



720 SW Washington St  
Suite 500  
Portland, OR 97205  
503.243.3500

# MEMORANDUM

**DATE:** September 5, 2017

**TO:** Silverton TSP Update Project Management Team

**FROM:** Ray Delahanty, AICP  
Lacy Brown, PhD, PE

**SUBJECT:** **Silverton Transportation System Plan Update  
Solutions Evaluation**

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The purpose of this memorandum is to present potential transportation system projects and evaluate the solutions using predetermined evaluation criteria. These projects are intended to improve the City of Silverton's transportation system for all users based on system deficiencies identified throughout the development of this TSP.

## Solutions Identification Process

The list of recommended projects outlined in the 2008 Silverton TSP served as the basis for the updated project list. Projects that have been completed since 2008 were removed from the list. Additional new projects were identified based on the existing and future system deficiencies analysis (addressing safety, operations, and infrastructure needs), as well as community feedback, the Safe Routes to School audit findings, and local planning documents (e.g., the West Side Plan).

## Planned but Unconstructed Projects

Transportation projects that were previously identified in the 2008 TSP but have not yet been constructed were reviewed to identify overlap with known gaps and deficiencies of the transportation system. The previously planned projects that would complement the goals and policies of the Silverton TSP Update were carried forward into the final project list, while other projects were modified to better complement the updated goals.

## Potential Projects

The following sections summarize a set of potential transportation improvement projects identified through the existing and future deficiencies analysis, local planning documents, feedback from the community and stakeholders, and the 2008 TSP project list.

## Motor Vehicle Projects

The existing conditions and future needs analysis identified motor vehicle system deficiencies within Silverton that include insufficient capacity and safety concerns at several locations. Mitigations for these deficiencies have been evaluated and recommended improvements have been included in the motor vehicle project list, presented in Table 1 and Figure 1 on the following page. Projects listed in bold in Table 1 address safety or operational deficiencies identified as part of this TSP update. Additional details on those projects are presented in Table 2.

**Table 1. Motor Vehicle Project List**

Number	Description	Location	Need Addressed
MV-01	Install a Roundabout or Traffic Signal	James Street/Pine Street	Mobility
MV-02*	Install a Roundabout or Traffic Signal	1st Street/Hobart Road	Mobility, Safety
MV-03*	Install a Roundabout or Traffic Signal	1st Street/Jefferson Street	Safety
MV-04	Bridge Crossing over Silver Creek	Connection between Water Street and Brook Street	Connectivity
MV-05	<b>Install a Roundabout</b>	<b>Westfield Street/Main Street</b>	<b>Mobility, Safety</b>
MV-06	<b>Install a Traffic Signal</b>	<b>Main Street/McClaine Street</b>	<b>Mobility</b>
MV-07	Install Center Two-Way Left-Turn Lane (TWLTL) on C Street	C Street between Silver Creek Bridge and James Street	Mobility
MV-08*	Improve Sight Distance and Crossing Safety	Oak Street/Mill Street	Safety
MV-09*	Disconnect Fossholm Road from McClaine Street and apply traffic calming strategies on Brook Street	Fossholm Road/McClaine Street	Safety
MV-10	<b>Add Southbound Right Turn Lane</b>	<b>C Street and McClaine Street between James Street and Westfield Street</b>	<b>Mobility</b>
MV-11*	<b>Close East Leg of Intersection</b>	<b>1st Street/C Street</b>	<b>Mobility</b>
MV-12*	<b>Install a Traffic Signal and add Southbound Right Turn Lane</b>	<b>Main Street/Water Street</b>	<b>Mobility</b>
MV-13*	Install a Traffic Signal and add Eastbound Left Turn Lane	Main Street/1st Street	Mobility
MV-14*	Install a Traffic Signal	Oak Street/Water Street	Mobility
MV-15*	Westside North-South Connector #2	Silverton Road to Main Street	Connectivity
MV-16	Westside North-South Connector #3	Main Street to Water Street	Connectivity
MV-17	Eastside North-South Connector #4	Monitor Road to Pioneer Drive	Connectivity
MV-18	Bridge Crossing over Silver Creek Connector #6	High Street	Connectivity
MV-19*	Install a Traffic Signal	Oak Street/1st Street	Mobility
MV-20*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 213/Steelhammer Road	Calming/Gateway
MV-21*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Pioneer Drive/Evans Valley Road	Calming/Gateway
MV-22*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 213/Monitor Road	Calming/Gateway
MV-23*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 214/Pioneer Drive	Calming/Gateway
MV-24*	Restrict Turning Movements on Northbound and Southbound Approaches	Silverton Road/Fossholm Road	Calming, Safety

Note: Projects in **bold** address deficiencies identified in the existing and future conditions analysis as part of this TSP update.  
 \* Asterisk denotes projects that will require coordination with ODOT or Marion County.



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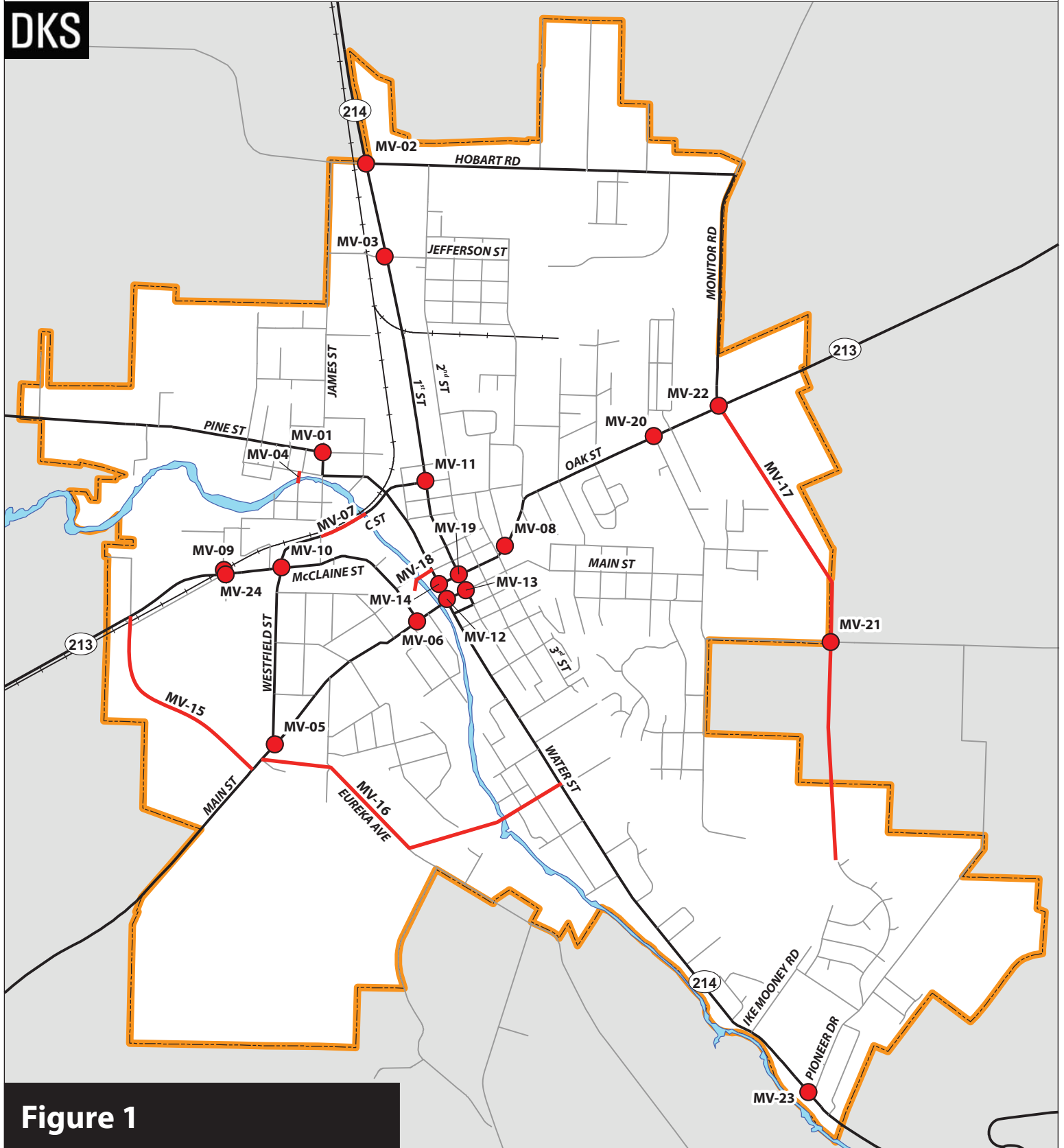


Figure 1

**Motor Vehicle Projects**

**Legend**

- Urban Growth Boundary
- Major Arterials
- Collectors and Local
- Motor Vehicle Intersection Project
- Motor Vehicle Segment Project
- Water
- ++ Railroad

**Table 2. Additional Detail on Motor Vehicle Projects**

Number	Location	Description
MV-05	Westfield Street/Main Street	Installation of a roundabout would mitigate the high frequency of rear-end and turning crashes at this intersection. A roundabout would also reduce vehicle speeds to reduce crash severity and allow for safer pedestrian crossings.
MV-06	Main Street/McClaine Street	Installation of a roundabout or traffic signal would increase the intersection capacity sufficiently to handle future traffic demands, particularly for southbound traffic.
MV-10	C Street and McClaine Street between James Street and Westfield Street	The signalized intersection of C Street/McClaine Street/Westfield Street does not provide enough capacity to meet future traffic demands, and the addition of through or turn lanes would significantly impact adjacent land uses. This improvement is assumed to be a southbound right turn lane and closure/prohibition of the southbound left turn, which has very low volume (fewer than 10 vehicles in the PM peak hour)
MV-11	1st Street/C Street	Closing the intersection to westbound traffic – by converting the segment of C Street between 1 <sup>st</sup> Street and 2 <sup>nd</sup> Street to one-way eastbound -- would provide the other three approaches with enough signal capacity to adequately handle future traffic demands.
MV-12	Main Street/Water Street	Installation of a traffic signal at this all-way stop-controlled intersection would provide sufficient capacity to serve future traffic demands. The adjacent bridge over Silver Creek and surrounding development limit options for adding capacity. MV-15, MV-16, and MV 24 would need to be built at the same time to provide coordinated operation on the downtown grid.

### Pedestrian Projects

The existing conditions and future needs analysis identified pedestrian system issues within Silverton that include an incomplete arterial/collector sidewalk system, significant barriers to the pedestrian network (e.g. railroad and creek), and the need for enhanced crossing locations in downtown Silverton. These needs correspond with those identified in the 2008 TSP.

All projects related to pedestrian-specific facilities are presented in Table 3 and Table 4, and shown graphically on Figure 2. These projects were developed using the 2008 TSP project list, the Safe Routes to School audit, the existing conditions analysis, and community feedback. The projects include both sidewalk infill and crossing enhancements. Crossing enhancements should be designed to fit the context of each location and may include the following measures to help define the crossing area and improve driver yielding behavior:

- Delineation of the crossing area: this can 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

