Street and B Street)
- Oak Street (between Norway Street to Steelhammer Road)
- Pioneer Drive (between South Water Street and Ike Mooney Road)

The cost estimates for these restriping projects are significantly lower than the construction of new bicycle lanes that require roadway widening. Each bicycle project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented.

From the Bicycle Master Plan, a more specific, shorter term, Action Plan was developed. The Action plan consists of projects that are reasonably expected to be funded by the year 2030. The TSP goals and policies and improvement strategies were used to rank the bicycle projects. In creating the Bicycle Action Plan, priority was given to completing the network (taking advantage of existing bike lanes) and providing bicycle access around land uses that are attractive to bicycle riders, such as schools, recreation and retail areas. The highest ranking City projects expected to be funded are included in the Action Plan. The Bicycle Master Plan and Action Plan and are shown in Table 6-1.

Figure 6-1: Bicycle Master Plan

Figure 6-2: Bicycle Action Plan

Table 6-1: Bicycle Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Bike Lanes on Existing Arterials & Collectors						
High	1st Street	Both	Hobart Road	B Street	Action	$68
High	Oak Street	Both	Steelhammer Road	East City limits	Action	$255
High	North Water Street	Both	Brown Street	C Street	Action	$70
High	South Water Street	Both	Lane Street	Pioneer Drive	Action	$500
High	Pine Street	Both	West City limits	Brown Street	Action	$418
High	Silverton Road	Both	West City limits	Existing section	Action	$262
High	2nd Street	Both	Bow Tie Lane	Oak Street	Action	$5
Med	Oak Street	Both	Norway Street	Steelhammer Road	Master	$14
Med	Eureka Avenue	Both	Main Street	South City limits	Master	$645
Med	Main Street	Both	Westfield Street	Water Street	Master	$465
Med	Oak Street	Both	3rd Street	Church Street	Master	$192
Med	McClaine Street	Both	Existing section	Main Street	Master	$255
Med	Monitor Road	Both	Oak Street	Hobart Road	Master	$480
Med	Ike Mooney Road	Both	Pioneer Drive	East City limits	Master	$340
Med	Pioneer Drive	Both	South Water Street	Ike Mooney Road	Master	$36
Med	Evans Valley Road	Both	Steelhammer Road	East City limits	Master	$270
Med	Steelhammer Road	Both	Oak Street	Evans Valley Road	Master	$420
Low	2nd Street	Both	Hobart Road	Bow Tie Lane	Master	$287
Low	Brown Street***	Both	James Street	Pine Street	Master	$45
Low	James Street	Both	Hobart Road	Pine Street	Master	$600
Low	Hobart Road	Both	James Street	Monitor Road	Master	$825
Bike Lanes on New Arterials & Collectors						
Westside Connector #2		North/South	Silverton Road	Main Street	Master	*
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	*
Northside Connector #5		East/West	James Street	2nd Street	Master	*
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	**
High	Off-street path #2		Charles Avenue	Peach Street	Action	**
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	**
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	**
Med	Pedestrian Bridge		Cowing Street	Hobart Road	Master	**
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	**
Low	Pedestrian Bridge		Peach Street	Existing Church Street alignment	Master	**
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	**
Low	Off-street path #7		Jefferson Street	Eska Way	Master	**
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	**
Low	Off-street path #9		Pine Street	Silver Creek	Master	**
Low	Off-street path #10		Wilson Street	Monson Road	Master	**

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Low	Off-street path #11		Water Street	Rogers Lane	Master	**
Low	Off-street path #12		McClaine Street	Railway Street	Master	**
Low	Off-street path #13		Westfield Street	New local roadway	Master	**
Low	Off-street path #14		West edge of West Side area	Main Street	Master	**

Project	From	To	Plan	Cost ($1000's)
Regional Bikeway				
Regional bikeway connection	Silverton City Limits	Stayton	Master	-
Regional bikeway connection	Silverton City Limits	Salem	Master	-
Regional bikeway connection	Silverton City Limits	Mt. Angel	Master	-
Regional bikeway connection	Silverton City Limits	Wayside Park	Master	-
Regional bikeway connection	Silverton City Limits	Reservoir	Master	-
Other Bicycle Projects				
Bicycle Route Signage (shared bicycle facilities)		Throughout Silverton	Master	$25
Bicycle Parking		Downtown locations and key destinations	Master	$20
		Bike Lanes on Existing Arterials & Collectors		$6,452
		Other Bicycle Projects		$45
		Total Bicycle Action Plan Cost		**$1,578**
		Total Bicycle Master Plan Cost		**$6,497**

Notes: *Project costs are included in the Motor Vehicle Plan (Chapter 8)
**Project costs are included in the Pedestrian Plan (Table 5-1)
***May consider providing bicycle facilities on parallel routes due to limited right-of-way

COMPLEMENTING LAND USE ACTIONS

Since the provision of a bicycle network will not be fully utilized without the supporting infrastructure, it is in the City's best interest to make bicycle options available. The City Zoning Code shall provide on-site bicycle parking requirements based on land use categories (i.e. residential, commercial, industrial and service zones).

As new development occurs, it is important that connections or accessways are provided to link the development to the existing bicycle and pedestrian facilities in as direct manner as is reasonable. If a development fronts a bikeway or sidewalk (as shown in the Bicycle or Pedestrian Master Plans), the developer shall be responsible for providing the bikeway or walkway facility as part of any half-street improvement required for project mitigation

CHAPTER 7 : TRANSIT

This chapter summarizes existing and future transit needs in the City of Silverton, and outlines strategies and an Action Plan to effectively mitigate deficiencies. The criteria used in evaluating transit needs and the strategies for addressing these needs were identified through work with the City's Technical Advisory Committee (TAC).

STRATEGIES

Several improvement strategies were developed to meet transit needs in Silverton. These strategies were ranked as part of this TSP update[21]. The strategies, which rely on coordination with the City of Silverton as well as other regional transit service providers, include (listed in order of importance):

- Provide park-and-ride lots and support van pools/car pools
- Improve rail facilities to support recreational/commuter rail services
- Rescheduling of CARTS to allow better commuter service to Salem
- Improve the dial-a-ride program (expanded service hours and more service)
- Explore the feasibility of local fixed-route transit service
- Expand regional transit services to surrounding communities
- Construct transit stop amenities (shelters, lights, benches, etc)
- Update roadway design standards to support future fixed-route transit service

NEEDS

The projected size of Silverton in the future year (2030) limits the probability of a fixed route transit system. Typically, a population of 25,000 is considered reasonable to conduct a transit feasibility study. Although local fixed-route transit is not a likely option for Silverton, other improvements to the existing transit system were identified for transit service and access within the City of Silverton including:

Local/Regional Connectivity

As Silverton population grows, it is likely that the number of people working in Salem will also continue to grow and the community will continue to expand as a bedroom community. Based on these characteristics the need for efficient, commuter service to Salem will expand. Adjustments to the future regional and local system must include the rescheduling of CARTS (Chemeketa Area Regional Transportation System), the commuter connection to Salem, to accommodate typical work hour schedules. Coordination will be required with the transit service provider in Salem (Cherriots) to provide this regional connection.

[21] Technical Advisory Committee Meeting, February 2, 2007.

Bus Stops

The existing regional transit service route provided by Chemeketa Area Regional Transportation System (CARTS) has three bus stops in Silverton, at Roth's Grocery Store, Safeway/Rite-aid and Downtown. Bus stop amenities, such as bus shelters, secure bicycle parking and street lighting are also important enhancements to the existing and proposed transit stops.

Enhancements to Dial-a-Ride Service

The Silver Trolley is the dial-a-ride service and serves as a primary component of the transit service provided within Silverton. Future improvements that would enhance the current service include additional vehicles to accommodate more passengers and expanded service hours.

Park-and-Ride Lot

The need for a west side park-and-ride lot was identified in the previous TSP to serve as a transfer point between the intercity and intracity bus routes as well as a parking lot for carpool and vanpool users. This lot would provide approximately 100 stalls at a location to be determined in the future. One potential park-and-ride location was identified near the Public Works Shop. Further site analysis will be required before a final location for a new park-and-ride can be determined.

TRANSIT MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. Future growth can be accommodated with significant investment in transportation improvements. The effectiveness of transit service is supported by a quality pedestrian and bicycle system. Pedestrian and bicycle system improvements, as detailed in Chapters 5 and 6, respectively, should serve transit services as well as other activity centers (e.g. schools, recreation, and retail areas).

The Transit Master Plan project list was determined based on the identified needs, policies and project feasibility. The transit master plan projects are summarized in Table 7-1 and shown in Figure 7-1. The City of Silverton owns and operates the intercity paratransit service and will be responsible for service enhancements. The City of Silverton shall coordinate with CARTS (Chemeketa Area Regional Transportation System) and Cherriots (the transit service provider in Salem) to incorporate changes to the regional bus service with the City.

Each transit project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented. However, changes to project priorities and availability of funding sources could allow Master Plan projects to be implemented, possibly before Action Plan projects. Planning level cost estimates were also provided for each project, based on the most recent available data.

A Transit Action Plan project list was created to identify high priority transit projects that are reasonably expected to be funded or implemented by the year 2030, which meets the requirements of the updated TPR[22]. The Transit Master Plan and Action Plan projects are summarized in Table 7-1.

[22] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April, 2005.

Figure 7-1: Transit Master Plan

Table 7-1: Transit Master Plan and Action Plan Projects

Priority	Project	Description	Plan	Cost ($1,000s)
High	Commuter Connection to Salem	Enhance fixed route commuter connection to and from Salem. One new bus stop location will be added in downtown Silverton.	Action	$100/Year
High	Bus shelters	Install bus shelters at the two existing commuter connections at Roth's Grocery Store and the Silver Falls Library	Action	$20
High	Park-and-Ride Lot	Implement west-side park-and-ride lot to serve transit and carpool users. Specific location to be determined.	Action	$350
Medium	Bicycle Parking	Install secure bicycle parking at Park-and-Ride Lot	Master	$10
Medium	Dial-a-ride services	Enhance dial-a-ride services, including hours of operation and expanded service, and one additional vehicle.	Master	$52/Year
Low	Local Fixed Route Transit Feasibility Study	Future population growth will dictate when this project will occur (generally 25,000 people).	Master	$50
		Total Transit Action Plan Project Cost (for 23 years)		**$2,670**
		Total Transit Master Plan Project Cost (for 23 years)		**$3,926**

CHAPTER 8 : MOTOR VEHICLE

This chapter summarizes motor vehicle system capacity needs for future conditions in the City of Silverton. The following sections outline strategies used to evaluate needs and recommends plans for motor vehicles (automobiles and trucks). The Motor Vehicle modal plan was developed to be consistent with other jurisdictional plans including Marion County's Regional Transportation System Plan (RTSP) and Oregon Department of Transportation's Highway Plan.