Table 3. Sidewalk Infill Project List

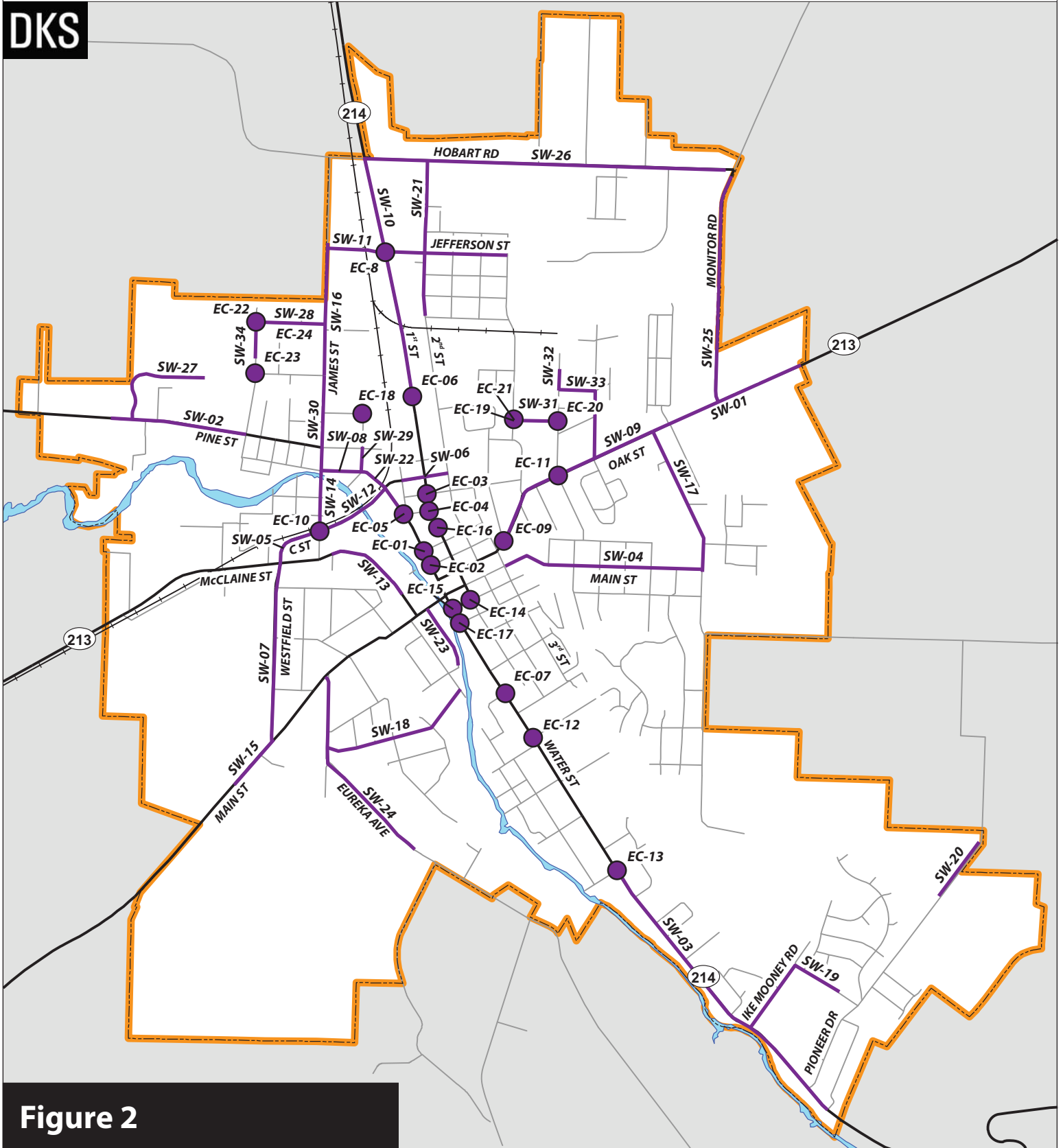
Number	Description	Start	End
SW-01	Sidewalk Infill on Oak Street	Steelhammer Rd	City limits
SW-02	Sidewalk Infill on Pine Street	Grant Street	City limits
SW-03	Sidewalk Infill on South Water Street	Peach Street	City limits
SW-04	Sidewalk Infill on Main Street	3rd Street	Steelhammer Road
SW-05	Sidewalk Infill on C Street	McClaine Street	James Street
SW-06	Sidewalk Infill on C Street	Front Street	2nd Street
SW-07	Sidewalk Infill on Westfield Street	Main Street	Existing section
SW-08	Sidewalk Infill on North Water Street	James Street	C Street
SW-09	Sidewalk Infill on Oak Street	Mill Street	Steelhammer Road
SW-10	Sidewalk Infill on 1st Street	Hobart Street	Existing section
SW-11	Sidewalk Infill on Jefferson Street	Mill Street	James Street
SW-12	Sidewalk Infill on C Street	James Street	N Water Street
SW-13	Sidewalk Infill on McClaine Street	Craig Street	Phelpe Street
SW-14	Sidewalk Infill on James Street	C Street	N Water Street
SW-15	Sidewalk Infill on West Main Street	Westfield Street	City limits
SW-16	Sidewalk Infill on James Street	Florida Drive	City limits
SW-17	Sidewalk Infill on Steelhammer Road	Oak Street	City limits
SW-18	Sidewalk Infill on Keene Avenue	Eureka Avenue	Coolidge Street
SW-19	Sidewalk Infill on Ike Mooney Road	South Water Street	Existing section
SW-20	Sidewalk Infill on Ike Mooney Road	Existing section	City limits
SW-21	Sidewalk Infill on 2nd Street	Whittier Street	Hobart Street
SW-22	Sidewalk Infill on North Water Street	C Street	A Street
SW-23	Sidewalk Infill on Fiske Street	Main Street	Charles Avenue
SW-24	Sidewalk Infill on Eureka Avenue	Main Street	south City limits
SW-25	Sidewalk Infill on Monitor Road	Hobart Street	Oak Street
SW-26	Sidewalk Infill on Hobart Street	1st Street	Monitor Road
SW-27	Sidewalk Infill on Kromminga Drive	Pine Street	High School
SW-28	Sidewalk Infill on Western Avenue	Grant Street	James Street
SW-29	Sidewalk Infill on Brown Street	Water Street	480' North of Water
SW-30	Sidewalk Infill on James Street	Jefferson Street	C Street
SW-31	Sidewalk Infill and Repair on Robinson Street	Mill Street	Mark Twain Elementary
SW-32	Sidewalk Infill on Church Street	Bartlett St	North to Dead End
SW-33	Sidewalk Infill on Bartlett Street, Norway Street	Church Street	Oak Street
SW-34	Sidewalk Infill on Grant Street	Western Avenue	High School Driveway

**Table 4. Pedestrian Crossing Enhancement Project List**

<b>Number</b>	<b>Description</b>	<b>Location</b>
EC-01	Pedestrian Crossing Enhancements	South leg of Water Street/Park Street
EC-02	Pedestrian Crossing Enhancements	South leg of Water Street/High Street
EC-03	Pedestrian Crossing Enhancements	North/South legs of 1st Street/B Street
EC-04	Pedestrian Crossing Enhancements	North leg of 1st Street/A Street
EC-05	Pedestrian Crossing Enhancements	North leg of Water Street/A Street
EC-06	Pedestrian Crossing Enhancements	1st Street/Bow Tie Lane
EC-07	Pedestrian Crossing Enhancements	Water Street/Wesley Street
EC-08	Pedestrian Crossing Enhancements and Sidewalk Connections	1st Street/Jefferson Street
EC-09	Pedestrian Crossing Enhancements and Sight Distance Improvements	Oak Street/Mill Street
EC-10	Pedestrian Crossing Enhancements (RRFB)	James Street/C Street
EC-11	Pedestrian Crossing Enhancements	Oak Street/Church Street
EC-12	Pedestrian Crossing Enhancements	S Water Street/Adams
EC-13	Pedestrian Crossing Enhancements	S Water Street/Peach
EC-14	Close Crosswalk	West Leg of 1st Street/Lewis Street
EC-15	Install Median Refuge Island to Reduce Crossing Distance	Water Street/Lewis Street
EC-16	Pedestrian Crossing Enhancements	Midblock (one side) 1st Street between Park Street and A Street
EC-17	Improve Lighting at Existing Crossing	Water Street/Jersey Street
EC-18	Install Curb Ramps for Existing Crosswalk	Brown Street/Schlador Street
EC-19	Install Curb Ramps for Existing Crosswalk	NW Corner of Mill Street/Robinson Street
EC-20	Install Curb Ramps for Existing Crosswalk	NW and SE Corners of Robinson Street/Church Street
EC-21	Install Crosswalk	East Leg of Mill Street/Robinson Street
EC-22	Install Crosswalk	South Leg of Western Avenue/Grant Street
EC-23	Install Crossing Warning Signs and Pavement Markings	Grant Street/Florida Street
EC-24	Install Street Lighting	Western Avenue (entire segment)



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**Figure 2**  
**Pedestrian Projects**

**Legend**

- Urban Growth Boundary
- Major Aterials
- Collectors and Local
- Pedestrian Intersection Project
- Pedestrian Segment Project
- Water
- Railroad



## Bicycle Projects

The existing conditions and future needs analysis identified several gaps in the bicycle network system within Silverton, as well as many high-stress bicycling environments, particularly outside roadways near the city limits. This section summarizes the dedicated bicycle projects, including bicycle lanes, shared-lanes (marked with sharrows), cycle tracks, and other bicycle facilities (e.g., route signing and bicycle parking). Combined bicycle and pedestrian projects (e.g., shared-use paths) are described in the following section.

The bicycle project list, developed using the 2008 TSP project list, the Safe Routes to School audit, the existing conditions analysis, and community feedback, is presented in Table 5 and on Figure 3.

**Table 5. Bicycle Project List**

Number	Description	Start	End
BP-01	Bicycle Facilities on 1st Street	Hobart Road	B Street
BP-02	Bicycle Facilities on Oak Street	Steelhammer	East City Limits
BP-03	Bicycle Facilities on North Water Street	James Street	C Street
BP-04	Bicycle Facilities on South Water Street	Lewis Street	Pioneer Drive
BP-05	Bicycle Facilities on Silverton Road	West City Limits	Existing sections
BP-06	Bicycle Facilities on Pine Street	West City Limits	James Ave
BP-07	Bicycle Facilities on Oak Street	Church Street	Steelhammer Road
BP-08	Bicycle Facilities on Eureka Avenue	Main Street	South City Limits
BP-09	Bicycle Facilities on Ike Mooney Road	Pioneer Drive	East City Limits
BP-10	Bicycle Facilities on Evans Valley Road	Steelhammer Road	East City Limits
BP-11	Bicycle Facilities on Steelhammer Road	Oak Street	Evans Valley Road
BP-12	Bicycle Facilities on Main Street	Westfield Street	Water Street
BP-13	Bicycle Facilities on Oak Street	3rd Street	Church Street
BP-14	Bicycle Facilities on Pioneer Drive	South Water Street	Ike Mooney Road
BP-15	Bicycle Facilities on McClaine Street	C Street	Main Street
BP-16	Bicycle Facilities on James Avenue	Hobart Road	C Street
BP-17	Bicycle Facilities on Monitor Road	Oak Street	Hobart Road
BP-18	Bicycle Facilities on Hobart Road	James Street	Monitor Road
BP-19	Bicycle Facilities on Main Street*	3rd Street	Steelhammer Road
BP-20	Bicycle Facilities on Kromminga Dr, Western St, Jefferson St	Pine Street	Mill Street
BP-21	Bicycle Facilities on Grant St, Water St, James St, Silver St, Alder Ave, Brook St, Wilson St, Short St	Western Street	Fossholm Road
BP-22	Bicycle Facilities on Peach St, Madison St, Cowing St, Coolidge St	S Water Street	Main Street
BP-23	Bicycle Facilities on James Street	McClaine Street	C Street
BP-24	Bicycle Facilities on Center Street	Westfield Street	Ross Avenue
BP-25	Bicycle Facilities on 2nd Street, Koons St	Jersey Street	S Water Street
BP-26	Bicycle Facilities on Church St, Kent St, Ames St, Reserve St	Robinson Street	Tillicum Street
BP-27	Bicycle Facilities on Ike Mooney Rd, Sun Valley Dr, Frontier St, Pioneer Dr	S Water Street	OS-15 Alignment
BP-28	Two-Way Raised Cycle Path on Westfield Street	Robert Frost Elementary	Center Street
BP-29	Regional Bikeway Connection	Silverton City Limits	Stayton
BP-30	Regional Bikeway Connection	Silverton City Limits	Salem
BP-31	Regional Bikeway Connection	Silverton City Limits	Mt. Angel
BP-32	Bicycle Route Signing (shared facilities) and Bicycle Parking	Downtown Silverton	
BP-33	Bicycle Route Signing (shared facility)	Brown Street	
BP-34	Bicycle Boulevard with Traffic Calming on 2 <sup>nd</sup> Street and Diverters (Northbound Through and Southbound Through Prohibited) at B Street	Jefferson Street	Jersey Street



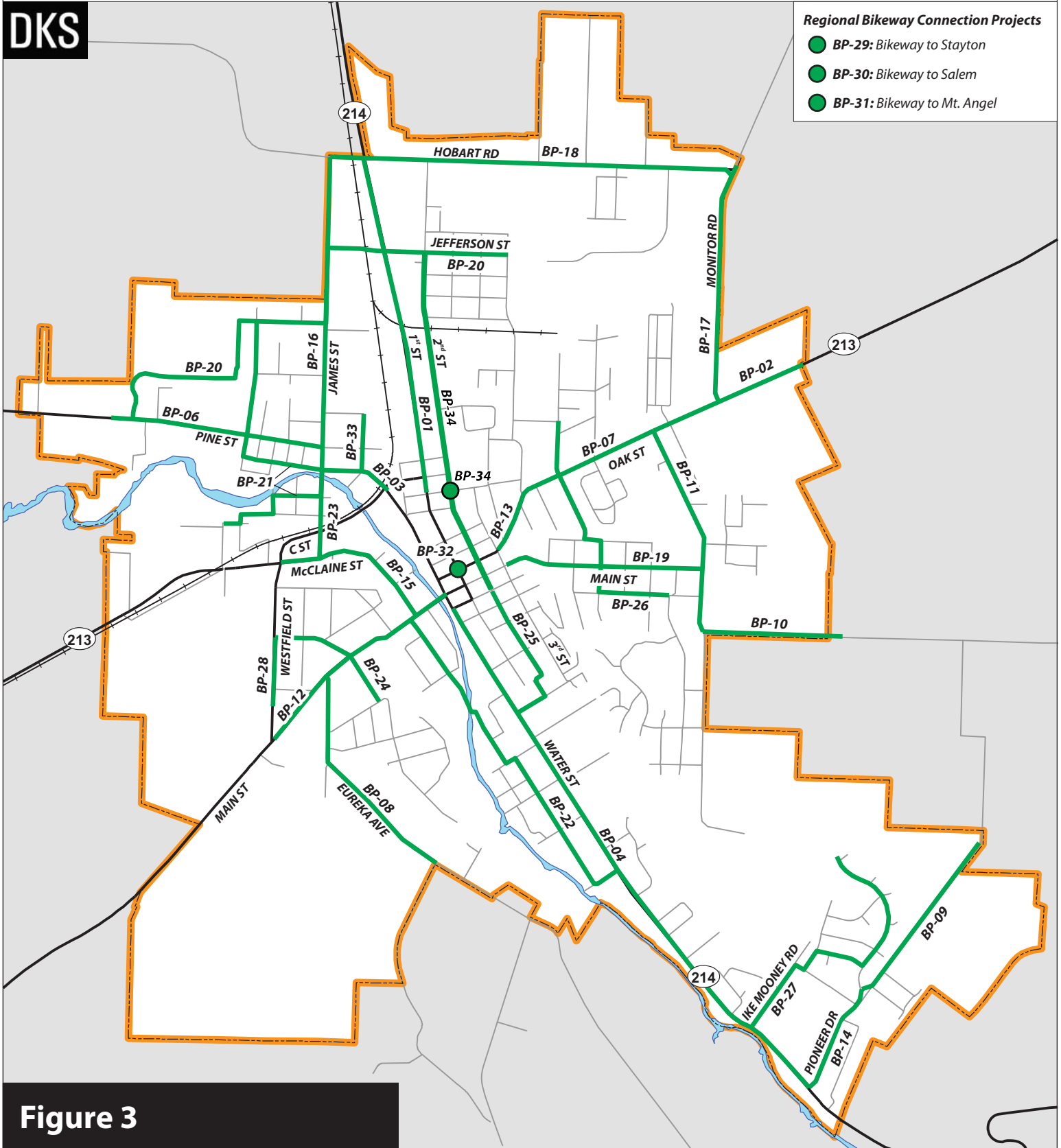
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**Regional Bikeway Connection Projects**