FUTURE CAPACITY DEFICIENCIES

As outlined in Chapter 4, traffic volumes were forecasted for the 2030 roadway system within the City of Silverton. The analysis for the forecasted 2030 growth was a No-Build scenario including only transportation system improvements in Silverton that are expected to be constructed in the near future. These projects include the construction of traffic signals and geometric modifications at C Street/1st Street (Hwy 214) and C Street/Water Street (Hwy 212). Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed. Under the future (2030) No-Build scenario there are several intersections within the TSP study area that do not meet jurisdictional performance standards.

STRATEGIES

To meet performance standards and serve future growth, the future transportation system needs significant multi-modal improvements and strategies to manage the forecasted travel demand. The City of Silverton's Special Transportation Area (STA) designation was approved by the Oregon Transportation Commission in September 2007. This highway designation is applied to a highway segment when an existing downtown business district straddles the state highway in an urban center. The objective of this designation is to provide access to community activities, businesses and residences and to accommodate pedestrian, bicycle and transit movement along and across the highway in a downtown/business district area. The STA designation results in higher mobility standards for the future year analysis[23]. This higher mobility standard permits the City to allow higher levels of congestion, which could reduce the need for road widening and better balance the through traffic needs with community desires for a pedestrian friendly district. The impact of future growth would be severe without investment in transportation improvements. Strategies for meeting automobile facility needs include the following:

- Transportation System Management (TSM), including:
  - Neighborhood Traffic Management
  - Access Management
  - Local Circulation Enhancements
- Transportation Demand Management (TDM)
- Roadway Extensions to Improve Circulation

[23] The STA designation changes the v/c mobility standard to 0.95 for ODOT facilities through downtown.

- Traffic Signals on Arterial/Collector Intersections
- Mitigate all Intersections to State and Local performance standards
    - Additional Traffic Signals on Arterial/Collector Intersections
    - Intersection Modifications

The following sections outline the type of improvements that would be necessary as part of a long-range Motor Vehicle Master Plan. Phasing of implementation will be necessary since all improvements cannot be done at once. This will require prioritization of projects and periodic updating to reflect current needs. The following sections are a guide to managing growth in Silverton as it occurs over the next 23 years.

TRANSPORTATION SYSTEM MANAGEMENT (TSM)

Transportation system Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximize mobility, and treating all modes of travel as a coordinated system. These types of measures include such things as traffic signal improvements, neighborhood traffic management, access management, and local street connectivity.

Neighborhood Traffic Management (NTM)

Neighborhood Traffic Management (NTM) is a term that has been used to describe traffic control devices typically used in residential neighborhoods to slow traffic or possibly reduce the volume of traffic. NTM is descriptively called traffic calming due to its ability to improve neighborhood livability. Silverton currently has limited neighborhood traffic management elements, such as on-street parking, in place on streets within the study area. The city may consider traffic calming measures and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function.

The City could consider adopting a neighborhood traffic management program. This program would help prioritize implementation and address issues on a systematic basis rather than a reactive basis. Criteria should be established for the appropriate application of NTM in the City. This would address warrants, standards for design, funding, the required public process, use on collectors/arterials (fewer acceptable measures – medians) and how to integrate NTM into all new development design. NTM projects on state facilities are required to meet ODOT standards. Pavement textures, chokers, on-street parking and traffic circles are prohibited on state highways. Curb extensions would only be supported on state highways in locations designated as Special Transportation Areas.

In addition to adopting a neighborhood traffic management program, the City should consider modifying the Traffic Impact Study requirements for development applications. This would include a neighborhood impact assessment and mitigation program if the development is anticipated to add significant traffic volumes (or change vehicle speeds) on surrounding local or neighborhood route streets in a residential area. Thresholds used to determine an impact may be similar to the following:

- Local residential street volumes should not increase above 1,200 average daily trips.
- Local residential or neighborhood route residential street speeds should not exceed 28 miles per hour (85th percentile speed).

- Impacts should be analyzed if the proposed project would increase volumes on a local residential or neighborhood route residential street by more than 25 vehicles in a peak hour.

Table 8-1 lists common NTM applications and suggests which devices may be supported by the Silverton Fire District. Any NTM project should include coordination with emergency agency staff to ensure public safety is not compromised.

Table 8-1: Traffic Calming Measures by Roadway Functional Classification

Traffic Calming Measure	Roadway Classification		
	Arterial	Collector	Neighborhood/Local Street
Curb Extensions	Supported	Supported	Calming measures are okay on lesser response routes that have connectivity (more than two accesses) and are accepted and field tested by the Silverton Fire District.
Medians and Pedestrian Islands	Supported	Supported	
Pavement Texture*	Supported	Supported	
Speed Hump	Not Supported	Not Supported	
Raised Crosswalk	Not Supported	Not Supported	
Speed Cushion (provides emergency pass-through with no vertical deflection)	Not Supported	Not Supported	
Choker	Not Supported	Not Supported	
Traffic Circle	Not Supported	Not Supported	
Diverter (with emergency vehicle pass through)	Not Supported	Supported	
Chicanes	Not Supported	Not Supported	

Notes: * Pavement texture is not supported for crosswalks located in the Downtown core.
Traffic calming measures are supported with the qualification that they meet Silverton Fire District guidelines including minimum street width, emergency vehicle turning radius, and accessibility/connectivity.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to the individual destination. Proper implementation of access management techniques will promote reduced congestion, reduced accident rates, less need for highway widening, conservation of energy, and reduced air pollution.

Access management involves the control or limiting of access on arterial and collector facilities to maximize their capacity and preserve their functional integrity. Numerous driveways erode the capacity of arterial and collector roadways and introduce a series of conflict points that present the potential for crashes and interfere with traffic flow. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets primarily function to provide direct access, collector and arterial streets serve greater traffic volume with the objective of facilitating through travel. Silverton, as with every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve access and mobility in Silverton:

- Work with land use development applications to consolidate driveways, provide crossover easements, and take access from lower class roads where feasible. Existing, non-conforming

accesses would only be subject to review and revision upon site improvement or a land use application.

- Implement access spacing standards for new developments and construction, including the prohibition of new single family residential access on arterials and collectors
- Access to arterial roadways should only be permitted for public roads. However, parcels shall not be landlocked by access spacing policies.
- Establish City access spacing standards to prohibit the construction of access points within the influence area of intersections. The influence area is that area where queues of traffic commonly form on the approach to an intersection (typically within 150 feet). In a case where a project has less than 150 feet of frontage, the site would need to explore potential shared access, or if that were not practical, place driveways as far from the intersection as the frontage would allow (permitting for 5 feet from the property line). However, full access may not be permitted in these conditions (e.g. restriction to right-in/right-out access)
- Implement City access spacing standards for new construction on County facilities within the urban growth boundary
- Meet ODOT access requirements on State facilities
- Establish maximum access spacing standards to promote connectivity.

The City of Silverton has historically struggled with the issue of limiting residential access to collector roadways. This is due to the desire to maintain the roadway as a public place that creates a friendly pedestrian and bicycle environment, as opposed to backing properties with fences that wall-off and isolate the roadway. To address this concern and implement the recommended access restrictions, the following measures shall be required:

- Provide a local street grid with 150-foot to 250-foot spacing that allows back-to-back lots along local streets with side yards to the collector roadway. In addition, prohibit the use of fences along lot lines that front the collector roadway, or
- Require lots with frontage along the collector roadway to orient the front of the home to the collector, but provide rear-alley or driveway motor vehicle access.

New development and roadway projects involving City street facilities should meet the recommended access spacing standards summarized in Table 8-2. In cases where physical constraints or unique site characteristics limit the ability for the access spacing standards shown in Table 8-2 to be met, the City of Silverton should retain the right to grant an access spacing variance. All requests for an access spacing variance should be required to complete an access management plan, which should include at a minimum the following items:

- Review of the existing access conditions within the study area (defined the property frontage plus the distance of the minimum access spacing requirement). This should include a review of the last three years of crash data, as well as collection of traffic volume information and intersection operations analysis.
- Short term analysis of the study area safety and operations with the proposed access configuration, as well as with a configuration that would meet access spacing standards.
- Long term analysis of the study area safety and operations with the proposed access configuration. This scenario should also include consideration of the long-term redevelopment potential of the area and discussion of how access spacing standards may be achieved.

Parcels shall not be landlocked by access spacing policies. Opportunities should be explored to provide future access through neighboring parcels and an interim access may be granted. Non-conforming access (defined per Table 8-2) should work to achieve a condition as close to standard as possible. For example, a private access may be permitted to an arterial roadway if no other option (e.g. access to a side street) exists; however, the private access would then be required to meet the minimum driveway spacing of 250 feet listed in Table 8-2.

Table 8-2: Recommended Access Spacing Standards for City Street Facilities

Street Facility	Maximum spacing* of roadways	Minimum spacing* of roadways	Minimum spacing** of roadway to driveway***	Minimum Spacing* driveway to driveway***
Arterial	1,000 feet	500 feet	250 feet	250 feet or combine
Collector:	500 feet	250 feet	150 feet	150 feet or combine
Neighborhood/Local	500 feet	250 feet	10 feet	10 feet

Notes: *Measured centerline to centerline

**Measured near street curb to near driveway edge

***Private access to arterial roadways shall only be granted through a requested variance of access spacing policies (which shall include an access management plan evaluation)

In addition to implementing access spacing standards, the City of Silverton shall require an access report for new access points, proposed to serve commercial and industrial developments, stating that the driveway/roadway is safe as designed and meets adequate stacking, sight distance and deceleration requirements as set by ODOT, Marion County and American Association of State Highway and Transportation Officials (AASHTO). Generally, the need for an access report is triggered by land use actions, design reviews, or land divisions.

Any proposed accesses to State facilities must be approved by ODOT. The *1999 Oregon Highway Plan* identifies access management objectives for all classifications of roadways under State jurisdiction. Both Highway 214 and Highway 213 are classified as District Highways by ODOT, which maintain a management objective that balances the needs of through traffic movement with direct property access. Based on these objectives, ODOT has established access spacing standards for all highway classifications that vary with proximity to urbanized areas and changes in posted speeds. These standards are also provided in the *1999 Oregon Highway Plan*. Table 8-3 identifies the ODOT access spacing standards for District Highways that are applicable within the Silverton urban growth boundary. Note that the spacing standards below are only to be applied to accesses on the same side of the highway.

Table 8-3: Minimum Access Spacing Standards for ODOT District Highways

Posted Speed	Minimum Distance between Accesses (Private or Public)
55 mph or more	700 feet
50 mph	550 feet
40-45 mph	500 feet
30-35 mph	350 feet
25 mph or less	350 feet

ODOT's access management requirements are implemented through OAR 734-051. These rules outline the criteria and procedure for approach permitting decisions, including the application process, conditions under which deviations from established access spacing standards can be allowed, and procedures for appealing decisions.

Marion County also maintains access spacing standards for facilities under County jurisdiction. For County roads within the City's Urban Growth Boundary, the County will use the City's adopted spacing standards[24].

Local Street Connectivity

Many of the existing local street networks, such as those in the downtown area, provide good connectivity with multiple options for travel in any direction. However, some of the newer residential neighborhoods have been developed with limited opportunities for movement into and out of the developments, with some neighborhoods funneling all traffic onto a single street. This type of street network results in out-of-direction travel for motorists and contributes to an imbalance of traffic volumes, which impacts residential frontage. This can result in the need for investments in wider roads, traffic signals and turn lanes that could otherwise be avoided.

By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced, accessibility between various travel modes can be enhanced and traffic levels can be balanced out between various streets. Additionally, public safety response time is reduced.

Some of these local connections can function in coordination with other street improvements to mitigate capacity deficiencies by better dispersing traffic. Several roadway connections will be needed within neighborhood areas to reduce out of direction travel for vehicles, pedestrians and bicyclists. This is most important in the areas where a significant amount of new development is possible.

Figure 8-1 shows the Local Street Connectivity Plan for Silverton. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. The arrows shown in the figures represent potential connections and the general direction for the placement of the connection[25]. In each case, the specific alignments and design will be better determined as part of development review. The criteria used for providing connections is as follows:

- Every 300 feet, a grid for pedestrians and bicycles
- Every 500 feet, a grid for automobiles

[24] Marion County Rural Transportation System Plan, July 2005.
[25] Other local street connections may be required as the City conducts development review.

To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways shall incorporate neighborhood traffic management into their design and construction. All stub streets shall have signs indicating the potential for future connectivity. Additionally, new development that constructs new streets, or street extensions, must provide a proposed street map that:

- Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers
- Limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Includes no close-end street longer than 220 feet or having no more than 25 dwelling units
- Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits

The arrows sbown on the local connectivity map, Figure 8-1, indicate priority connections only and represent future local and neighborhood routes.

Topography, railroads and environmental conditions, such as the Silver Creek, limit the level of connectivity in Silverton. Other stub end streets in the City's road network may become cul-de-sacs, extended cul-de-sacs or provide local connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac will be mandatory as future development occurs. The goal is to improve city connectivity for all modes of transportation.

Traffic Signal Spacing

Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. A minimum traffic signal spacing of 1,000-feet should be required for arterial and collector facilities outside of the Special Transportation Area (STA). Different signal spacing standards may be applied to lower classifications of roadways. ODOT identifies ½ mile as the desirable spacing of signalized intersections on regional and statewide highways but recognizes that shorter signal spacing may be appropriate due to a number of factors including existing road layout and land use patterns.

Figure 8-1: Local Street Connectivity

Functional Classification

The proposed functional classification map for streets in Silverton is shown in Figure 8-2. Any street not designated as an arterial, collector or neighborhood route is considered a local street. The functional classifications within the City are defined below.

Arterial Streets

Arterial streets serve to interconnect the City. These streets link major commercial, residential, industrial and institutional areas. Arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well placed arterial street. The maximum interval for arterial spacing within the City shall be 3,000 feet. Access control is the key feature of an arterial route. Arterials are typically multiple miles in length.

Collector Streets

Collector streets provide both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials) and penetrate residential neighborhoods, distributing trips from the neighborhood and local street system. The maximum interval for collector roadways shall be 1,500 feet. Collectors are typically greater than 0.5 to 1.0 miles in length.

Neighborhood Routes

Neighborhood routes are usually long relative to local streets and provide connectivity to collectors or arterials. Because neighborhood routes have greater connectivity, they generally have more traffic than local streets and are used by residents in the area to get into and out of the neighborhood, but do not serve citywide/large area circulation. They are typically about a quarter to a half-mile in total length. Traffic from cul-de-sacs and other local streets may drain onto neighborhood routes to gain access to collectors or arterials. Because traffic needs are greater than a local street, certain measures should be considered to retain the neighborhood character and livability of these routes. Neighborhood traffic management measures are often appropriate (including devices such as speed humps, traffic circles and other devices - refer to later section in this chapter). However, it should **not** be construed that neighborhood routes automatically get speed humps or any other measures. While these routes have special needs, neighborhood traffic management is only one means of retaining neighborhood character and vitality.

Local Streets

Local streets have the sole function of providing access to immediate adjacent land. Service to "through traffic movement" on local streets is deliberately discouraged by design. All other city streets in Silverton not designated above as collector streets or neighborhood routes are considered to be local streets.

Criteria for Changes to Functional Classification

The criteria used to assess functional classification have two components: the extent of connectivity and the frequency of the facility type. Maps can be used to determine regional, city/district and neighborhood connections. The frequency or need for facilities of certain classifications is not routine or easy to package into a single criterion. While planning textbooks call for arterial spacing of a mile, collector spacing of a quarter to a half-mile, and neighborhood connections at an eighth to

a sixteenth of a mile, this does not form the only basis for defining functional classification.

Changes in land use, environmental issues or barriers, topographic constraints, and demand for facilities can change the frequency for routes of certain functional classifications. While spacing standards can be a guide, they must consider other features and potential long term uses in the area (some areas would not experience significant changes in demand, where others will). It is acceptable for the city to re-classify street functional designations to have different naming conventions, however, the general intent and purpose of the facility, whatever the name, should be consistent with regional, state and federal guidelines.

By planning an effective functional classification of Silverton streets, the City can manage public facilities pragmatically and cost effectively. These classifications do not mean that because a route is an arterial it is large and has lots of traffic. Nor do the definitions dictate that a local street should only be small with little traffic. Identification of connectivity does not dictate land use or demand for facilities. The demand for streets is directly related to the land use. The highest level connected streets have the greatest potential for higher traffic volumes, but do not necessarily have to have high volumes as an outcome, depending upon land uses in the area. Typically, a significant reason for high traffic volumes on surface streets at any point can be related to the level of land use intensity within a mile or two. Many arterials with the highest level of connectivity have only 35 to 65 percent "through traffic". Without the connectivity provided by arterials and collectors, the impact of traffic intruding into neighborhoods and local streets goes up substantially.

Functional Classification Changes in Silverton

The 2000 TSP established a functional classification for Silverton that included arterials, collectors, and neighborhood collectors. The proposed functional classification differs from the existing approved functional classification. Neighborhood routes were not defined in the existing functional classification. The classifications of several roadways within the study area have been revised. The key changes include increasing the number of arterial roadways to create a connected network that serves regional trips at key gateways into the City, maintaining and updating the collector system to reflect changing land uses, and providing neighborhood routes that serve clear connections from neighborhoods that feed into the collector and arterial network.

A revised functional classification map is illustrated in Figure 8-2. The recommended changes to the functional classification defined in the 2000 TSP are also summarized below.

- Monitor Road is upgraded from a collector to an arterial
- Hobart Road is upgraded from a collector to an arterial
- Pine Street is upgraded from a collector to an arterial
- James Street between Florida Drive and C Street changes from a neighborhood collector to a collector
- North Water Street between Brown Street and C Street changes to an arterial street
- North Water Street between James Street and Brown Street changes to a local street (after the completion of the Brown Reroute project)
- Brown Street is classified as a neighborhood route
- McClaine Street is upgraded from a neighborhood collector to an arterial
- Welch Street is classified as a neighborhood route

- Fairview Street is classified as a neighborhood route
- Main Street between Eureka Avenue and North Water Street is upgraded from a neighborhood collector to an arterial
- 2nd Street between C Street and Oak Street is reclassified as a collector
- 2nd Street between Oak Street becomes a neighborhood route
- Steelhammer Road is upgraded to a collector
- Main Street between North Water Street and Steelhammer Road becomes a collector
- Jefferson Street between James Street and Mill Street becomes a neighborhood route
- Mill Street is added as a neighborhood route
- Pine Street between James Street and Brown Street is upgraded to an arterial
- Brown Street between Pine Street and North Water Street is upgraded to an arterial

Figure 8-2: Functional Classification Map

Roadway Cross-Section Standards

The street design characteristics in Silverton were developed to meet the function and demand for each facility type. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility, while meeting standards.

In addition to the city streets, the two state highways within the community have an additional set of design considerations as defined in the *Oregon Highway Plan* (OHP) and in the *Highway Design Manual*. The City has been designated as a Special Transportation Designation (STA) which affects highway operations and design parameters in downtown Silverton.

Special Transportation Area (STA) Designation

ODOT defines a STA as "a highway segment designation that may be applied to a highway segment when an existing downtown or planned downtown, business district or community center straddles the state highway in existing or certain planned urban centers." The main focus of an STA is to encourage pedestrian and bicycle movement, making an interconnected local street network important to facilitate local automobile and pedestrian circulation. In order to be considered for STA designation, an area must:

- Straddle a state highway;
- Not be located on a freeway or expressway; and
- Have slow traffic speeds, generally 25 mph or less.

Typically, STAs are located with mixed land uses and buildings spaced close together and developed with little or no setback from the highway. Sidewalks should be wide and located adjacent to the buildings and the highway. In general, public road connections are preferred to private driveway access, which would mean that businesses would combine driveways and have access on the side streets as opposed to direct access to the highway. However, private driveway access would be retained where feasible access alternatives are not available. The key characteristic for an STA designation that correlates to cross section standards is the ability to narrow travel lanes.

Roadway Cross Sections

The street design characteristics for city streets and the two state highways were developed to comply with current planning standards and meet the function and demand for each facility type, with special consideration to the above STA designation requirements for the ODOT highways. The resulting street cross-sections are depicted in Figure 8-3 through Figure 8-5 for arterials, collectors, neighborhood routes, local streets and alleys. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility, while meeting the design standards.