- BP-29: Bikeway to Stayton
- BP-30: Bikeway to Salem
- BP-31: Bikeway to Mt. Angel



**Figure 3**

**Bicycle Projects**

**Legend**

- Urban Growth Boundary
- Major Arterials
- Collectors and Local
- Bicycle Intersection Project
- Bicycle Segment Project
- Water
- Railroad

## Shared-Use Path Projects

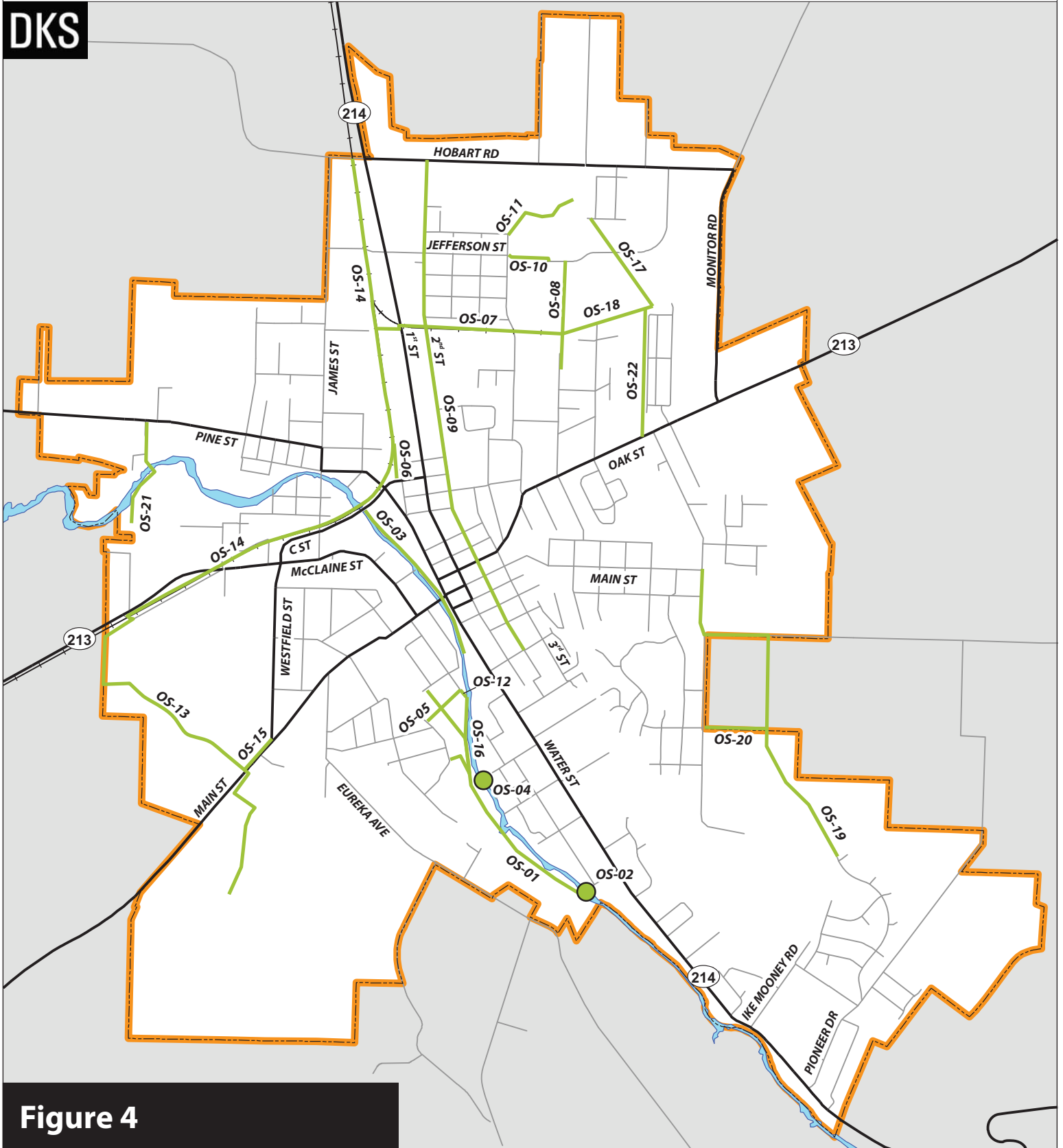
This section presents all of the shared bicycle-pedestrian projects, comprised of shared-use paths and pedestrian bridges, as shown in Table 6 and on Figure 4. These projects help address gaps and deficiencies in both the bicycle and pedestrian networks.

**Table 6. Shared-Use Path Project List**

Number	Description	Start	End
OS-01	Shared-Use Path #1	Charles Avenue	Peach Street
OS-02	Pedestrian Bridge	Peach Street	
OS-03	Shared-Use Path #2 (Creek trail)	C Street	Silver Falls Library
OS-04	Pedestrian Bridge	Cowing Street	
OS-05	Pedestrian Stairway Connection	Coolidge Park	Anderson Drive
OS-06	Shared-Use Path #3	C Street	Off-Street Connection #10 Alignment
OS-07	Shared-Use Path #4	Existing rail line alignment	Church Street extension
OS-08	Shared-Use Path #5	Eska Way	Existing Church Street alignment
OS-09	Shared-Use Path #6 (2nd Street)	Hobart Road	Oak Street
OS-10	Shared-Use Path #7	Jefferson Street	Eska Way
OS-11	Shared-Use Path #8	Lincoln Street	east side of Webb Lake
OS-12	Salamander Footbridge Connection	Coolidge McClaine Park	
OS-13	Shared-Use Path #9	Pettit Reservoir	Silverton Road
OS-14	Shared-Use Path #10 (rail alignment)	Monson Road	Hobart Road
OS-15	Shared-Use Path #11	Westfield Street	Path #9 Alignment
OS-16	Shared-Use Path #12	Coolidge Street	Anderson Drive
OS-17	Shared-Use Path #13	Mallard Street	Sage Street
OS-18	Shared-Use Path #14	Mill Street	Sage Street
OS-19	Shared-Use Path #15	Pioneer Drive	Main Street
OS-20	Shared-Use Path #16	Eastview Lane	Path #15 Alignment
OS-21	Shared-Use Path #17	Pine Street	Monson Road
OS-22	Shared-Use Path #18	Oak Street	Path #14 Alignment



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**Figure 4**

**Shared-Use Path Projects**

**Legend**

- Urban Growth Boundary
- Major Aterials
- Collectors and Local
- Off-Street Path Crossing Project
- Off-Street Path Segment Project
- Water
- +
+
+
 Railroad

## Transit Projects

Transit service in Silverton is limited and there are several options for improving the community's access to public transportation, including commuter transit services, park-and-ride lots, and a fixed-route city service. The potential projects are shown in Table 7 and on Figure 5.

**Table 7. Transit Project List**

Number	Project Name	Description
TS-01	Commuter Connection to Salem	Develop a commuter transit connection to Salem. Install a transit stop downtown.
TS-02	Park-and-Ride Lot	Develop a park-and-ride facility on the west side of Silverton
TS-03	Enhance Dial-a-Ride services	Provide service enhancements to the existing dial-a-ride services, including increased hours of operation and ease of scheduling
TS-04	Local Fixed Route Transit Feasibility Study	Conduct feasibility study for the implementation of fixed-route transit service
TS-05	Park-and-Ride Lot and Increased Transit Service	Develop a park-and-ride facility on the east side of Silverton (in the industrial area between Mill Street and Monitor Road) and provide transit service (bus stops, shelters, lighting, etc.)

## Rail Projects

The existing conditions analysis highlighted the rail line as a barrier to bicycle and pedestrian travel and a limiting factor for roadway improvements. Several of the at-grade rail crossings were identified as deficiencies in the system safety performance evaluation, as outlined in Table 8 and on Figure 6.

**Table 8. Railroad Project List**

Number	Project Name	Description
RR-01	Rail/Highway Grade Crossing Improvements on Fossholm Road near Highway 213	This grade crossing is located in close proximity to Highway 213 and there is limited sight distance for vehicles turning onto Fossholm Road from Highway 213/McClaine Street. Consider disconnecting Fossholm Road from Highway 213 once the Westside Plan is developed and other connections are provided.
RR-02	Rail/Highway Grade Crossing Improvements on Hobart Road near Highway 214	Upgrade to an active warning system including standard signs, pavement markings, and gates.
RR-03	Rail/Highway Grade Crossing Improvements on Jefferson Street near Highway 214/1st Street	Upgrade to an active warning system including standard signs, pavement markings, and gates. Provide accessible pedestrian facilities across tracks.
RR-04	Rail/Highway Grade Crossing Improvements on James Street near C Street	Upgrade to an active warning system including standard signs, pavement markings, and gates. Provide accessible pedestrian facilities across tracks.

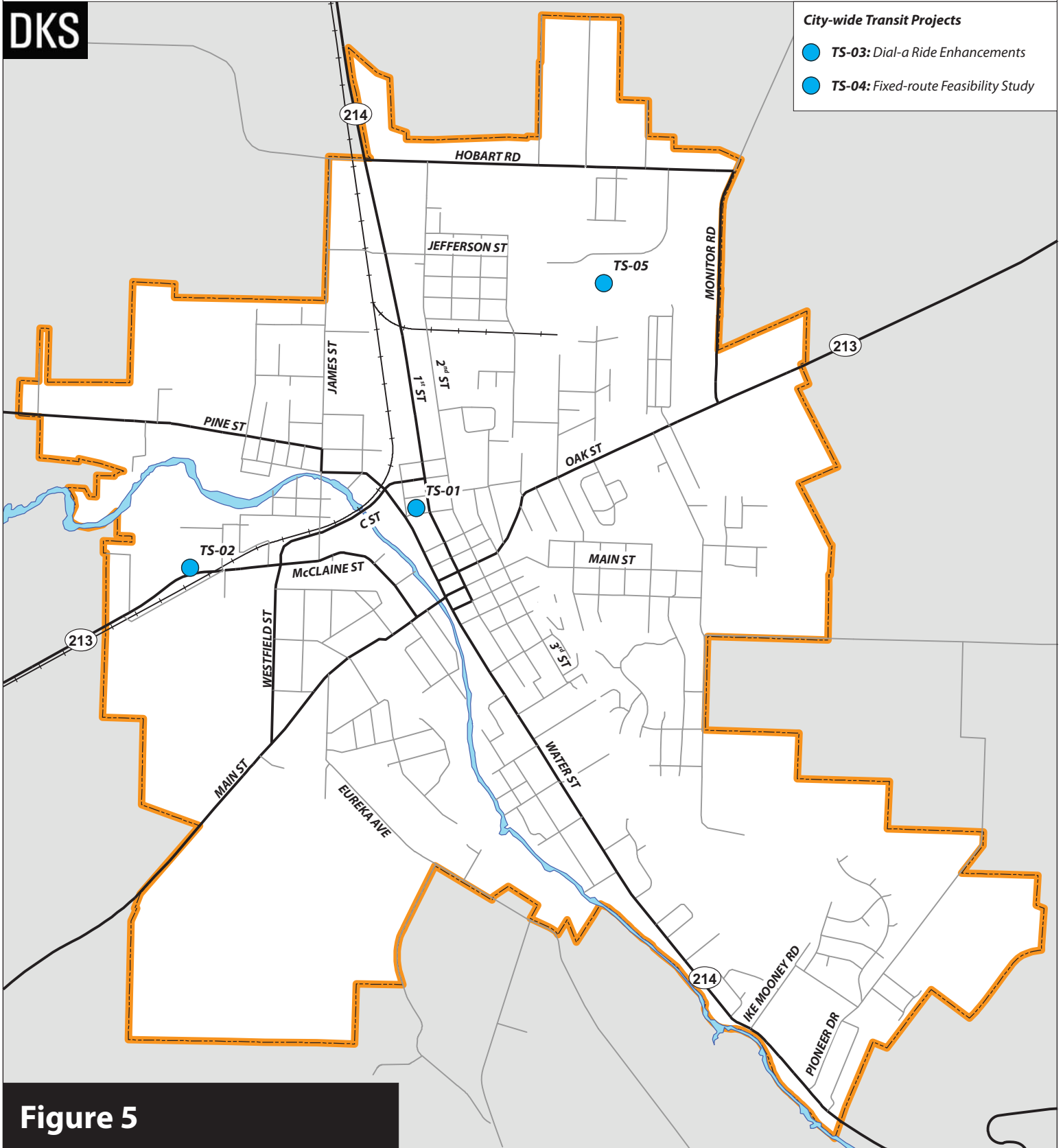
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### City-wide Transit Projects