Specific right-of-way needs will need to be monitored continuously through the development review process to reflect current needs and conditions (that is to say that more specific detail may become evident in development review which requires improvements other than these outlined in this 20 year general planning assessment of street needs).

On facilities under State jurisdiction, ODOT's design standards from the current Highway Design Manual will apply, with any deviation from those standards requiring approval of a design exception. Within the City of Silverton, this would include Highway 213 east of downtown and Highway 214.

Figure 8-3: Arterial Cross-sections

Figure 8-4: Collector Cross-sections

Figure 8-5: Local Street Cross-sections

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth in the Silverton area occurs, the number of vehicle trips and travel demand in the area will also increase. The ability to change a user's travel behavior and provide alternative mode choices will help accommodate this growth.

TDM measures applied on a regional basis can be an effective tool in reducing vehicle miles traveled. Additionally, the Employee Commute Options (ECO) program administered by the Department of Environmental Quality (DEQ) under OAR 340-20-047 requires larger employers (more than 50 employees) in metropolitan areas to provide commute options that encourage employees to reduce auto trips to the work site.

Research has shown that a comprehensive set of complementary policies implemented over a large geographic area can have an effect on the number of vehicle miles traveled to/from that area.[26] However, the same research indicates that in order for TDM measures to be effective, they should go beyond the low-cost, uncontroversial measures commonly used such as carpooling, transportation coordinators/associations, priority parking spaces, etc.

Many of the TDM strategies are tailored towards urban applications, where there are major employment generators and transit opportunities. TDM measures for more rural communities require special development, as compared to those that are implemented in urban areas. TDM measures in rural environments should focus on increasing travel options and creating an environment that is supportive for walking and cycling. The most effective TDM measure for Silverton includes elements related to increased parking management (parking time limits and pricing) downtown, carpools, improved services for alternative modes of travel and employer incentives for the hospital schools and BrucePak.[27] However, TDM includes a wide variety of actions that are specifically tailored to the individual needs of an area. Table 8-4 provides a list of several strategies that will be applied as appropriate within the City of Silverton.

[26] *The Potential for Land Use Demand Management Policies to Reduce Automobile Trips*, ODOT, by ECO Northwest, June 1992.

[27] TriMet Employer Commute Options (employer survey information available online: http://www.trimet.org/employers/ecosrvy.htm

Table 8-4: Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction
Telecommuting	Employees perform regular work duties at home or at a work center closer to home, rather than commuting from home to work. This can be full time or on selected workdays. This can require computer equipment to be most effective.	82-91% (Full Time) 14-36% (1-2 day/wk)
Compressed Work Week	Schedule where employees work their regular scheduled number of hours in fewer days per week.	7-9% (9 day/80 hr) 16-18% (4 day/40 hr) 32-36% (3 day/36 hr)
Alternative Mode Subsidy	For employees that commute to work by modes other than driving alone, the employer provides a monetary bonus to the employee.	21-34% (full subsidy of cost, high alternative modes) 2-4% (half subsidy of cost, medium alternative modes)
Bicycle Program	Provides support services to those employees that bicycle to work. Examples include: safe/secure bicycle storage, shower facilities and subsidy of commute bicycle purchase.	0-10%
On-site Rideshare Matching for HOVs	Employees who are interested in carpooling or vanpooling provide information to a transportation coordinator regarding their work hours, availability of a vehicle and place of residence. The coordinator then matches employees who can reasonably rideshare together.	1-2%
Provide Vanpools	Employees that live near each other are organized into a vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	15-25% (company provided van with fee) 30-40% (subsidized van)
Gift/Awards for Alternative Mode Use	Employees are offered the opportunity to receive a gift or an award for using modes other than driving alone.	0-3%
Walking Program	Provide support services for those who walk to work. This could include buying walking shoes or providing lockers and showers.	0-3%
Company Cars for Business Travel	Employees are allowed to use company cars for business-related travel during the day	0-1%
Guaranteed Ride Home Program	A company owned or leased vehicle is provided in the case of an emergency for employees that use alternative modes.	1-3%
Time off with Pay for Alternative Mode Use	Employees are offered time off with pay as an incentive to use alternative modes.	1-2%

Source: *Guidance for Estimating Trip Reductions from Commute Options*, Oregon Department of Environmental Quality, August 1996.

Many of the peak hour issues can be attributed to commuting patterns to Salem and Portland, in addition to the local trips. Much of Silverton current traffic congestion stems from through and recreational traffic, issues that TDM strategies do not address.

FUTURE CAPACITY ANALYSIS

Analysis of future conditions with the current (no-build) roadway network in place was discussed in Chapter 4. Three alterative scenarios were evaluated to determine the impacts of several potential improvements to the transportation system. The following section outlines the analysis of the following scenarios:

- 2030 Transportation Demand Management Scenario
- 2030 Committed Scenario
- 2030 Enhanced Circulation Scenario

2030 Transportation Demand Management Scenario

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth in the Silverton area occurs, the number of vehicle trips and travel demand in the area will also increase.

The implementation of various strategies are generally aimed at reducing the number of internal-internal trips (the trips that begin and end within the City), specifically with a trip end in the downtown area. The target trips for reduction in downtown Silverton make up approximately 8% of the total number of trips on the street system. As the trips are focused in the downtown core; the trip reduction is significantly less in the rest of the City.

The system improvements that make up this scenario include build-out of eacb of the multi-modal plans presented in this chapter (pedestrians, bicycles, transit, TDM). The 2030 forecasts for this scenario are based on the potential reduction that could be achieved with each of these elements in place. These TDM measures are estimated to have approximately a 10% reduction of trips, which was applied to the 8% of target trips yielding an estimated trip reduction of 1%. The 1% trip reduction was applied to the downtown core which would be the most significantly impacted by potential TDM measures. This scenario does not include any capacity improvements in Silverton. The v/c ratios were compared between the No-Build and the 2030 Transportation Demand Management Scenarios to quantify the impacts that the implementation of TDM measures may have on the downtown system. The highest change in v/c ratios occurred at the intersection of Main Street/Water Street; the 1% trip reduction reduced the v/c ratio by 0.01. The other intersections exhibited changes less than 0.01 which indicate that this scenario does not have significant impacts on the transportation system.

While a comprehensive TDM program may not address the transportation operational issues in Silverton during the PM peak times, employers that have more than 50 employees should be required to implement a van pool program, flexible working hours or another transportation demand management strategy that would influence regional trips be implemented and administered by these large employers to obtain compliance with OAR 340-20-047 mentioned above. Setting TDM goals and policies for new development will be necessary to implement TDM measures in the future.

2030 Committed Scenario

This analysis includes previously identified arterial and collector roadway additions and planned transportation improvements from Silverton's current Capital Improvement Plan that would improve circulation or add system capacity. Only projects that were assumed to be funded and constructed by the forecast year of 2030 were included in the analysis model. Key improvements affecting future traffic assignment and operations include:

Intersection Improvements

- Main Street and Water Street (add traffic signal)
- Main Street and 1st Street (add traffic signal)
- Oak Street (Highway 213) and 1st Street (add traffic signal)
- C Street and Front Street (restrieted to right in/out movements based on the latest design for C Street/Water Street and C Street/1st Street improvements)

New Roadways

- East Side Connector (Monitor Road extension to South Water Street)
- West Side Connector and Bridge (Pine Street to Silverton Road)

The projects ineluded in this scenario were identified in the 2001 TSP and were considered by City staff to remain as potential improvements to the transportation system. These projects create conneetions that provide alternative routes of travel within Silverton and improve overall transportation system connectivity. As tbe number of routing options increases, the travel demand placed on more congested roadways may be lessoned.

The new roadways were taken into account when assigning future trips in the transportation model. Generally, the west-side connector relieved trips on the C Street/James Street corridor and the east-side connector relieved trips through downtown that have origins/destinations on the east and south sides of the City.

Assuming these improvements were in place, the projected growth in traffic volumes over the next 23 years was added to the new roadway network to examine future performance at the study intersections. As in the ease of no improvements to the roadway system, expected growth would result in significant increases in traffic volumes at most interseetions. The 2030 operational analysis (summarized in Table 8-5) including previously identified projects described above, found many study intersections would reach or exeeed full capacity and experience high levels of congestion and delay without additional improvements to the existing transportation system. Table 8-5 also shows the operations that could be achieved with additional mitigation measures applied to the transportation system.

These new roadway projects result in a new distribution of forecasted trips across the city, as travelers may choose new and more direct routes. Although most study intersections that failed to meet performance standards in the no-build scenario continue to fail, the performance at some intersections have improved as demand is shifted to new roadways.

Table 8-5: 2030 Committed Scenario Intersection Operations (PM Peak Hour)

Intersection	Committed Configuration		Mitigated Configuration	
	LOS	V/C ratio	LOS	V/C ratio
Signalized Intersections				
C Street/McClaine Street	**F**	**>1.0**	B	0.75
1st Street (Hwy 214)/Oak Street (Hwy 213)	B	0.70	n/a	n/a
1st Street(Hwy214)/Main Street	**F**	**>1.0**	B	0.67
Water Street/Main Street	B	0.78	B	0.68
1st Street(Hwy214)/C Street	D	0.89	n/a	n/a
Water Street/C Street	C	0.75	n/a	n/a
All-Way Stop Controlled Intersections				
Oak Street (Hwy 213)/Water Street*	**E**	**>1.0**	B	0.67
McClaine Street/Main Street*	**F**	**>1.0**	C	0.88
James Street/Pine Street	C	0.82	n/a	n/a
James Street/Water Street	B	0.65	n/a	n/a
Unsignalized Intersections				
Water Street/Lewis Street	A/A	0.10	n/a	n/a
1st Street(Hwy 214)/Lewis Street	A/E	0.38	n/a	n/a
Oak St(Hwy 213)/2nd Street*	**A/F**	**>1.0**	C	0.78
Westfield Street/Main Street	A/B	0.30	n/a	n/a
Oak St(Hwy 213)/Steelhammer Road	**A/F**	**0.62**	A/B**	n/a
Oak St(Hwy 213)/Monitor Road	**A/F**	**0.49**	A/B**	n/a
1st Street(Hwy214)/Pioneer Drive	A/C	0.30	n/a	n/a
1st Street(Hwy214)/Hobart Road	**A/F**	**0.89**	B	0.69
Front Street/C Street	A/C	0.10	n/a	n/a
Water Street/Park Street	A/A	0.05	n/a	n/a
James Street/C Street	**A/F**	**>1.0**	A/E	0.31

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop V/C ratio = average V/C ratio for entire intersection
Unsignalized V/C ratio = critical movement V/C ratio
Bold type indicates a failure to meet adopted mobility standard.
*Unsignalized in the committed scenario, signalized in the mitigated scenario
**Potential mitigation includes construction of a roundabout; further analysis to be conducted (signal warrants and all-way stop control warrants were not met)

Preliminary traffic signal warrants[28] were evaluated at the unsignalized study intersections under the 2030 Committed Project scenario. The Peak Hour Warrant analysis was based on PM peak hour traffic volumes. Locations meeting signal warrants were improved to signalized control for the mitigate scenario.

Micro-simulation

The isolated intersection analysis summarized in Table 4 does not reflect the downtown street network system level operation. The proposed traffic signals were modeled and simulated using Sim Traffic to reflect the interaction that occurs between closely spaced intersections. The micro

[28] Preliminary Signal Warrants, MUTCD Warrant 3 (Peak Hour Vehicular Volume).

simulation models the operations and queuing characteristics based on volume and geometry inputs and provides system-wide performance measures that evaluate the operations based on vehicle delay. Two different simulation scenarios were conducted. The first scenario modeled the existing roadway intersections with five traffic signals in place (four from the planned improvements and one additional signal due to a future deficiency at Oak Street (Hwy 213)/2nd Street. Due to the grid network and close intersection spacing, the queuing overflow affected the intersection operations and contributed to excessive vehicle delay. The total vehicle delay for the system was approximately 8 minutes.

The second simulation included modifications to the existing network (e.g. turn lanes and turn restrictions) to accommodate heavy turning movements. The addition of turn lanes (southbound right turn lane) at Main Street/Water Street and Main Street/1st Street (eastbound left turn lane) and the left turn restrictions at Oak Street/2nd Street significantly reduced the total network delay to one minute.

Recommended Mitigation Measures

The following list includes the recommended mitigation measures required based on the identified future deficiencies and the requirements that allow the downtown traffic signal network to function adequately. The mitigation measures include:

- Install traffic signal at McClaine Street/Main Street
- Install traffic signal at 1st Street (Hwy 214)/Hobart Road
- Install traffic signal at Oak Street (Highway 213)/2nd Street
- Install traffic signal at Oak Street (Highway 213)/Water Street
- Close the south leg of 1st Street (Hwy 214)/Lewis Street
- Construct southbound right turn lane at Main Street/Water Street
- Construct eastbound left turn lane at Main Street/1st Street
- Construct westbound right turn lane at McClaine Street/Main Street
- Restrict eastbound/westbound left turns at Oak Street (Highway 213)/2nd Street
- Construct southbound right turn lane at C Street/McClaine Street
- Construct westbound right turn lane at McClain Street/Main Street
- Construct roundabout at Highway 213/Monitor Road

2030 Enhanced Circulation Alternative

Based upon the evaluation of intersection capacity, the roadways in Silverton would not meet 2030 demands without intersection improvements. Another scenario was evaluated to determine if a system of new roadway connections could alleviate the impacts on the state highway system and reduce the number of mitigations required for the future year. This scenario included the development of alternatives to address the following capacity and connectivity issues:

- **Lack of north-south circulation**-The primary north-south connection through Silverton extends through downtown on the state highway couplet (Highway 214). There are limited complete parallel routes that provide north-south connectivity throughout Silverton to alleviate the anticipated growth that is forecasted to occur under future year (2030) conditions.
- **Lack of east-west circulation**-The primary east-west connection through Silverton extends through downtown on Highway 213. Similar to the primary north-south connection, the roadway is congested in the future year (2030). The east-west connectivity is also limited by the existing bridge crossings.

A system of new roadway connections was identified based on discussion with City staff and input from the Technical Advisory Committee. The 2030 Enhanced Circulation scenario includes the two connector roadways previously identified in the 2000 TSP and included in the 2030 Committed Projects scenario and three additional roadways that were developed to address circulation and connectivity issues throughout the City of Silverton. The primary function of this system of connectors is to lessen the travel demand utilizing the state highway system that bisects the City.

Three of the potential roadway connections are north-south connections on the west and east of the downtown core that provide parallel routes to the 1st Street/Water Street couplet. The remaining two connections address the east-west capacity issues, including a bridge crossing over Silver Creek and an east-west connection north of downtown. The improvements selected for this analysis are discussed below, summarized in Table 8-6 and shown in Figure 8-6.

Westside North-South Connector #1: This potential roadway provides a connection from Pine Street to Silverton Road west of Grant Street. The roadway provides an important west side connection and an additional bridge crossing west of downtown. Currently, the nearest bridge crossing is at James Street and this connection generally relieved trips on the C Street/James Street Corridor. The construction of a bridge crossing over Silver Creek adds significant cost to the project. This roadway connection was identified in the 2000 TSP.

Westside North-South Connector #2: This potential roadway provides a connection from Silverton Road to Main Street. As a stand-alone project, the amount of vehicles that would utilize the connection is limited. However, it would likely connect to North-South Connector #1 and North-South Connector #3 to provide a complete north-south connection that would provide access to the Oregon Garden and destinations both north and south of downtown. The proposed alignment will be along the south and west edge of the Silverton school district property and would accommodate west side access without requiring travel through the downtown area.

Westside North-South Connector #3: This potential roadway provides a connection from Main Street to South Water Street and provides the last segment of the complete Westside north-south connection from Pine Street. This proposed connector will tie into the existing alignment of Eureka Avenue and then continue to South Water Street. Due to the existing topography between the Eureka Avenue and South Water Street and slopes of approximately 55%, a retaining wall will be required for this southern segment of the roadway. The retaining wall and other geographical constraints contribute to a significant cost for the completion of this roadway connection.

Eastside North-South Connector #4: This potential roadway provides a parallel route that connects Silverton on the eastside of downtown. The alignment will tie into Monitor Road at Oak Street and connect to Pioneer Drive to the south. Generally, the east-side connector relieved trips through downtown that have origins/destinations on the east and south sides of Silverton. The proposed roadway is expected to carry approximately 1,900 vehicles in the future year (2030). This connection was also identified in the 2000 TSP. A key issue with this connection is the project limits outside of the adopted Urban Growth Boundary (UGB). This portion of the project would need to go through a Goal Exception analysis consistent with State of Oregon statutes in order to be designated in the TSP for funding or carried forward to project implementation.

The proposed alignment of the connector crosses Evans Valley Road which is a likely location to break the construction of the connector into two phases: north of Evans Valley Road and south of Evans Valley Road. Phase 1 should be constructed first to connect the rapidly developing Pioneer neighborhood to Evans Valley Road, from there motor vehicle trips destined to Monitor Road or Highway 213 could be served by existing surface streets (until Phase 2, north of Evans Valley Road) is constructed.

Northside East-West Connector #5: This potential roadway connects James Street and 2nd Street south of Jefferson Street. The primary purpose of this roadway is to provide another connection north of C Street for trips destined on the east or west side of 1st Street (Hwy 214). The forecasted future daily volume on this roadway is approximately 900 vehicles. It does not have significant impacts on the adjacent intersections, although it does improve the connectivity and circulation north of downtown. A key issue with this roadway is the proposed railroad crossing. It is likely that ODOT Rail may not approve a new at-grade rail crossing within this City, and this connection would be required to be grade separated.

Bridge Crossing Connector #6: This potential roadway provides a short connection and bridge crossing over Silver Creek at High Street. Bridge crossings are limited in the downtown area to C Street and Main Street. The construction of this connector would alleviate some of the trips destined for the two existing crossings to access McClain Street. The bridge crossing has a high cost associated with its construction and is not expected to shift significant volumes from the two adjacent, critical intersections at C Street/Water Street or Main Street/Water Street.

Table 8-6: Potential Roadway Connections

Project Description	From/To	Projected ADT
Westside North-South Connector #1	Silverton Road/Pine Street (west of Westfield Street)	2,500 vehicles
Westside North-South Connector #2	Silverton Road/Main Street (west of Westfield Street)	3,300 vehicles
Westside North-South Connector #3	Main Street/South Water Street (west of Westfield Street)	4,000 vehicles
Eastside North-South Connector #4	Hwy 213/Pioneer Drive (Monitor Road Extension south to Pioneer Drive)	1,900 vehicles
Northside East-West Connector #5	James Street/2nd Street (south of Jefferson Street)	900 vehicles
Bridge Crossing Connector #6	N Water Street/McClaine Street (at High Street)	700 vehicles

The new roadway connections were considered when assigning future trips in the transportation model. Table 8-7 lists the study intersection performance with this scenario; six intersections fail to meet LOS and v/c ratio performance standards. Therefore, additional intersection capacity improvements (turn lanes or signalization) were considered to meet performance standards. Table 8-7 lists the 2030 Build Mitigated intersection performance. The intersection capacity improvements are consistent with those listed for the 2030 Committed Scenario.