- **TS-03: Dial-a Ride Enhancements**
- **TS-04: Fixed-route Feasibility Study**



**Figure 5**

## Transit Projects

### Legend

- Urban Growth Boundary
- Major Arterials
- Collectors and Local
- Transit Improvement Project
- Water
- Railroad



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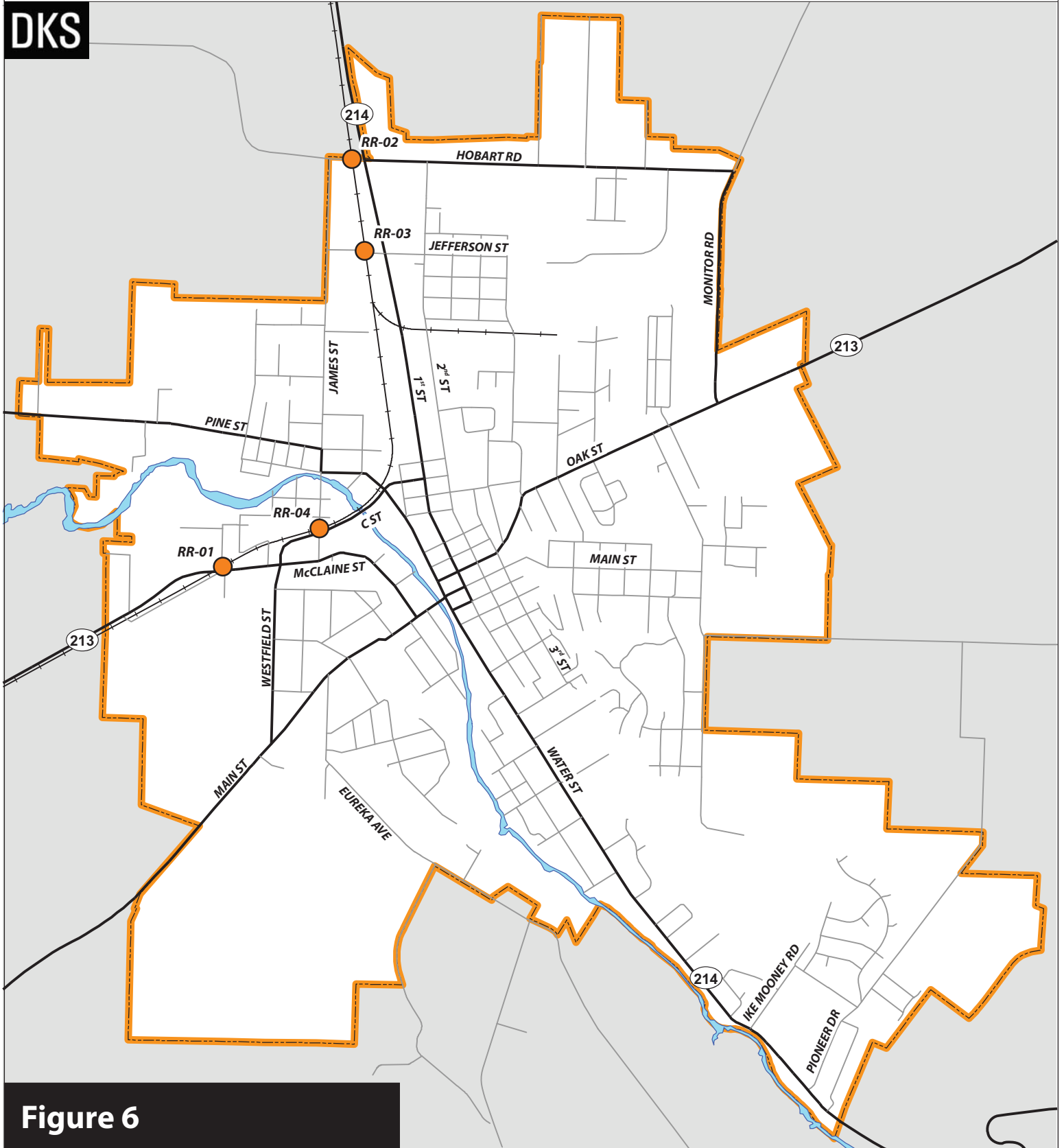


Figure 6

Rail Projects

Legend

- Urban Growth Boundary
- Major Aterials
- Collectors and Local
- Railroad Improvement Project
- Water
- Railroad

## Project Evaluation and Prioritization

Transportation concepts and project alternatives developed through this TSP update were evaluated by applying criteria that are based on the TSP’s goals and objectives. These project level criteria provided a point-based technical rating method that was used to evaluate how well proposed design alternatives meet the objectives of the TSP.

### Scoring Methodology

Project alternatives were ranked by summing (and weighting) the scores for each evaluation criterion. Scores for each criterion were based on a five-point scale, from +2 to -2, with +2 generally representing a clear positive impact relative to the criterion, and -2 representing a clear negative impact relative to the criterion. A score of 0 typically represents no impact on the criterion, and +1 and -1 represent minor positive and negative impacts.

**Table 9: Evaluation Criteria and Scoring Methodology Example**

Evaluation Criteria	Evaluation Score	
<b><u>3: Improve Safety Performance</u></b>	+2	Improves safety for all modes
	+1	Improves safety for some or all modes, but does not decrease safety for any mode
	0	Has no net effect on safety performance
	-1	Has a negative safety impact for one or more modes
	-2	Has a negative safety impact for all modes

The criteria and related scoring parameters generate an aggregate score that reflects each project’s effectiveness in addressing the TSP’s goal areas. The eight TSP goals and associated criteria are summarized below along with weighting factors that represent the relative importance of each goal to the community (based on feedback from the first project PAC meeting).

- Goal 1: Enhance livability through proper multi-modal design (weight: 4.6)
- Goal 2: Create a balanced system that promotes active transportation (weight: 3.5)
- Goal 3: Improve safety performance (weight: 4.3)
- Goal 4: Develop a system that can efficiently handle traffic demands of the future (weight: 3.9)
- Goal 5: Provide a system that is accessible to all users (weight: 4.1)
- Goal 6: Provide a system that allows for efficient freight movement (weight: 4.3)
- Goal 7: Identify potential projects that can be feasibly funded (weight: 4.4)
- Goal 8: Maintain consistency with local, regional, and statewide plans and policies (weight: 3.9)



## Evaluation and Prioritization Results

Each of the projects listed in the previous sections were scored and ranked according to the evaluation criteria described above. The following tables summarize the preliminary project rankings based on evaluation scoring.

**Table 10. Motor Vehicle Project Ranking**

Number	Description	Location	Rank
MV-02*	Install a Roundabout or Traffic Signal	1st Street/Hobart Road	1
MV-06	Install a Traffic Signal	Main Street/McClaine Street	1
MV-05	Install a Roundabout	Westfield Street/Main Street	3
MV-12*	Install a Traffic Signal and add Southbound Right Turn Lane	Main Street/Water Street	3
MV-13*	Install a Traffic Signal and add Eastbound Left Turn Lane	Main Street/1st Street	3
MV-14*	Install a Traffic Signal	Oak Street/Water Street	3
MV-19*	Install a Traffic Signal	Oak Street/1st Street	3
MV-09*	Disconnect Fossholm Road from McClaine Street and apply traffic calming strategies on Brook Street	Fossholm Road/McClaine Street	3
MV-01	Install a Roundabout or Traffic Signal	James Street/Pine Street	9
MV-03*	Install a Roundabout or Traffic Signal	1st Street/Jefferson Street	9
MV-20*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 213/Steelhammer Road	9
MV-21*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Pioneer Drive/Evans Valley Road	9
MV-22*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 213/Monitor Road	9
MV-23*	Install a Roundabout, Landscaped Median, or other Calming/Gateway Treatment	Highway 214/Pioneer Drive	9
MV-10	Add Southbound Right Turn Lane, Prohibit Southbound Left Turn	C Street and McClaine Street between James Street and Westfield Street	9
MV-08*	Improve Sight Distance and Crossing Safety	Oak Street/Mill Street	16
MV-11*	Close East Leg of Intersection	1st Street/C Street	17
MV-15*	Westside North-South Connector #2	Silverton Road/Main Street	18
MV-16	Westside North-South Connector #3	Main Street/South Water Street	18
MV-17	Eastside North-South Connector #4	Monitor Road/Oak Street/Pioneer Drive	18
MV-18	Bridge Crossing over Silver Creek Connector #6	High Street	21
MV-04	Bridge Crossing over Silver Creek	Connection between Water Street and Brook Street	22
MV-24*	Restrict Turning Movements on Northbound and Southbound Approaches	Silverton Road/Fossholm Road	23
MV-07	Install Center Two-Way Left-Turn Lane (TWLTL) on C Street	C Street between Silver Creek Bridge and James Street	24

Note: \* Asterisk denotes projects that will require coordination with ODOT or Marion County.

Table 11. Pedestrian Project Ranking

Number	Description	Start	End	Rank
EC-08	Pedestrian Crossing Enhancements and Sidewalk Connections	1st Street/Jefferson Street		1
SW-28	Sidewalk Infill on Western Avenue	Grant Street	James Street	1
SW-30	Sidewalk Infill on James Street	Jefferson Street	C Street	1
EC-24	Install Street Lighting	Western Avenue (entire segment)		1
EC-10	Pedestrian Crossing Enhancements (RRFB)	James Street/C Street		1
EC-11	Pedestrian Crossing Enhancements	Oak Street/Church Street		1
SW-04	Sidewalk Infill on Main Street	3rd Street	Steelhammer Road	1
SW-03	Sidewalk Infill on South Water Street	Peach Street	City limits	1
EC-18	Install Curb Ramps for Existing Crosswalk	Brown Street/Schlador Street		1
SW-11	Sidewalk Infill on Jefferson Street	Mill Street	James Street	1
EC-21	Install Crosswalk	East Leg of Mill Street/Robinson Street		1
EC-22	Install Crosswalk	South Leg of Western Avenue/Grant Street		1
SW-31	Sidewalk Infill and Repair on Robinson Street	Mill Street	Mark Twain Elementary	1
SW-33	Sidewalk Infill on Bartlett Street, Norway Street	Church Street	Oak Street	1
EC-19	Install Curb Ramps for Existing Crosswalk	NW Corner of Mill Street/Robinson Street		15
EC-20	Install Curb Ramps for Existing Crosswalk	NW and SE Corners of Robinson Street/Church Street		15
EC-23	Install Crossing Warning Signs and Pavement Markings	Grant Street/Florida Street		15
SW-05	Sidewalk Infill on C Street	McClaine Street	James Street	15
SW-10	Sidewalk Infill on 1st Street	Hobart Street	Existing section	15
SW-17	Sidewalk Infill on Steelhammer Road	Oak Street	City limits	15
SW-18	Sidewalk Infill on Keene Avenue	Eureka Avenue	Coolidge Street	15
SW-21	Sidewalk Infill on 2nd Street	Whittier Street	Hobart Street	15
SW-01	Sidewalk Infill on Oak Street	Steelhammer Rd	City limits	23
SW-29	Sidewalk Infill on Brown Street	Water Street	480' North of Water	23
SW-32	Sidewalk Infill on Church Street	Bartlett St	North to Dead End	23
SW-34	Sidewalk Infill on Grant Street	Western Avenue	High School Driveway	23
EC-01	Pedestrian Crossing Enhancements	South leg of Water Street/Park Street		23
EC-02	Pedestrian Crossing Enhancements	South leg of Water Street/High Street		23
EC-03	Pedestrian Crossing Enhancements	North/South legs of 1st Street/B Street		23
EC-04	Pedestrian Crossing Enhancements	North leg of 1st Street/A Street		23
EC-05	Pedestrian Crossing Enhancements	North leg of Water Street/A Street		23
EC-06	Pedestrian Crossing Enhancements	1st Street/Bow Tie Lane		23
EC-07	Pedestrian Crossing Enhancements	Water Street/Wesley Street		23
EC-09	Pedestrian Crossing Enhancements and Sight Distance Improvements	Oak Street/Mill Street		23
EC-12	Pedestrian Crossing Enhancements	S Water Street/Adams		23
EC-13	Pedestrian Crossing Enhancements	S Water Street/Peach		23
EC-14	Close Crosswalk	West Leg of 1st Street/Lewis Street		23
EC-15	Install Median Refuge Island to Reduce Crossing Distance	Water Street/Lewis Street		23
EC-16	Pedestrian Crossing Enhancements	Midblock 1st Street between Park Street and A Street		23
SW-02	Sidewalk Infill on Pine Street	Grant Street	City limits	23
SW-07	Sidewalk Infill on Westfield Street	Main Street	Existing section	23
SW-14	Sidewalk Infill on James Street	C Street	N Water Street	23
EC-17	Improve Lighting at Existing Crossing	Water Street/Jersey Street		43
SW-06	Sidewalk Infill on C Street	Front Street	2nd Street	43
SW-08	Sidewalk Infill on North Water Street	James Street	C Street	43
SW-09	Sidewalk Infill on Oak Street	Mill Street	Steelhammer Road	43
SW-12	Sidewalk Infill on C Street	James Street	N Water Street	43
SW-13	Sidewalk Infill on McClaine Street	Craig Street	Phelpe Street	43
SW-15	Sidewalk Infill on West Main Street	Westfield Street	City limits	43
SW-16	Sidewalk Infill on James Street	Florida Drive	City limits	43