Figure 8-6: Potential Collector Roadways

Table 8-7: 2030 Enhanced Circulation Intersection Operations (PM Peak Hour)

Intersection	Enhanced Circulation Configuration		Mitigated Configuration	
	LOS	V/C ratio	LOS	V/C ratio
Signalized Intersections				
C Street/McClaine Street	**E**	**>1.0**	B	0.75
1st Street (Hwy 214)/Oak Street (Hwy 213)	C	0.59	n/a	n/a
1st Street(Hwy214)/Main Street	**F**	**0.93**	B	0.60
Water Street/Main Street	B	0.68	n/a	n/a
1st Street(Hwy214)/C Street	D	0.83	n/a	n/a
Water Street/C Street	C	0.68	n/a	n/a
All-Way Stop Controlled Intersections				
McClaine Street/Main Street*	**F**	**>1.0**	B	0.63
Oak Street(Hwy 213)/Water Street*	**E**	**>1.0**	B	0.61
James Street/Pine Street	C	0.69	n/a	n/a
James Street/Water Street	B	0.61	n/a	n/a
Unsignalized Intersections				
Water Street/Lewis Street	A/A	0.07	n/a	n/a
Oak St(Hwy 213)/2nd Street*	C	0.75	n/a	n/a
1st Street(Hwy 214)/Lewis Street	A/C	0.26	n/a	n/a
Westfield Street/Main Street	A/B	0.22	n/a	n/a
Oak St(Hwy 213)/Steelhammer Road	A/F	0.63	A/B**	
Oak St(Hwy 213)/Monitor Road	A/F	0.49	A/B**	
1st Street(Hwy214)/Pioneer Drive	A/C	0.32	n/a	n/a
1st Street(Hwy214)/Hobart Road	**A/F**	**0.89**	B	0.67
Front Street/C Street	A/C	0.10	n/a	n/a
Water Street/Park Street	A/A	0.05	n/a	n/a
James Street/C Street	**A/F**	**>1.0**	A/E	0.31

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop V/C ratio = average V/C ratio for entire intersection
Unsignalized V/C ratio = critical movement V/C ratio
Bold type indicates a failure to meet adopted mobility standard.
*Unsignalized in the Enhanced Circulation scenario, signalized in the mitigated scenario
**Potential mitigation includes construction of a roundabout; further analysis to be conducted (signal warrants and all-way stop control warrants were not met)

With the proposed roadway connections in place, the delay and v/c ratios were reduced at all of the intersections but did not have significant impacts on the required mitigations. All of the mitigations that were identified in the Committed Project scenario were also required for the 2030 Enhanced Circulation scenario. Although the proposed roadway connections are not warranted as mitigation for intersection deficiencies, they provide several other benefits that enhance community livability including:

- Improved circulation;
- Improved emergency service access; and
- Reduced total vehicle-miles-traveled (VMT)

The cost and feasibility of construction for each of these roadway connections should be considered and balanced with the anticipated benefits to determine whether the improvements should be included as part of the motor vehicle project list. The projects that may be the most feasible to construct and provide the most connectivity benefit include connections #1 (between Pine Street and Silverton Road) and #4 (between Highway 213 and Pioneer Drive).

Motor Vehicle Master Plan and Action Plan

The improvements identified to meet 2030 system demand combine the projects identified in prior plans (Silverton's 2000 TSP and Marion County's RTSP) and other projects determined from coordination with City staff and public involvement. These improvements are shown in Figure 8-7 and listed in Table 8-8.

The cost estimates shown in these tables are estimated by DKS Associates using standard assumptions for new facilities. Further refinements should be made of these estimates prior to capital budgeting. Five master plan projects have been selected for more detailed cost estimates and are included in the technical appendix.

Inclusion of an improvement project in the TSP does not commit the City or ODOT to allow, construct or participate in funding the specific improvement. Projects on the State Highway System that are contained in the TSP are not considered reasonably likely to be funded projects until they are programmed into the Statewide Transportation Improvement Plan (STIP).

As such, projects proposed in the TSP that are located on a State highway cannot be considered mitigation for future development or land use actions until they are programmed into the STIP. Unanticipated issues related to project funding, as well as the environment, land use, the economy, changes in the use of the transportation system, or other concerns may be causes for re-evaluation of alternatives discussed below and possible removal of a project from consideration for funding or construction. Highway projects that are programmed to be constructed may have to be altered or canceled at a later time to meet changing budgets or unanticipated conditions.

The Motor Vehicle Action Plan was created to identify high priority motor vehicle projects that are reasonably expected to be funded by the year 2030, which meets the requirements of the updated Transportation Planning Rule[29]. The mitigation measures (improvement projects) in downtown Silverton cannot be implemented individually due to the close intersection spacing and potential queuing effects that occur within a grid network. The order that the improvement projects are implemented is critical to traffic operations. Refer to the Silverton Downtown Plan and phasing memorandum in the technical appendix for project phasing and implementation order for projects located in downtown Silverton. The Motor Vehicle Action Plan identified in the TSP update analysis is included in Table 8-8 and indicates the approximate years that the improvement projects will be needed. However, changes to project priorities and available funding sources could allow Master Plan projects to be implemented, possibly before Action Plan Projects.

The costs outlined to maintain the existing roadway system (including operations and capital improvements to existing facilities) over the next 23 years exceed the projected revenues, as discussed in Chapter 10. Without additional revenue sources, the expected funding deficit would not allow for any capital improvements projects that provide new capacity (turn lanes, bike lanes, etc.)

[29] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

Table 8-8: Motor Vehicle Master Plan and Action Plan Projects

Location	Description	Plan	Cost ($1,000)
Intersection Improvements			
McClaine Street/Main Street	Install traffic signal and construct westbound right turn lane	Action (2015)	$600
1st Street (Hwy 214)/Hobart Road	Install traffic signal	Action (2025)	$250
Oak Street (Hwy 213)/2nd Street	Install traffic signal	Action (2030)	$250
Oak Street (Hwy 213)/Water Street	Install traffic signal	Action (2025)	$250
Oak Street(Hwy 213)/1st Street	Install traffic signal	Action (2020)	$250
1st Street (Hwy 214)/Lewis Street	Close the south leg of intersection	Action (2020)	$10
Main Street/1st Street	Install traffic signal	Action (2020)	$250
Main Street/1st Street	Construct an eastbound left turn lane	Action (2025)	$250
Main Street/Water Street	Install traffic signal	Action (2015)	$250
Main Street/Water Street	Construct a southbound right turn lane	Action (2030)	$250
Oak Street/2nd Street	Restrict eastbound and westbound left turns (signing)	Action (2030)	$5
C Street/McClaine Street	Construct southbound right turn lane	Action (2020)	$420
James Street/C Street**	Restrict northbound and southbound left turns	Action (2010)	-
Highway 213/Steelhammer Road	Construct left turn pocket with median treatment	Action (2025)	$250
Pioneer Drive/Evans Valley Road	Construct roundabout	Action (2030)	$750
Highway 213/Monitor Road	Construct roundabout	Action (2030)	$2,300
Arterial Corridor Improvements			
Brown Street Reroute	Upgrade Brown Street (From Water Street to Pine Street) and Pine Street (from Brown Street to James Street) to arterial standards and reroute traffic between Water Street and Pine Street via the new arterial link	Master (2020)	$2,185

Location	Description	Plan	Cost ($1,000)
Roadway Connections[30]			
Eastside North-South Connector #4 (Phase 1)	Construct north-south connector roadway from Pioneer Drive to Evans Valley Road	Action	$3,750
Eastside North-South Connector #4 (Phase 2)	Construct north-south connector roadway from Evans Valley Road to Highway 213	Master	$8,250
Westside North-South Connector #2	Construct north-south connector roadway from Silverton Road to Main Street	Master	$5,950
Northside East-West Connector #5	Construct east-west connector roadway from James Street to 2nd Street (south of Jefferson Street)	Master	$2,500
	Total Motor Vehicle Action Plan Project Cost		**$10,085**
	Total Motor Vehicle Master Plan Project Cost		**$29,936**

Note: *Project is located outside of current UGB. See footnote for related information.
**The turn restrictions at C Street/James Street should be implemented after the C Street/Water Street traffic signal has been constructed.

Table 8-9: 2030 Mitigated Intersection Operations (PM Peak Hour)

Intersection		2030 No-Build		2030 Mitigated Configuration	
	Jurisdiction	LOS	V/C	LOS	V/C
Signalized Intersection					
C Street/McClaine Street	Marion County	**F**	**>1.0**	C	0.90
1st Street(Hwy214)/C Street	ODOT	**D**	**0.91**	**D**	**0.91**
Water Street/C Street	Marion County	C	0.68	C	0.68
All-way Stop Controlled Intersections					
Oak Street(Hwy 213)/Water Street	ODOT	D	0.85	B	0.67
McClaine Street/Main Street	Silverton	**F**	**>1.0**	B	0.64
James Street/Pine Street	Silverton	D	0.95	D	0.95
James Street/Water Street	Silverton	C	0.72	C	0.72
Unsignalized Intersections					
1st Street (Hwy 214)/Oak Street (Hwy 213)	ODOT	**E**	**> 1.0**	B	0.70
1st Street(Hwy214)/Main Street	ODOT	**F**	**> 1.0**	B	0.67
Water Street/Main Street	ODOT	**F**	**> 1.0**	B	0.68

[30] This table identifies anticipated future roadway extensions outside of the UGB. These facilities are included in the master plan, but they will be authorized by subsequent land use decisions. These roadways are needed to support long term transportation needs and represent logical extensions and connections to meet future needs. These alignments are generalized recommendations for connectivity and will be refined when future land use decisions, such as UGB amendments, are considered. Designation of these projects as planned facilities or improvements will require an amendment to the Marion County TSP and/or a UGB amendment.

Intersection		2030 No-Build		2030 Mitigated Configuration	
	Jurisdiction	LOS	V/C	LOS	V/C
Water Street/Lewis Street	ODOT	A	0.10	A	0.47
1st Street(Hwy 214)/Lewis Street	ODOT	**A/F**	**0.42**	A/A	0.40
Westfield Street/Main Street	Marion County	A/B	0.30	A/B	0.30
Oak St(Hwy 213)/Steelhammer Road	ODOT	**A/F**	**0.68**	A/D	0.38
Oak St(Hwy 213)/Monitor Road	ODOT	**A/E**	**0.37**	**A/D**	**0.65**
1st Street(Hwy214)/Pioneer Drive	ODOT	A/B	0.17	A/B	0.19
1st Street(Hwy214)/Hobart Street	ODOT	**A/F**	**0.91**	B	0.71
Oak St(Hwy 213)/2nd Street	ODOT	**A/F**	**>1.0**	C	0.78
Front Street/C Street	ODOT	**A**/D	0.90	A/D	0.1**7**
Water Street/Park Street	ODOT	A/B	0.04	A/B	0.04
James Street/C Street	Marion County	**B/F**	**>1.0**	A/C	0.45

Figure 8-7: Motor Vehicle Master Plan

Several gravel streets were also identified by the City as high priority streets for potential paving projects. Priority streets have been selected based on through traffic volumes, size (generally longer than two lots), and placement (primarily in developed areas). These street paving projects are shown in Table 8-10 and will be funded by the City as outlined in Chapter 10.

Table 8-10: Gravel Street Paving Action Plan Projects

Project	From	To	Distance (ft)	Cost ($1,000s)
Lane Street	South Water Street	3rd Street	930	$246
Rock Street	East Main Street	Kent Street	340	$94
Brooks Street	Alder Street	Wilson Street	450	$120
Short Street	Alder Street	Wilson Street	350	$94
Wilson Street	Short Street	Brook Street	600	$158
North 3rd Street	Oak Street	B Street	900	$238
Hill Street	-	-	600	$158
Wall Street & Bartlett Street	Norway Street	South end	600	$158
Park Street	2nd Street	3rd Street	273	$72
		Total Gravel Street Paving Project Cost		**$1,338**

TRUCKS

Efficient truck movement plays a vital role in maintaining and developing Silverton's economic base. Well planned truck routes can provide for the economical movement of raw materials, finished products and services. Trucks moving from industrial areas to regional highways or traveling through Silverton are different than trucks making local deliveries. The transportation system should be planned to accommodate this goods movement need. The following goals and policies pertaining to freight movement and facilities have been developed as part of this Transportation System Plan.

The establishment of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety and minimizing maintenance costs of the roadway system. The existing truck routes adequately serve future needs in Silverton; no new truck routes are proposed. The existing routes bypass downtown on Westfield Street, 1st Street, Hobart Road and Monitor Road.

The plan is aimed at addressing the through movement of trucks, not local deliveries. The objective of this route designation is to allow these routes to focus on design criteria that is "truck friendly", (i.e. 12 foot travel lanes, longer access spacing, 35 foot (or larger) curb returns and pavement design that accommodates a larger share of trucks). Because these routes are through routes and relate to regional movement, they should relate to the regional freight system.

CHAPTER 9 : OTHER MODES

This chapter summarizes existing and future rail, air, water and pipeline needs in the City of Silverton. While auto, transit, bicycle and pedestrian transportation modes have a more significant effect on the quality of life in Silverton, other modes of transportation must also be considered and addressed. Future needs for rail, air, marine and pipeline infrastructure are identified by their providers and are summarized below.

Rail

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch rail line service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. The following existing and forecasted needs have been identified within the City of Silverton:

Rail/Highway Grade Crossing Improvements- Three crossing have been identified for crossing improvements. The following crossings are currently controlled by stop signs and should be upgraded to crossing gates, flashers and pedestrian path features:

- 1st Street (Hwy 214)/Hobart Road
- 1st Street (Hwy 214)/Jefferson Street
- James Street/C Street

Rail Facility Upgrade- The existing rail facility is only used for freight rail service, in the future passenger rail (tourist-oriented) and/or commuter rail options may be introduced. The existing rail system will require facility improvements to accommodate these additional rail uses, as well as further coordination with the Oregon Department of Transportation.

Future Potential Rail Station- If commuter and/or passenger rail is introduced within the City of Silverton a centrally located rail station will be required. A potential, future station location has been identified on the northeast corner of C Street/Water Street. Future development in that area should not preclude this location as a potential station site.

Air

One private airfield facility is located northwest of Silverton. There are currently no existing or planned public airports within the Silverton TSP study area. Passenger service in Silverton is provided via the McNary Field Airport, approximately 20 miles west of Silverton in Salem and at the Portland International Airport, approximately 60 miles north of Silverton. No policies or recommendations in this area of transportation are needed for the City of Silverton within the planning horizon.

Water

No waterways are used for commercial transportation purposes within the Silverton TSP study area. Silver Creek and surrounding park areas and trails are used for recreation. No plans were identified for waterway infrastructure expansion. As such, no policies or recommendations in this area of transportation are provided for Silverton.

Pipeline

All existing pipelines within and passing through Silverton are outside of the maintenance responsibilities of the City. As such, no policies or recommendations in this area of transportation are provided for Silverton.

CHAPTER 10 : FINANCING AND IMPLEMENTATION

This chapter outlines the funding sources that can be used to meet the needs of the future transportation system. The costs for the modal elements of the transportation system plan are outlined and compared to the potential revenue sources. Options are discussed regarding how to balance costs of the plan and revenues.

CURRENT FUNDING STRATEGIES

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a greater share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through local improvement districts (LIDs) and frontage or off-site improvements required as mitigation for land development.

The City of Silverton utilizes a number of mechanisms to fund construction of its transportation infrastructure as described below. The first two sources collect revenue each year that is used to repair street facilities or construct new streets, with some restrictions on the type and location of projects. The last program is different in that it does not generate on-going revenue, but is a means to acquire needed property and improvements (Exaction) as development occurs.

State Fuel Tax and Vehicle License Fee

The State of Oregon Highway Trust Fund collects various taxes and fees on fuel, vehicle licenses, and permits. A portion is paid to cities annually on a per capita basis. By statute, the money may be used for any road-related purpose. Silverton currently uses these funds for street operating and maintenance needs.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. The gas tax in Oregon has not increased since 1992 (currently 24 cents per gallon.) The tax does not vary with gas prices changes, nor is there an adjustment for inflation. The lack of change since 1992 means that the net revenue collected has gradually eroded as the cost to construct and repair transportation systems has increased. Fuel efficiency in new vehicles has further reduced the revenue stream.

Oregon vehicle registration fees are collected as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon have recently increased from $15 per vehicle per year to $27 per vehicle per year for passenger cars, with similar increases for other vehicle types. There is no adjustment for inflation tied to vehicle registration fees.

Silverton receives about $350,000 per year in gas tax and vehicle license fee revenue for streets, bikeways and sidewalks. Essentially all of these funds are spent on surface maintenance of local streets and administrative costs. Because there is no index for cost inflation, this revenue level will increase only proportionate with the city's population growth relative to Marion County growth.

System Development Charge

The System Development Charge (SDC) for streets is used as a funding source for capacity adding projects for the transportation system. The SDC is collected from new development based on the proposed land use and size. SDC fees are based on each land use's potential vehicle trip generation. The current SDC rate was set in 1999 and updated in 2005. SDCs are based on the number of Equivalent Length New Daily Trips (ELNDT) estimated for each development. The current SDC rate per PM peak hour trip is $3,535, which includes the SDC reimbursement fee and the SDC improvement fee.

Based on the Action Plans identified in this TSP, the list of capital improvement projects eligible for SDC funding is significantly modified. The revised SDC eligible cost for intersection improvements, roadway reconstruction, pedestrian improvements, and bicycle improvements totals $6,396,992 (this assumes the SDC calculation methodology utilizing 29% SDC share is maintained). The estimated growth in vehicle trips in the 23 year horizon of the TSP is 2,780 pm peak hour trips. Based on these land use forecasts[31], Silverton's SDC rate would be revised to $2,735. The total SDC fees collected over the next 23 years would be approximately $7,603,300.

ODOT Fund Exchange

Silverton has received at least $95,000 annually from ODOT's Fund Exchange. It is anticipated that this money will continue to be a revenue source for operations and maintenance for the City's transportation system.

Exactions

These are improvements that are obtained when development is permitted. Developers are required to improve their frontage and, in some cases, provide off site improvements depending upon their level of traffic generation and the impact to the transportation system. Off-site mitigation measures can include, but are not limited to, Master Plan projects identified in the TSP.

Urban Renewal Funds

An Urban Renewal District (URD) is a tax-funded district within the City. The URD is funded with the incremental increases in property taxes that result from construction of applicable improvements. This type of tax increment financing has been used in Oregon since 1960. Uses of the funding inelude, but are not limited to, transportation. However, for the purposes of the transportation system plan for the City of Silverton, it is assumed that the future URD funds will be used to implement the Downtown Silverton Improvement Plan[32] and funds will not be available for other transportation system improvements. The estimated amount of urban renewal funds is $100,000 annually, which corresponds to $2.3 million over the 23 year planning horizon. These funds can be used to construct projects located in the downtown area.

[31] This revenue estimate should be refined as more specific development data becomes available.
[32] Silverton Downtown Master Plan, June 2007.

Grants and Donations

Silverton has received grants and donations to fund operations of the Silver Trolley, as well as to construct bicycle and pedestrian improvements. These fund sources include ODOT, Salem Area Mass Transit, the Department of Energy, and private donations. For the purpose of this plan, it is assumed that the current state grant programs that are funding the transit operations will continue to be a revenue source. In the event that the state grant programs are discontinued, a Transit Operations Fee may be considered to meet transit operations needs.

Summary

Table 10-1 summarizes the current renewable funding sources, including recent annual revenues and the projected revenues through the planning horizon year 2030. Assuming the renewable funding sources outlined above, the City of Silverton will collect approximately $611,100 for transportation operations and maintenance and $430,578 for capital improvements each year. This revenue will be generated from the state (fuel taxes and license fees), the Urban Renewal Fund, System Development Charges, and other revenue sources. Total revenues to be collected over 23 years between 2007 and 2030 would be $24 million with current funding sources and projected population and employment growth.

Table 10-1: Summary of Current Revenues for Transportation

Funding Category	Funding Allocation	Estimated Revenues Through 2030	Annual Amount
New Development (not SDC)	Operations and Maintenance	$143,000	$6,200
State Fuel Apportionment & Vehicle License Fee	Operations and Maintenance	$8,406,000	$365,500
ODOT Fund Exchange	Operations and Maintenance	$2,056,000	$89,400
Transit Operations Grant	Operations and Maintenance	$3,450,000	$150,000
Urban Renewal Fund	Capital Improvements	$2,300,000	$100,000
System Development Charge	Capital Improvements	$7,603,300	$330,578
	Total O&M Revenues	**$14,055,000**	**$611,100**
	Total Capital Revenues	**$9,903,300**	**$430,578**

Note: The annual amount indicates average annual totals over the last four years.

Source: City of Silverton, Adopted Budget, Fiscal Years 2003-2004 through 2006-2007

PROJECTS AND PROGRAMS

This section presents the recommended projects and programs developed for the City of Silverton to serve local travel for the coming 23 years. The Pedestrian, Bicycle, Transit, and Motor Vehicle projects were identified in the Action Plan for each mode, and represent those projects that have the highest short-term need for implementation to satisfy performance standards or other policies established for the Silverton Transportation System Plan. The costs for the remaining projects noted in the modal Master Plans are identified, but these have not been included in the funding needs analysis for the City because the Action Plan is limited to projects most likely to be funded within

the planning horizon. Other projects on the Master Plan list require additional funding, and they are expected to be built beyond the 23 year horizon or completed with development exactions or other unanticipated funding sources.

Project Cost Estimates

Cost estimates (general planning level) were developed for the projects identified in the motor vehicle, bicycle, transit, and pedestrian elements. Cost estimates from the existing City planned projects were used in this study, if they were determined to be reasonable. Other projects were estimated using general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs[33]. Development of more detailed project costs can be prepared in the future with more refined financial analysis. Since many of the projects overlap elements of various modes, the costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project mode elements out separately, however, in most cases, there are greater cost efficiencies of undertaking a combined, overall project. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

All cost estimates are based on 2007 dollars. Historical construction costs price index has increased by 2.5 to 2.75 percent per year according to Engineering News Record research[34] . Construction costs have increased 100 percent in the 20 years from 1979 to 1999.