**Table 11. Pedestrian Project Ranking (Continued)**

Number	Description	Start	End	Rank
SW-19	Sidewalk Infill on Ike Mooney Road	South Water Street	Existing section	43
SW-20	Sidewalk Infill on Ike Mooney Road	Existing section	City limits	43
SW-22	Sidewalk Infill on North Water Street	C Street	A Street	43
SW-23	Sidewalk Infill on Fiske Street	Main Street	Charles Avenue	43
SW-24	Sidewalk Infill on Eureka Avenue	Main Street	south City limits	43
SW-25	Sidewalk Infill on Monitor Road	Hobart Street	Oak Street	43
SW-26	Sidewalk Infill on Hobart Street	1st Street	Monitor Road	43
SW-27	Sidewalk Infill on Kromminga Drive	Pine Street	High School	43

**Table 12. Bicycle Project Ranking**

Number	Description	Start	End	Rank
BP-34	Bicycle Boulevard with Traffic Calming on 2nd Street and Diverters at B Street	Jefferson Street	Jersey Street	1
BP-25	Bicycle Lanes on 2nd Street, Koons St	Oak Street	S Water Street	2
BP-01	Bicycle Lanes on 1st Street	Hobart Road	B Street	3
BP-04	Bicycle Lanes on South Water Street	Lewis Street	Pioneer Drive	3
BP-26	Bicycle Lanes on Church St, Kent St, Ames St, Reserve St	Robinson Street	Tillicum Street	3
BP-19	Bicycle Lanes on Main Street	3rd Street	Steelhammer Road	6
BP-07	Bicycle Facilities on Oak Street	Church Street	Steelhammer Road	6
BP-12	Bicycle Lanes on Main Street	Westfield Street	Water Street	6
BP-13	Bicycle Lanes on Oak Street	3rd Street	Church Street	6
BP-15	Bicycle Lanes on McClaine Street	C Street	Main Street	6
BP-16	Bicycle Lanes on James Avenue	Hobart Road	C Street	6
BP-20	Bicycle Lanes on Kromminga Dr, Western St, Jefferson St	Pine Street	Mill Street	6
BP-03	Bicycle Lanes on North Water Street	James Street	C Street	6
BP-02	Bicycle Lanes on Oak Street	Steelhammer	East City Limits	14
BP-06	Bicycle Lanes on Pine Street	West City Limits	James Ave	14
BP-28	Two-Way Raised Cycle Path on Westfield Street	Robert Frost Elementary	Center Street	14
BP-22	Bicycle Lanes on Peach St, Madison St, Cowing St, Coolidge St	S Water Street	Main Street	17
BP-05	Bicycle Lanes on Silverton road	West City Limits	Existing sections	17
BP-09	Bicycle Lanes on Ike Mooney Road	Pioneer Drive	East City Limits	17
BP-11	Bicycle Lanes on Steelhammer Road	Oak Street	Evans Valley Road	17
BP-14	Bicycle Lanes on Pioneer Drive	South Water Street	Ike Mooney Road	17
BP-18	Bicycle Lanes on Hobart Road	James Street	Monitor Road	17
BP-08	Bicycle Lanes on Eureka Avenue	Main Street	South City Limits	23
BP-10	Bicycle Lanes on Evans Valley Road	Steelhammer Road	East City Limits	23
BP-17	Bicycle Lanes on Monitor Road	Oak Street	Hobart Road	23
BP-21	Bicycle Lanes on Grant St, Water St, James St, Silver St, Alder Ave, Brook St, Wilson St, Short St	Western Street	Fossholm Road	23
BP-23	Bicycle Lanes on James Street	McClaine Street	C Street	23
BP-24	Bicycle Lanes on Center Street	Westfield Street	Ross Avenue	23
BP-27	Bicycle Lanes on Ike Mooney Rd, Sun Valley Dr, Frontier St, Pioneer Dr	S Water Street	OS-15 Alignment	23
BP-32	Bicycle Route Signing (shared facilities) and Bicycle Parking	Downtown Silverton		29
BP-33	Bicycle Route Signing (shared facility)	Brown Street		29
BP-29	Regional Bikeway Connection	Silverton City Limits	Stayton	32
BP-30	Regional Bikeway Connection	Silverton City Limits	Salem	32
BP-31	Regional Bikeway Connection	Silverton City Limits	Mt. Angel	32

**Table 13. Shared-Use Path Project Ranking**

Number	Description	Start	End	Rank
OS-09	Off-Street path #6	Hobart Road	Oak Street	1
OS-11	Off-Street path #8	Lincoln Street	East side of Webb Lake	2
OS-18	Off-Street Path Connection #14	Mill Street	Sage Street	2
OS-16	Off-Street Path Connection #12	Coolidge Street	Anderson Drive	4
OS-02	Pedestrian Bridge	Peach Street		5
OS-04	Pedestrian Bridge	Cowing Street		5
OS-17	Off-Street Path Connection #13	Mallard Street	Sage Street	5
OS-21	Off-Street Path Connection #17	Pine Street	Monson Road	8
OS-03	Off-Street path #2	C Street	Silver Falls Library	9
OS-14	Off-Street Path Connection #10	Monson Road	Hobart Road	9
OS-01	Off-Street path #1	Charles Avenue	Peach Street	11
OS-06	Off-Street path #3	C Street	Off-Street Connection #10 Alignment	11
OS-07	Off-Street path #4	Existing rail line alignment	Church Street extension	11
OS-08	Off-Street path #5	Eska Way	Existing Church Street alignment	11
OS-10	Off-Street path #7	Jefferson Street	Eska Way	11
OS-12	Salamander Footbridge Connection	Coolidge McClaine Park		11
OS-13	Off-Street Path Connection #9	Pettit Reservoir	Silverton Road	11
OS-19	Off-Street Path Connection #15	Pioneer Drive	Main Street	11
OS-22	Off-Street Path Connection #18	Oak Street	Connection #14 Alignment	11
OS-15	Off-Street Path Connection #11	Westfield Street	Connection #9 Alignment	20
OS-20	Off-Street Path Connection #16	Eastview Lane	Connection #15 Alignment	20
OS-05	Pedestrian Stairway Connection	Coolidge Park	Anderson Drive	22

**Table 14. Transit Project Ranking**

Number	Project Name	Description	Rank
TS-01	Commuter Connection to Salem	Develop a commuter transit connection to Salem. Install a transit stop downtown.	1
TS-04	Local Fixed Route Transit Feasibility Study	Conduct feasibility study for the implementation of fixed-route transit service	2
TS-02	Park-and-Ride Lot	Develop a park-and-ride facility on the west side of Silverton	3
TS-05	Park-and-Ride Lot and Increased Transit Service	Develop a park-and-ride facility on the east side of Silverton (in the industrial area between Mill Street and Monitor Road) and provide transit service (bus stops, shelters, lighting, etc.)	3
TS-03	Enhance Dial-a-Ride services	Provide service enhancements to the existing dial-a-ride services, including increased hours of operation and ease of scheduling	5

**Table 15. Rail Project Ranking**

Number	Project Name	Description	Rank
RR-03	Rail/Highway Grade Crossing Improvements on Jefferson Street near Highway 214/1st Street	Upgrade to an active warning system including standard signs, pavement markings, and gates. Provide accessible pedestrian facilities across tracks.	1
RR-04	Rail/Highway Grade Crossing Improvements on James Street near C Street	Upgrade to an active warning system including standard signs, pavement markings, and gates. Provide accessible pedestrian facilities across tracks.	1
RR-01	Rail/Highway Grade Crossing Improvements on Fossholm Road near Highway 213	This grade crossing is located in close proximity to Highway 213 and there is limited sight distance for vehicles turning onto Fossholm Road from Highway 213/McClaine Street. Consider disconnecting Fossholm Road from Highway 213 once the Westside Plan is developed and other connections are provided.	3
RR-02	Rail/Highway Grade Crossing Improvements on Hobart Road near Highway 214	Upgrade to an active warning system including standard signs, pavement markings, and gates.	4

### Mitigated Scenario System Performance

Projects that performed well under the above evaluation and were expected to impact traffic operations were packaged together for further analysis. The projects included are shown in Table 16.

**Table 16. Projects Included in Mitigated Scenario**

Number	Project	Location
MV-02	Install a Roundabout or Signal	1st Street/Hobart Road
MV-05	Install a Roundabout or Signal	Westfield Street/Main Street
MV-06	Install a Roundabout or Signal	Main Street/McClaine Street
MV-09, MV 11	Disconnect Fossholm Road from McClaine Street, Extend Industrial Way to Monson Road, Traffic Calming on Brook Street	Fossholm Street/McClaine Street
MV-12	Add Southbound Right Turn Lane, Prohibit Southbound Left Turn	C Street/McClaine Street
MV-13	Convert C Street to One-Way Eastbound Operation	Between 1 <sup>st</sup> Street and 2 <sup>nd</sup> Street
MV-14	Install Traffic Signal	Main Street/Water Street
MV-15	Install Traffic Signal	Main Street/1st Street
MV-16	Install Traffic Signal	Oak Street/Water Street
MV-24	Install Traffic Signal	Oak Street/1st Street
BP-34	Bicycle Boulevard with Traffic Calming on 2 <sup>nd</sup> Street and Diverters (Northbound Through and Southbound Through Prohibited) at B Street	2 <sup>nd</sup> Street Between Jefferson Street and Jersey Street

The 2037 future year network for the Silverton small community model was modified to include the above package of projects, and the model was run to produce an updated volume set. Model volumes were post-processed, using the same methodology as was used in the “no-build” forecast, in order to develop new intersection turning movement volumes for operational analysis.

The results of the intersection operational analysis are shown in Table 17 on the following page.

Table 17: Intersection Operations Comparison (2037 PM Peak Hour)

Intersection and Jurisdiction			Operating Standard		2037 No-Build PM Peak Hour			2037 Build PM Peak Hour		
			v/c	LOS/Delay	v/c	LOS	Delay	v/c	LOS	Delay
<b>All-Way Stop-Controlled (AWSC) Intersections</b>										
4	James St./Pine St.	City	0.85	D	0.55	B	15	0.54	B	15
5	James St./Water St.	City	0.85	D	0.71	C	20	0.68	C	18
<b>Other Unsignalized Intersections</b>										
1	2nd St./Hobart Rd.	County	0.90	D	0.13	A/B	12	0.11	A/B	11
3	OR 214/Jefferson St.	ODOT	0.90	-	0.45	A/E	45	0.73	A/F	112
6	James St./C St.	County	0.85	D	0.47	A/C	19	0.44	A/C	18
11	Front St./C St.	City	0.90	D	0.14	A/B	14	0.14	B/B	14
12	Water St./Park St.	ODOT	1.00	-	0.29	A/B <sup>b</sup>	12 <sup>b</sup>	0.02	A/A <sup>b</sup>	1 <sup>b</sup>
15	Water St./Lewis St.	ODOT	1.00	55s	0.54	A	11 <sup>a</sup>	0.54	A	5 <sup>a</sup>
16	OR 214/Pioneer Dr.	ODOT	0.90	-	0.13	A/C	17	0.13	A/C	17
20	1st St./Lewis St.	ODOT	1.00	55s	0.04	A <sup>a</sup>	44 <sup>a</sup>	0.04	A <sup>a</sup>	37 <sup>a</sup>
21	2nd St./Oak St.	ODOT	1.00	55s	<b>1.11</b>	C <sup>a</sup>	<b>60<sup>a</sup></b>	0.99	C <sup>a</sup>	44 <sup>a</sup>
22	Steelhammer Rd./Oak St.	ODOT	0.95	-	0.26	A/C	21	0.28	A/C	21
23	Steelhammer Rd./Main St.	County	0.90	D	0.23	A/B	11	0.22	A/B	10
24	OR 213/Monitor Rd.	ODOT	0.95	-	0.25	A/D	31	0.27	A/D	34
<b>Signalized Intersections</b>										
2	OR 214/ Hobart Rd.	ODOT	0.90	-	0.83	A/F	79	0.71	B	11
7	Westfield St./McClaine St.	City	0.85	D	<b>1.48</b>	<b>F</b>	157	<b>0.97</b>	D	47
8	Main St./Westfield St.	City	0.85	D	0.25	A/B	11	0.22	A	7
9	Water St./C St.	ODOT	1.00	-	0.75	C	22	0.76	C	22
10	Main St./McClaine St.	City	0.85	55s	<b>1.04</b>	<b>F</b>	<b>71<sup>a</sup></b>	0.68	E <sup>a</sup>	36 <sup>a</sup>
13	Water St./Oak St.	ODOT	1.00	55s	0.86	D	48 <sup>a</sup>	0.48	C <sup>a</sup>	16 <sup>a</sup>
14	Water St./Main St.	ODOT	1.00	55s	<b>1.12</b>	<b>F</b>	<b>77<sup>a</sup></b>	0.59	B <sup>a</sup>	22 <sup>a</sup>
17	1st St./C St.	ODOT	1.00	-	<b>1.10</b>	E	58	0.98	D	45
18	1st St./Oak St.	ODOT	1.00	55s	0.85	A <sup>a</sup>	21 <sup>a</sup>	0.55	B <sup>a</sup>	13 <sup>a</sup>
19	1st St./Main St.	ODOT	1.00	55s	0.89	B <sup>a</sup>	52 <sup>a</sup>	0.68	C <sup>a</sup>	20 <sup>a</sup>

<sup>a</sup> Delay results for the downtown core area are based on the vehicle delay reported in SimTraffic for the worst approach, consistent with City of Silverton standards for designated downtown intersections.

<sup>b</sup> Results from Synchro in-program operations. Due to unique geometry, HCM Report not available.

Note: **Bold/Shaded** text indicates failure to meet agency mobility target.

Mitigations in the “Build” package of improvements allow all study intersections to meet operating standards with one exception. The Westfield Street/McClaine Street intersection operates at a v/c ratio of 0.97, which is under capacity, but above the City’s standard for signalized intersections (0.85). Further mitigations, such as additional turn lanes and receiving lanes, could help the intersection meet standard, but would have significant right-of-way impact. Construction of project MV-15, a new collector street through the west side area between Main Street and Silverton Road, may also help reduce volume at this intersection. For now, the recommended approach is to amend the City’s v/c standard for this intersection upward to 1.00.

## **Next Steps**

The projects identified in this memorandum address the needs of community in terms of safety, mobility, and livability. The next steps involve identifying, securing, and allocating funding to implement these projects. The City of Silverton can utilize the project rankings developed and presented in this memorandum to establish priorities for funding and implementation for short-term and long-term planning horizons.



**Appendix**

2037 Future Year Build Scenario Synchro HCM Reports

2037 Future Year Build Scenario SimTraffic Delay Reports

**Intersection**

Int Delay, s/veh 2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	270	10	70	210	10	50
Future Vol, veh/h	270	10	70	210	10	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	0	3	15	0	2
Mvmt Flow	303	11	79	236	11	56

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	315
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.13
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.227
Pot Cap-1 Maneuver	-	-	1240
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1240
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-



















Approach	EB	WB	NB
HCM Control Delay, s	0	2	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	632	-	-	1240	-
HCM Lane V/C Ratio	0.107	-	-	0.063	-
HCM Control Delay (s)	11.4	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

# HCM Signalized Intersection Capacity Analysis

## 2: Hwy 214 & Hobart Road

Silverton TSP  
Future PM Build Scenario

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	30	90	10	100	90	50	0	300	130	70	470	20	
Future Volume (vph)	30	90	10	100	90	50	0	300	130	70	470	20	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00	
Fr <sub>t</sub>		0.99			0.97			1.00	0.85		1.00	0.85	
Fl <sub>t</sub> Protected		0.99			0.98			1.00	1.00		0.99	1.00	
Satd. Flow (prot)		1655			1474			1683	1365		1662	1488	
Fl <sub>t</sub> Permitted		0.90			0.84			1.00	1.00		0.92	1.00	
Satd. Flow (perm)		1511			1262			1683	1365		1539	1488	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	33	99	11	110	99	55	0	330	143	77	516	22	
RTOR Reduction (vph)	0	5	0	0	16	0	0	0	67	0	0	10	
Lane Group Flow (vph)	0	138	0	0	248	0	0	330	76	0	593	12	
Heavy Vehicles (%)	0%	5%	0%	26%	2%	7%	0%	4%	9%	2%	5%	0%	
Turn Type	Perm	NA		Perm	NA			NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2		2	6		6	
Actuated Green, G (s)		13.3			13.3			24.1	24.1		24.1	24.1	
Effective Green, g (s)		13.3			13.3			24.1	24.1		24.1	24.1	
Actuated g/C Ratio		0.29			0.29			0.53	0.53		0.53	0.53	
Clearance Time (s)		4.0			4.0			4.0	4.0		4.0	4.0	
Vehicle Extension (s)		2.5			2.5			2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		442			369			893	724		816	789	
v/s Ratio Prot								0.20					
v/s Ratio Perm		0.09			c0.20				0.06		c0.39	0.01	
v/c Ratio		0.31			0.67			0.37	0.10		0.73	0.01	
Uniform Delay, d <sub>1</sub>		12.5			14.1			6.2	5.3		8.1	5.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d <sub>2</sub>		0.3			4.3			0.2	0.0		3.0	0.0	
Delay (s)		12.8			18.4			6.4	5.3		11.2	5.0	
Level of Service		B			B			A	A		B	A	
Approach Delay (s)		12.8			18.4			6.1			11.0		
Approach LOS		B			B			A			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			10.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			45.4									Sum of lost time (s)	8.0
Intersection Capacity Utilization			79.3%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Vol, veh/h	0	20	70	30	20	10	70	500	70	30	570	20
Future Vol, veh/h	0	20	70	30	20	10	70	500	70	30	570	20
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	100	-	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	11	0	0	11	0	0	40	4	0	0	8	75
Mvmt Flow	0	22	77	33	22	11	77	549	77	33	626	22
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1412	1395	628	1447	1395	549	626	0	0	549	0	0
Stage 1	692	692	-	703	703	-	-	-	-	-	-	-
Stage 2	720	703	-	744	692	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.2	7.21	6.5	6.2	4.5	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.21	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.21	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.3	3.599	4	3.3	2.56	-	-	2.2	-	-
Pot Cap-1 Maneuver	110	143	487	104	143	539	797	-	-	1031	-	-
Stage 1	420	448	-	414	443	-	-	-	-	-	-	-
Stage 2	405	443	-	393	448	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	79	115	486	64	115	539	796	-	-	1031	-	-
Mov Cap-2 Maneuver	79	115	-	64	115	-	-	-	-	-	-	-
Stage 1	357	426	-	352	377	-	-	-	-	-	-	-
Stage 2	318	377	-	298	426	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	24.4			112			1.1			0.4		
HCM LOS	C			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	796	-	-	283	91	1031	-	-				
HCM Lane V/C Ratio	0.097	-	-	0.349	0.725	0.032	-	-				
HCM Control Delay (s)	10	0	-	24.4	112	8.6	0	-				
HCM Lane LOS	B	A	-	C	F	A	A	-				
HCM 95th %tile Q(veh)	0.3	-	-	1.5	3.6	0.1	-	-				

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	10	10	230	0	10	10	10	0	180	120	10
Future Vol, veh/h	0	10	10	230	0	10	10	10	0	180	120	10
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	10	0	4	2	0	0	0	2	1	0	0
Mvmt Flow	0	12	12	274	0	12	12	12	0	214	143	12
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12.2	9.4	14.6
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	58%	4%	33%	5%
Vol Thru, %	39%	4%	33%	76%
Vol Right, %	3%	92%	33%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	310	250	30	210
LT Vol	180	10	10	10
Through Vol	120	10	10	160
RT Vol	10	230	10	40
Lane Flow Rate	369	298	36	250
Geometry Grp	1	1	1	1
Degree of Util (X)	0.545	0.431	0.059	0.366
Departure Headway (Hd)	5.313	5.21	5.962	5.277
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	679	690	598	680
Service Time	3.35	3.252	4.024	3.32
HCM Lane V/C Ratio	0.543	0.432	0.06	0.368
HCM Control Delay	14.6	12.2	9.4	11.4
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	3.3	2.2	0.2	1.7

**Intersection**

Intersection Delay, s/veh  
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	10	160	40
Future Vol, veh/h	0	10	160	40
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	12	190	48
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.4
HCM LOS	B

Intersection	
Intersection Delay, s/veh	14.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	10	10	10	0	40	10	120	0	10	190	30
Future Vol, veh/h	0	10	10	10	0	40	10	120	0	10	190	30
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	0	14	9	2	0	33	1	2	0	0	0
Mvmt Flow	0	12	12	12	0	48	12	143	0	12	226	36
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.6	11	11.6
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	33%	24%	53%
Vol Thru, %	83%	33%	6%	45%
Vol Right, %	13%	33%	71%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	230	30	170	400
LT Vol	10	10	40	210
Through Vol	190	10	10	180
RT Vol	30	10	120	10
Lane Flow Rate	274	36	202	476
Geometry Grp	1	1	1	1
Degree of Util (X)	0.395	0.061	0.308	0.678
Departure Headway (Hd)	5.19	6.104	5.485	5.123
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	693	585	654	705
Service Time	3.226	4.162	3.53	3.152
HCM Lane V/C Ratio	0.395	0.062	0.309	0.675
HCM Control Delay	11.6	9.6	11	18.3
HCM Lane LOS	B	A	B	C
HCM 95th-tile Q	1.9	0.2	1.3	5.3



**Intersection**

Intersection Delay, s/veh  
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	210	180	10
Future Vol, veh/h	0	210	180	10
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	3	2	0
Mvmt Flow	0	250	214	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	18.3
HCM LOS	C

**Intersection**

Int Delay, s/veh 3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	220	690	10	60	580	20	0	0	40	0	0	200
Future Vol, veh/h	220	690	10	60	580	20	0	0	40	0	0	200
Conflicting Peds, #/hr	2	0	1	1	0	2	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	4	0	4	8	0	0	0	0	0	0	2
Mvmt Flow	232	726	11	63	611	21	0	0	42	0	0	211

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	634	0	0	738	0	0	2050	1956	733	1965	1950	624
Stage 1	-	-	-	-	-	-	1196	1196	-	749	749	-
Stage 2	-	-	-	-	-	-	854	760	-	1216	1201	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.1	6.5	6.2	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.5	4	3.3	3.5	4	3.318
Pot Cap-1 Maneuver	959	-	-	859	-	-	42	65	424	48	65	485
Stage 1	-	-	-	-	-	-	229	262	-	407	422	-
Stage 2	-	-	-	-	-	-	356	417	-	223	260	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	958	-	-	859	-	-	15	34	424	27	34	484
Mov Cap-2 Maneuver	-	-	-	-	-	-	15	34	-	27	34	-
Stage 1	-	-	-	-	-	-	135	154	-	239	374	-
Stage 2	-	-	-	-	-	-	178	369	-	118	153	-





















Approach	EB		WB		NB		SB
HCM Control Delay, s	2.4		0.9		14.4		18
HCM LOS					B		C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	424	958	-	-	859	-	-	484
HCM Lane V/C Ratio	0.099	0.242	-	-	0.074	-	-	0.435
HCM Control Delay (s)	14.4	10	0	-	9.5	0	-	18
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0.9	-	-	0.2	-	-	2.2

# HCM Signalized Intersection Capacity Analysis

## 7: Westfield Street/C Street & McClaine Street

Silverton TSP  
Future PM Build Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	520	390	130	120	350	20	150	410	80	0	345	410
Future Volume (vph)	520	390	130	120	350	20	150	410	80	0	345	410
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.96		1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1630	1676		1646	1670		1630	1638			1667	1365
Flt Permitted	0.14	1.00		0.47	1.00		0.18	1.00			1.00	1.00
Satd. Flow (perm)	249	1676		808	1670		314	1638			1667	1365
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	531	398	133	122	357	20	153	418	82	0	352	418
RTOR Reduction (vph)	0	10	0	0	2	0	0	6	0	0	0	317
Lane Group Flow (vph)	531	521	0	122	375	0	153	494	0	0	352	101
Confl. Peds. (#/hr)	2						2					
Heavy Vehicles (%)	2%	0%	2%	1%	4%	0%	2%	5%	0%	0%	5%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA			NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	67.5	54.5		36.7	27.7		39.6	39.6			27.8	27.8
Effective Green, g (s)	67.5	54.5		36.7	27.7		39.6	39.6			27.8	27.8
Actuated g/C Ratio	0.59	0.47		0.32	0.24		0.34	0.34			0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	575	793		323	401		197	563			402	329
v/s Ratio Prot	c0.29	0.31		0.03	0.22		0.05	c0.30			0.21	
v/s Ratio Perm	c0.25			0.09			0.21					0.07
v/c Ratio	0.92	0.66		0.38	0.94		0.78	0.88			0.88	0.31
Uniform Delay, d1	29.3	23.2		28.8	42.8		29.7	35.5			42.0	35.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	20.6	2.0		0.7	29.1		17.3	14.4			18.7	0.5
Delay (s)	50.0	25.1		29.6	71.9		47.0	49.9			60.7	36.3
Level of Service	D	C		C	E		D	D			E	D
Approach Delay (s)		37.5			61.6			49.2			47.4	
Approach LOS		D			E			D			D	

### Intersection Summary

HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	115.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 8: Main Street & Westfield Street

Silverton TSP  
Future PM Build Scenario



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (vph)	150	210	140	10	10	170
Future Volume (vph)	150	210	140	10	10	170
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.87	
Flt Protected	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1498	1733	1657		1416	
Flt Permitted	0.65	1.00	1.00		1.00	
Satd. Flow (perm)	1029	1733	1657		1416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	231	154	11	11	187
RTOR Reduction (vph)	0	0	2	0	161	0
Lane Group Flow (vph)	165	231	163	0	37	0
Heavy Vehicles (%)	11%	1%	5%	0%	0%	8%
Turn Type	Perm	NA	NA		Prot	
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)	33.2	33.2	33.2		6.7	
Effective Green, g (s)	33.2	33.2	33.2		6.7	
Actuated g/C Ratio	0.69	0.69	0.69		0.14	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	2.5	2.5	2.5		2.5	
Lane Grp Cap (vph)	713	1201	1148		198	
v/s Ratio Prot		0.13	0.10		c0.03	
v/s Ratio Perm	c0.16					
v/c Ratio	0.23	0.19	0.14		0.19	
Uniform Delay, d1	2.7	2.6	2.5		18.2	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.1	0.3		0.3	
Delay (s)	2.8	2.7	2.8		18.5	
Level of Service	A	A	A		B	
Approach Delay (s)		2.7	2.8		18.5	
Approach LOS		A	A		B	

### Intersection Summary





















HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	47.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 9: Water Street & C Street