Other Transportation Programs and Services

In addition to the physical system improvements identified in the previous section, the transportation facilities will require on-going operation and maintenance improvements across a variety of areas. These other transportation programs are recommended to respond to the specific policies and needs in maintaining roadway pavement quality, allocations for implementing neighborhood traffic management, and on-going update and support of related planning documents.

- **Roadway Maintenance:** The annual cost of maintaining the streets and sidewalks within Silverton was estimated at $573,000, a portion of which is paid for by gas tax revenues from the state. This does not include road maintenance responsibilities on the arterial streets that are serviced by Marion County or ODOT. Over 20 years, the City's road maintenance responsibility accounts for $13.2 million. The actual maintenance costs could vary from this estimate.
- **Transit Operations:** The Action Plan for transit service includes the addition of a city operated commuter service to Salem, which would require the purchase of an additional transit vehicle and operating and maintenance costs. The annual cost of providing this service, in combination with improving the Silver Trolley service, was estimated at $150,000 per year. These annual transit operating costs are assumed to be funded through current state grant programs. The actual costs could vary from this estimate.

[33] General plan level cost estimates do not reflect specific project construction costs, but represent an average estimate. Further preliminary engineering evaluation is required to determine impacts to right-of-way, environmental mitigation and/or utilities. This level of cost-estimating is typically completed during project development and design. Experience has shown that individual projects costs can increase by 25 to 75 percent as a result of the above factors.

[34] Engineering News Record Construction Cost Index as reported for the past ten years for 20 cities around the United States. Reference: http://www.enr.com/features/conEco/costIndexes/constIndexHist.asp

- **Gravel Street Paving:** The annual cost of paving gravel streets in Silverton was estimated at $58,000 per year. This is based on paving the streets that the City has identified as high priority gravel roadways for maintenance. Actual costs could vary from this estimate based on drainage needs or other issues.
- **Roadway Reconstruction:** The City's Capital Improvement Plan (CIP) includes a series of roadway reconstruction projects for collector or arterial roadways with failing bases or that are in need of urbanization. The total cost of completing these reconstruction projects was estimated at $8.452 million, a portion of which is SDC eligible. The actual reconstruction costs could vary from this estimate.

Silverton Costs for TSP Action Plans

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Transit, Bicycles, and Pedestrians total $24.2 million, and several other recommended transportation operations and maintenance programs would add $13.5 million for a total cost over 23 years of $37.6 million. This total exceeds the expected 23-year revenue estimate of $24 million (see Table 10-1) by approximately $13.6 million. Alternative solutions to address this funding deficit for the Action Plan projects are discussed in the next section.

Table 10-2: Silverton Transportation Action Plans Costs over 23 years (2007 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$10,085
Roadway Reconstruction	$8,452
Bicycle	$1,578
Transit	$370
Pedestrian	$3,679
Total Capital Projects	**$24,164**
Operations and Maintenance Programs and Services	
Roadway Maintenance ($378,000 per year)	$8,693
Local Transit Operations ($150,000/yr)	$3,450
Gravel Street Paving ($58,000/yr)	$1,334
Total Operations and Maintenance Programs	**$13,477**
23 YEAR TOTAL in 2007 Dollars	**$37,641**

NEW FUNDING SOURCES AND OPPORTUNITIES

The new transportation improvement projects and action plans will require funding beyond the levels currently collected by the City. There are several potential funding sources for transportation improvements. This section summarizes several funding options available for transportation improvements. These are sources that have been used in the past by agencies in Oregon. In most cases, these funding sources, when used collectively, are sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects, it is necessary to seek several avenues of funding projects. Unique or hybrid funding of projects

generally will include these funding sources combined in a new package.

Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community that supports needed transportation improvements. That is the value of the Transportation System Plan. In most communities where time is taken to build a consensus regarding a transportation plan, funding sources can be developed to meet the needs of the community.

Transportation program funding options range from local taxes, assessments, and charges to state and federal appropriations, grants, and loans. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability and competitiveness of state and federal funds. Nonetheless, it is important for the City to consider all of its options and understand where its power may exist to provide and enhance funding for its Transportation programs.

The following funding sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. There may be means to begin to or further utilize these sources, as described below, to address new needs identified in the Transportation System Plan.

Safe Routes to School (SRTS)

The Oregon Safe Routes to School (SRTS) Program has money allocated for projects at schools, serving grades K-8 that should be pursued in the City of Silverton. The program administers funds received from the 2005 SAFETEA-LU transportation bill for Safe Routes to School Programs throughout the state. Potential grant funds are distributed as a reimbursement program through an open and competitive process. Funding is available through this program for pedestrian and bicycle infrastructure projects within two miles of schools. These funds should be pursued to implement key Pedestrian Plan projects that are included in the Master Plan, but are not funded as part of the Action Plan.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program. General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City. This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council. General Fund resources can fund any aspect of the program, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source to fund new aspects of the Transportation program are only available to the extent that either General Fund revenues are increased or City Council directs and diverts funding from other City programs.

Voter-Approved Local Gas Tax

Communities such as Sandy, Woodburn, and Tillamook have adopted local gas taxes by public vote. In Sandy, the tax is one cent per gallon, paid to the city monthly by distributors of fuel. The process for presenting such a tax to voters will need to be consistent with Oregon State law as well as the laws of the City of Silverton.

Transportation Utility Fee Revenue

A number of Oregon cities supplement their street funds with street utility fees. Local cities with adopted street utility fees include Hubbard, Milwaukie, Wilsonville and Tualatin. Establishing user fees to fund applicable transportation activities and/or capital construction ensures that those who create the demand for service pay for it proportionate to their use. The street utility fees are recurring monthly or bi-monthly charges that are paid by all residential, commercial, industrial, and institutional users. The fees are charged proportionate with the amount of traffic generated, so a retail commercial user pays a higher rate than a residential user. Typically, there are provisions for reduced fees for those that can demonstrate they use less than the average rate implies, for example, a resident that does not own an automobile or truck.

From a system health perspective, forming a utility fee also helps to support the ongoing viability of the program by establishing a source of reliable, dedicated funding for that specific function. Fee revenues can be used to secure revenue bond debt used to finance capital construction. A transportation utility can be formed by Council action and does not require a public vote.

Based on average utility fee rates, a preliminary estimate for transportation utility fee revenue in Silverton ranges from $8 million to $10 million over the next 23 years; this corresponds to approximately $33 to $43 per person per year. A specific fee study would be required to establish a fee program for the City of Silverton to determine specific allocations to its residents and merchants.

Exactions

Exactions are improvements that are obtained when development is permitted. Developers are required to improve their frontage and, in some cases, provide off site improvements depending upon their level of traffic generation and the impact to the transportation system. The City of Silverton utilizes exactions today, but the Development Code may need some revision to enforce the TSP Action Plan for development exactions. Based upon review of the TSP Action Plan projects, an assessment was made of potential exactions for frontage improvements where projects were adjacent to vacant parcels or parcels with redevelopment potential. This assessment found that $2.2 million of the Action Plan project costs could be funded through development exactions.

System Development Charge (SDC) Update Study

The SDC revenue assumptions were calculated with an assumed 29% share for future growth (consistent with the existing SDC rate calculation methodology based on population growth). For this TSP update, new population forecasts were developed and it is recommended that an SDC update study be conducted to re-calculate the growth share and/or update calculation methodologies. Based on preliminary calculations from population forecasts, a reasonable estimate for the new SDC growth share could increase from 29% to 35% and generate additional revenue for capital improvement projects.

Other Funding Sources

Local Improvement District Assessment Revenue

The City may set up Local Improvement Districts (LIDs) to fund specific capital improvement projects within defined geographic areas, or zones of benefit. LIDs impose assessments on properties within its boundaries. LIDs may not fund ongoing maintenance costs. They require separate accounting, and the assessments collected may only be spent on capital projects within the

geographic area. Citizens representing 33% of the assessment can terminate a LID and overturn the planned projects so projects and costs of a LID must meet with broad approval of those within the boundaries of the LID.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and / or U.S. Congress for transportation capital improvements. There may be projects identified within this Plan for which the City may want to pursue these special, one-time appropriations.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. A Portland area example would be the Westside LRT where the local share of funding was voter approved as an addition to property tax.

Debt Financing

Debt financing can also be used to mitigate the immediate impacts of significant capital improvement projects and spread costs over the useful life of a project. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but is also viewed as an equitable funding strategy, spreading the burden of repayment over existing and future customers who will benefit from the projects. The obvious caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds

Subject to voter approval, the City can issue General Obligation (G.O.) bonds to debt finance capital improvement projects. G.O. bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property City-wide (a property tax increase). Depending on the critical nature of any projects identified in the Transportation Plan, and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved G.O. bonds may be a feasible funding option for specific projects. Proceeds may not be used for ongoing maintenance.

Revenue Bonds

Revenue bonds are debt instruments secured by rate revenue. In order for the City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds, due to the perceived stability offered by the "full faith and credit" of a jurisdiction.

Recommendations for New Transportation Funds

The City shall consider establishing a transportation utility fee as the backbone of its operations and maintenance funding approach. Street utility fees provide a stable source of dedicated revenue useable for transportation system operations and maintenance and/or capital construction. Rate revenues also secure revenue bond debt if used to finance capital improvements. Transportation utilities will be formed by Council action, and billed through the City utility billing system (e.g. water bills).

The City should also review the Development Code to allow development exactions to fund TSP projects (Action Plan or Master Plan). In addition, the City shall actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction.

A transportation utility fee and the enforcement of development exactions could generate approximately $13.6 million over the next 23 years, as shown in Table 10-3. These additional funds are expected to generate sufficient revenues to fully fund the Action Plan projects and maintenance programs.

Table 10-3: Recommended New Funding Sources for Transportation Programs

Transportation Funding Source	Estimated Revenue ($1,000)
Transportation Utility Fee*	$10,060
Development Exactions	$2,200
SDC Update-Revised Growth Share (35%)	$1,360
20 YEAR TOTAL in 2004 Dollars	**$13,620**

Notes: * Assumes utility fee corresponding to $41 per capita per year (a typieal single family household may be charged approximately $5 per month).[35]

[35] A specific fee study would be required to establish a fee program for the City of Silverton to determine specific allocations to its residents and merchants.

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