Silverton TSP

Future PM Build Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	470	260	250	630	190	0	0	0	60	220	20
Future Volume (vph)	20	470	260	250	630	190	0	0	0	60	220	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	5.0	4.5	5.0	5.0				4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98				1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00				0.95	1.00	
Satd. Flow (prot)	1662	1716	1452	1662	1699	1442				1662	1708	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00				0.95	1.00	
Satd. Flow (perm)	1662	1716	1452	1662	1699	1442				1662	1708	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	516	286	275	692	209	0	0	0	66	242	22
RTOR Reduction (vph)	0	0	144	0	0	76	0	0	0	0	4	0
Lane Group Flow (vph)	22	516	142	275	692	133	0	0	0	66	260	0
Confl. Peds. (#/hr)			2	2			5		10	10		5
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	2%	1%	0%	3%	1%	0%	0%	0%	0%	1%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm				Prot	NA	
Protected Phases	5	2		1	6					7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.8	30.7	30.7	16.0	44.9	44.9				16.8	16.8	
Effective Green, g (s)	1.8	30.7	30.7	16.0	44.9	44.9				16.8	16.8	
Actuated g/C Ratio	0.02	0.40	0.40	0.21	0.58	0.58				0.22	0.22	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0	5.0				4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	38	679	575	343	984	835				360	370	
v/s Ratio Prot	0.01	0.30		c0.17	c0.41					0.04	c0.15	
v/s Ratio Perm			0.10			0.09						
v/c Ratio	0.58	0.76	0.25	0.80	0.70	0.16				0.18	0.70	
Uniform Delay, d1	37.5	20.2	15.7	29.2	11.6	7.6				24.8	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	
Incremental Delay, d2	19.6	4.9	0.2	12.6	2.3	0.1				0.2	6.0	
Delay (s)	57.1	25.1	15.9	41.9	13.9	7.6				25.0	34.0	
Level of Service	E	C	B	D	B	A				C	C	
Approach Delay (s)		22.8			19.3			0.0			32.2	
Approach LOS		C			B			A			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			77.5				Sum of lost time (s)				14.0	
Intersection Capacity Utilization			68.9%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 10: Main Street & McClaine Street

Silverton TSP  
Future PM Build Scenario



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Traffic Volume (vph)	50	410	330	410	450	70
Future Volume (vph)	50	410	330	410	450	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00	0.98	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.98	
Flt Protected		0.99	1.00	1.00	0.96	
Satd. Flow (prot)		1850	1827	1531	1768	
Flt Permitted		0.93	1.00	1.00	0.96	
Satd. Flow (perm)		1738	1827	1531	1768	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	436	351	436	479	74
RTOR Reduction (vph)	0	0	0	219	10	0
Lane Group Flow (vph)	0	489	351	217	543	0
Confl. Peds. (#/hr)	2			2	2	
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	3%	2%	4%	3%	1%	0%
Turn Type	Perm	NA	NA	Perm	Prot	
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)		29.8	29.8	29.8	22.2	
Effective Green, g (s)		29.8	29.8	29.8	22.2	
Actuated g/C Ratio		0.50	0.50	0.50	0.37	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)		863	907	760	654	
v/s Ratio Prot			0.19		c0.31	
v/s Ratio Perm		c0.28		0.14		
v/c Ratio		0.57	0.39	0.28	0.83	
Uniform Delay, d1		10.6	9.4	8.9	17.2	
Progression Factor		1.00	0.71	0.64	1.00	
Incremental Delay, d2		2.7	0.2	0.1	8.6	
Delay (s)		13.3	6.9	5.8	25.8	
Level of Service		B	A	A	C	
Approach Delay (s)		13.3	6.3		25.8	
Approach LOS		B	A		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			14.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			80.9%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑↑				↗			↗
Traffic Vol, veh/h	0	550	20	0	1010	40	0	0	20	0	0	60
Future Vol, veh/h	0	550	20	0	1010	40	0	0	20	0	0	60
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	5	0	0	6	0	0	0	0	0	0	0
Mvmt Flow	0	591	22	0	1086	43	0	0	22	0	0	65
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	603	-	-	565
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.2	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	503	0	0	473
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	503	-	-	473
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			12.5			13.8		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	503	-	-	-	-	473						
HCM Lane V/C Ratio	0.043	-	-	-	-	0.136						
HCM Control Delay (s)	12.5	-	-	-	-	13.8						
HCM Lane LOS	B	-	-	-	-	B						
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.5						



**Intersection**

Int Delay, s/veh 0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔					↔↔
Traffic Vol, veh/h	0	0	0	0	30	710
Future Vol, veh/h	0	0	0	0	30	710
Conflicting Peds, #/hr	2	4	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	0	0	0	0	34	798

**Major/Minor**

	Minor1		Major2	
Conflicting Flow All	475	-	7	0
Stage 1	7	-	-	-
Stage 2	468	-	-	-
Critical Hdwy	6.8	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	2.2	-
Pot Cap-1 Maneuver	524	0	1627	-
Stage 1	-	0	-	-
Stage 2	602	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	501	-	1627	-
Mov Cap-2 Maneuver	501	-	-	-
Stage 1	-	-	-	-
Stage 2	579	-	-	-

**Approach**










	WB	SB
HCM Control Delay, s	0	0.4
HCM LOS	A	

**Minor Lane/Major Mvmt**

	WBLn1	SBL	SBT
Capacity (veh/h)	-	1627	-
HCM Lane V/C Ratio	-	0.021	-
HCM Control Delay (s)	0	7.3	0.1
HCM Lane LOS	A	A	A
HCM 95th %tile Q(veh)	-	0.1	-

HCM Signalized Intersection Capacity Analysis  
 13: Water Street & Oak Street


















Silverton TSP  
 Future PM Build Scenario

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (vph)	280	0	0	0	350	450
Future Volume (vph)	280	0	0	0	350	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0					4.0
Lane Util. Factor	1.00					0.95
Frbp, ped/bikes	1.00					1.00
Flpb, ped/bikes	1.00					0.99
Frt	1.00					1.00
Flt Protected	0.95					0.98
Satd. Flow (prot)	1752					3443
Flt Permitted	0.95					0.98
Satd. Flow (perm)	1752					3443
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	298	0	0	0	372	479
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	298	0	0	0	0	851
Confl. Peds. (#/hr)	9	15		8	8	
Heavy Vehicles (%)	3%	0%	0%	0%	2%	2%
Turn Type	Prot				Perm	NA
Protected Phases	8					6
Permitted Phases					6	
Actuated Green, G (s)	15.0					37.0
Effective Green, g (s)	15.0					37.0
Actuated g/C Ratio	0.25					0.62
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.5					2.5
Lane Grp Cap (vph)	438					2123
v/s Ratio Prot	c0.17					
v/s Ratio Perm						0.25
v/c Ratio	0.68					0.40
Uniform Delay, d1	20.3					5.9
Progression Factor	0.48					1.00
Incremental Delay, d2	3.5					0.6
Delay (s)	13.3					6.4
Level of Service	B					A
Approach Delay (s)	13.3		0.0			6.4
Approach LOS	B		A			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			8.2		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			48.2%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 14: Water Street/Hwy 214/Water Street & Main Street

Silverton TSP  
 Future PM Build Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	450	440	30	480	0	0	0	0	60	390	320
Future Volume (vph)	0	450	440	30	480	0	0	0	0	60	390	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		1.00	1.00		1.00						0.95	
Frbp, ped/bikes		1.00	0.98		1.00						0.97	
Flpb, ped/bikes		1.00	1.00		1.00						1.00	
Frt		1.00	0.85		1.00						0.94	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		1863	1549		1809						3201	
Flt Permitted		1.00	1.00		0.96						1.00	
Satd. Flow (perm)		1863	1549		1741						3201	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	469	458	31	500	0	0	0	0	62	406	333
RTOR Reduction (vph)	0	0	118	0	0	0	0	0	0	0	154	0
Lane Group Flow (vph)	0	469	340	0	531	0	0	0	0	0	648	0
Confl. Peds. (#/hr)	13		10	10		13	27		20	20		27
Heavy Vehicles (%)	0%	2%	2%	0%	5%	0%	0%	0%	0%	0%	2%	3%
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		23.8	23.8		23.8						28.2	
Effective Green, g (s)		23.8	23.8		23.8						28.2	
Actuated g/C Ratio		0.40	0.40		0.40						0.47	
Clearance Time (s)		4.0	4.0		4.0						4.0	
Vehicle Extension (s)		2.5	2.5		2.5						2.5	
Lane Grp Cap (vph)		738	614		690						1504	
v/s Ratio Prot		0.25										
v/s Ratio Perm			0.22		c0.30						0.20	
v/c Ratio		0.64	0.55		0.77						0.43	
Uniform Delay, d1		14.6	14.0		15.7						10.6	
Progression Factor		0.80	0.75		0.94						0.51	
Incremental Delay, d2		1.2	0.7		4.8						0.8	
Delay (s)		13.0	11.2		19.6						6.2	
Level of Service		B	B		B						A	
Approach Delay (s)		12.1			19.6			0.0			6.2	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			11.8								HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			60.0								Sum of lost time (s)	8.0
Intersection Capacity Utilization			89.0%								ICU Level of Service	E
Analysis Period (min)			15									

c Critical Lane Group

**Intersection**

Int Delay, s/veh 3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶		↶	↷
Traffic Vol, veh/h	10	70	170	10	130	190
Future Vol, veh/h	10	70	170	10	130	190
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	0	3	17	1	1
Mvmt Flow	13	91	221	13	169	247

















Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	811	227	0	0	234	0
Stage 1	227	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209	-
Pot Cap-1 Maneuver	352	817	-	-	1339	-
Stage 1	815	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	308	817	-	-	1339	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	815	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	3.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	308	817	1339	-
HCM Lane V/C Ratio	-	-	0.042	0.111	0.126	-
HCM Control Delay (s)	-	-	17.2	10	8.1	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.4	0.4	-

HCM Signalized Intersection Capacity Analysis  
 17: 1st Street & C Street

















Silverton TSP  
 Future PM Build Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	510	130	0	0	0	0	390	290	10	0	0	820
Future Volume (vph)	510	130	0	0	0	0	390	290	10	0	0	820
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5					4.0	4.0				4.0
Lane Util. Factor		1.00					1.00	1.00				1.00
Frbp, ped/bikes		1.00					1.00	1.00				0.99
Flpb, ped/bikes		1.00					1.00	1.00				1.00
Frt		1.00					1.00	0.99				0.86
Flt Protected		0.96					0.95	1.00				1.00
Satd. Flow (prot)		1599					1568	1614				1412
Flt Permitted		0.96					0.95	1.00				1.00
Satd. Flow (perm)		1599					1568	1614				1412
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	537	137	0	0	0	0	411	305	11	0	0	863
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	82
Lane Group Flow (vph)	0	674	0	0	0	0	411	315	0	0	0	781
Confl. Peds. (#/hr)	3		3	3			3	6		5	5	6
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	6%	1%	0%	0%	4%	0%	6%	8%	0%	0%	0%	6%
Turn Type	pm+pt	NA					Split	NA				custom
Protected Phases	5	2					7	7				8
Permitted Phases	2											6
Actuated Green, G (s)		48.3					25.9	25.9				64.3
Effective Green, g (s)		48.3					25.9	25.9				64.3
Actuated g/C Ratio		0.47					0.25	0.25				0.63
Clearance Time (s)		4.5					4.0	4.0				4.0
Vehicle Extension (s)		3.0					3.0	3.0				3.0
Lane Grp Cap (vph)		752					395	407				884
v/s Ratio Prot							c0.26	0.20				c0.14
v/s Ratio Perm		0.42										0.42
v/c Ratio		0.90					1.04	0.77				0.88
Uniform Delay, d1		24.9					38.4	35.7				16.1
Progression Factor		1.00					1.00	1.00				1.00
Incremental Delay, d2		13.3					56.2	8.9				10.4
Delay (s)		38.2					94.6	44.6				26.4
Level of Service		D					F	D				C
Approach Delay (s)		38.2			0.0			72.9			26.4	
Approach LOS		D			A			E			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			44.8				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			102.7				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			85.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 18: 1st Street & Oak Street

Silverton TSP  
Future PM Build Scenario

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 				
Traffic Volume (vph)	40	320	0	0	240	180	30	350	230	0	0	0
Future Volume (vph)	40	320	0	0	240	180	30	350	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frb, ped/bikes		1.00			0.99			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.94			0.94				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1823			1706			3208				
Flt Permitted		0.72			1.00			1.00				
Satd. Flow (perm)		1316			1706			3208				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	44	352	0	0	264	198	33	385	253	0	0	0
RTOR Reduction (vph)	0	0	0	0	59	0	0	113	0	0	0	0
Lane Group Flow (vph)	0	396	0	0	403	0	0	558	0	0	0	0
Confl. Peds. (#/hr)	18		7	7		18	23		8	8		23
Heavy Vehicles (%)	0%	4%	0%	0%	4%	3%	0%	5%	4%	0%	0%	0%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		19.5			19.5			32.5				
Effective Green, g (s)		19.5			19.5			32.5				
Actuated g/C Ratio		0.32			0.32			0.54				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		2.5			2.5			2.5				
Lane Grp Cap (vph)		427			554			1737				
v/s Ratio Prot					0.24							
v/s Ratio Perm		c0.30						0.17				
v/c Ratio		0.93			0.73			0.32				
Uniform Delay, d1		19.6			17.9			7.6				
Progression Factor		0.94			1.00			0.55				
Incremental Delay, d2		25.1			4.5			0.4				
Delay (s)		43.5			22.4			4.6				
Level of Service		D			C			A				
Approach Delay (s)		43.5			22.4			4.6			0.0	
Approach LOS		D			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			20.1				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			75.0%				ICU Level of Service		D			
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 19: 1st Street & Main Street

Silverton TSP  
Future PM Build Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	240	0	0	230	60	210	260	10	0	0	0
Future Volume (vph)	220	240	0	0	230	60	210	260	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frbp, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			1.00				
Flt Protected		0.98			1.00			0.98				
Satd. Flow (prot)		1821			1769			3348				
Flt Permitted		0.63			1.00			0.98				
Satd. Flow (perm)		1176			1769			3348				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	242	264	0	0	253	66	231	286	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	506	0	0	300	0	0	526	0	0	0	0
Confl. Peds. (#/hr)	15		10	10		15	7		10	10		7
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	1%	0%	0%	3%	7%	3%	6%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		29.0			29.0			23.0				
Effective Green, g (s)		29.0			29.0			23.0				
Actuated g/C Ratio		0.48			0.48			0.38				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		2.5			2.5			2.5				
Lane Grp Cap (vph)		568			855			1283				
v/s Ratio Prot					0.17							
v/s Ratio Perm		c0.43						0.16				
v/c Ratio		0.89			0.35			0.41				
Uniform Delay, d1		14.1			9.6			13.5				
Progression Factor		0.36			1.00			1.00				
Incremental Delay, d2		14.5			0.2			1.0				
Delay (s)		19.7			9.8			14.5				
Level of Service		B			A			B				
Approach Delay (s)		19.7			9.8			14.5			0.0	
Approach LOS		B			A			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			15.3				HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			69.2%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔		↖		↗		↕				
Traffic Vol, veh/h	420	30	10	10	0	20	0	50	10	0	0	0
Future Vol, veh/h	420	30	10	10	0	20	0	50	10	0	0	0
Conflicting Peds, #/hr	2	0	1	1	0	2	4	0	1	1	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	4	6	0	0	0	0	0	9	0	0	0	0
Mvmt Flow	545	39	13	13	0	26	0	65	13	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	2	0	0	53	0	-	-	1165	47
Stage 1	-	-	-	-	-	-	-	1137	-
Stage 2	-	-	-	-	-	-	-	28	-
Critical Hdwy	4.14	-	-	4.1	-	-	-	6.59	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.236	-	-	2.2	-	-	-	4.081	3.3
Pot Cap-1 Maneuver	1607	-	-	1566	0	-	0	188	1028
Stage 1	-	-	-	-	0	-	0	269	-
Stage 2	-	-	-	-	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1607	-	-	1565	-	-	-	0	1026
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-
Stage 1	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	0	-

Approach	EB	WB	NB
HCM Control Delay, s	7.7	2.4	
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBR
Capacity (veh/h)	-	1026	1607	-	-	1565	-
HCM Lane V/C Ratio	-	0.044	0.339	-	-	0.008	-
HCM Control Delay (s)	-	8.7	8.4	0	-	7.3	-
HCM Lane LOS	-	A	A	A	-	A	-
HCM 95th %tile Q(veh)	-	0.1	1.5	-	-	0	-



**Intersection**

Int Delay, s/veh 16.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	510	20	80	420	50	0	20	50	70	50	30
Future Vol, veh/h	10	510	20	80	420	50	0	20	50	70	50	30
Conflicting Peds, #/hr	3	0	0	0	0	3	6	0	0	0	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	3	0	8	3	0	0	3	0	2	5	0
Mvmt Flow	10	526	21	82	433	52	0	21	52	72	52	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	488	0	0	546	0	0	1228	1209	536	1220	1194	468
Stage 1	-	-	-	-	-	-	557	557	-	627	627	-
Stage 2	-	-	-	-	-	-	671	652	-	593	567	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.1	6.53	6.2	7.12	6.55	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.12	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.12	5.55	-
Follow-up Hdwy	2.2	-	-	2.272	-	-	3.5	4.027	3.3	3.518	4.045	3.3
Pot Cap-1 Maneuver	1086	-	-	994	-	-	156	182	549	157	184	599
Stage 1	-	-	-	-	-	-	518	511	-	471	472	-
Stage 2	-	-	-	-	-	-	449	463	-	492	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1081	-	-	994	-	-	101	159	549	116	161	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	101	159	-	116	161	-
Stage 1	-	-	-	-	-	-	511	504	-	464	417	-
Stage 2	-	-	-	-	-	-	329	409	-	422	495	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.3	19.3	127.6
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	1081	-	-	994	-	-	156
HCM Lane V/C Ratio	0.223	0.01	-	-	0.083	-	-	0.991
HCM Control Delay (s)	19.3	8.4	0	-	8.9	0	-	127.6
HCM Lane LOS	C	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	0.8	0	-	-	0.3	-	-	7.5

**Intersection**

Int Delay, s/veh 2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	470	40	80	470	30	50
Future Vol, veh/h	470	40	80	470	30	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	7	5	2	0	4
Mvmt Flow	505	43	86	505	32	54

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	548	1204
Stage 1	-	-	527
Stage 2	-	-	677
Critical Hdwy	-	4.15	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	-	2.245	3.5
Pot Cap-1 Maneuver	-	1007	205
Stage 1	-	-	596
Stage 2	-	-	509
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1007	181
Mov Cap-2 Maneuver	-	-	181
Stage 1	-	-	596
Stage 2	-	-	448

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	311	-	-	1007	-
HCM Lane V/C Ratio	0.277	-	-	0.085	-
HCM Control Delay (s)	20.9	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.3	-

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	110	0	50	0	0	0	0	40	0	0	60	60
Future Vol, veh/h	110	0	50	0	0	0	0	40	0	0	60	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0	100	3	0	0	0	11
Mvmt Flow	129	0	59	0	0	0	0	47	0	0	71	71
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	153	106	182	188	47	141	0	0	47	0	0
Stage 1	106	106	-	47	47	-	-	-	-	-	-	-
Stage 2	47	47	-	135	141	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	5.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	3.1	-	-	2.2	-	-
Pot Cap-1 Maneuver	819	742	954	784	710	1028	1010	-	-	1573	-	-
Stage 1	905	811	-	972	860	-	-	-	-	-	-	-
Stage 2	972	860	-	873	784	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	819	742	954	736	710	1028	1010	-	-	1573	-	-
Mov Cap-2 Maneuver	819	742	-	736	710	-	-	-	-	-	-	-
Stage 1	905	811	-	972	860	-	-	-	-	-	-	-
Stage 2	972	860	-	819	784	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.4			0			0			0		
HCM LOS	B			A								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1010	-	-	857	-	1573	-	-				
HCM Lane V/C Ratio	-	-	-	0.22	-	-	-	-				
HCM Control Delay (s)	0	-	-	10.4	0	0	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.8	-	0	-	-				

**Intersection**

Int Delay, s/veh 3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔			↔	↔
Traffic Vol, veh/h	90	380	0	0	410	50	0	0	0	40	0	100
Future Vol, veh/h	90	380	0	0	410	50	0	0	0	40	0	100
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Stop
Storage Length	-	-	-	-	-	100	-	-	-	-	-	75
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	3	0	0	4	35	0	0	0	18	0	2
Mvmt Flow	100	422	0	0	456	56	0	0	0	44	0	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	456	0	0	422	0	0	1080	1078	422	1078	1078	456
Stage 1	-	-	-	-	-	-	622	622	-	456	456	-
Stage 2	-	-	-	-	-	-	458	456	-	622	622	-
Critical Hdwy	4.12	-	-	4.1	-	-	7.1	6.5	6.2	7.28	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.28	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.28	5.5	-
Follow-up Hdwy	2.218	-	-	2.2	-	-	3.5	4	3.3	3.662	4	3.318
Pot Cap-1 Maneuver	1105	-	-	1148	-	0	197	220	636	183	220	603
Stage 1	-	-	-	-	-	0	478	482	-	555	572	-
Stage 2	-	-	-	-	-	0	587	572	-	448	482	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1103	-	-	1148	-	-	146	194	636	166	194	602
Mov Cap-2 Maneuver	-	-	-	-	-	-	146	194	-	166	194	-
Stage 1	-	-	-	-	-	-	422	425	-	490	572	-
Stage 2	-	-	-	-	-	-	478	572	-	395	425	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0	0	18.6
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1103	-	-	1148	-	166	602
HCM Lane V/C Ratio	-	0.091	-	-	-	-	0.268	0.185
HCM Control Delay (s)	0	8.6	0	-	0	-	34.4	12.3
HCM Lane LOS	A	A	A	-	A	-	D	B
HCM 95th %tile Q(veh)	-	0.3	-	-	0	-	1	0.7

Summary of All Intervals

Run Number	2	3	5	7	8	9	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50	4:50
End Time	5:30	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	40	40	40	40	40	40	40
Time Recorded (min)	30	30	30	30	30	30	30
# of Intervals	3	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2	2
Vehs Entered	1889	1855	1953	1932	1896	1874	1898
Vehs Exited	1889	1880	1962	1952	1910	1914	1917
Starting Vehs	108	143	124	142	145	168	138
Ending Vehs	108	118	115	122	131	128	120
Travel Distance (mi)	903	889	917	928	904	908	908
Travel Time (hr)	66.0	63.3	64.3	67.5	63.8	69.2	65.7
Total Delay (hr)	30.5	28.2	28.3	31.1	28.1	33.6	30.0
Total Stops	3395	3255	3239	3512	3360	3469	3369
Fuel Used (gal)	38.2	37.5	38.3	39.4	37.7	39.4	38.4

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by PHF, Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	5:15
Total Time (min)	15
Volumes adjusted by PHF, Growth Factors.	

Run Number	2	3	5	7	8	9	Avg
Vehs Entered	1035	954	1029	980	994	959	992
Vehs Exited	998	966	1003	989	1004	993	993
Starting Vehs	108	143	124	142	145	168	138
Ending Vehs	145	131	150	133	135	134	135
Travel Distance (mi)	484	464	473	475	477	471	474
Travel Time (hr)	35.6	33.2	32.9	34.8	33.2	38.8	34.8
Total Delay (hr)	16.6	15.0	14.3	16.2	14.5	20.4	16.2
Total Stops	1936	1749	1636	1831	1748	1900	1799
Fuel Used (gal)	20.5	19.6	19.7	20.2	19.7	21.2	20.2

**Interval #2 Information Recording2**

Start Time	5:15
End Time	5:30
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	2	3	5	7	8	9	Avg
Vehs Entered	854	901	924	952	902	915	906
Vehs Exited	891	914	959	963	906	921	923
Starting Vehs	145	131	150	133	135	134	135
Ending Vehs	108	118	115	122	131	128	120
Travel Distance (mi)	419	426	444	453	428	437	434
Travel Time (hr)	30.3	30.0	31.4	32.7	30.5	30.4	30.9
Total Delay (hr)	13.9	13.3	14.0	14.8	13.6	13.2	13.8
Total Stops	1459	1506	1603	1681	1612	1569	1568
Fuel Used (gal)	17.7	17.9	18.6	19.1	18.0	18.2	18.3

**10: Main Street & McClaine Street Performance by approach**

Approach	EB	WB	SB	All
Denied Delay (hr)	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.0	0.5	0.2
Total Delay (hr)	3.7	2.7	3.2	9.6
Total Del/Veh (s)	53.2	23.5	39.9	36.2
Stop Delay (hr)	3.1	2.2	2.5	7.8
Stop Del/Veh (s)	45.1	19.0	30.9	29.4

**12: Water Street & Park Street Performance by approach**

Approach	SB	All
Denied Delay (hr)	0.0	0.0
Denied Del/Veh (s)	0.2	0.2
Total Delay (hr)	0.2	0.2
Total Del/Veh (s)	1.4	1.4
Stop Delay (hr)	0.0	0.0
Stop Del/Veh (s)	0.0	0.0

**13: Water Street & Oak Street Performance by approach**

Approach	WB	SB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.0	0.1
Total Delay (hr)	1.1	1.3	2.4
Total Del/Veh (s)	26.3	11.6	15.6
Stop Delay (hr)	1.0	0.9	1.8
Stop Del/Veh (s)	22.7	7.8	11.8

**14: Water Street/Hwy 214/Water Street & Main Street Performance by approach**

Approach	EB	WB	SB	All
Denied Delay (hr)	0.0	0.4	0.0	0.5
Denied Del/Veh (s)	0.0	5.7	0.4	1.5
Total Delay (hr)	1.8	2.6	2.4	6.9
Total Del/Veh (s)	13.9	35.7	22.1	21.9
Stop Delay (hr)	1.2	2.2	2.1	5.5
Stop Del/Veh (s)	9.1	30.1	18.6	17.3

**15: Water Street/Hwy 214 & Lewis Street Performance by approach**

Approach	NB	SB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.4	0.1	0.2
Total Delay (hr)	0.3	0.2	0.5
Total Del/Veh (s)	4.7	1.7	2.7
Stop Delay (hr)	0.1	0.1	0.2
Stop Del/Veh (s)	1.9	0.6	1.0

**18: 1st Street & Oak Street Performance by approach**

Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.3	0.1
Total Delay (hr)	0.9	0.9	0.8	2.6
Total Del/Veh (s)	16.4	14.2	9.0	12.6
Stop Delay (hr)	0.8	0.8	0.7	2.2
Stop Del/Veh (s)	14.6	11.9	7.7	10.8

**19: 1st Street & Main Street Performance by approach**

Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.1	0.0	0.1
Denied Del/Veh (s)	0.0	2.8	0.3	0.7
Total Delay (hr)	1.5	0.7	1.8	3.9
Total Del/Veh (s)	19.7	15.5	22.6	19.9
Stop Delay (hr)	1.3	0.6	1.7	3.5
Stop Del/Veh (s)	16.8	13.2	21.2	17.8

**20: 1st Street & Lewis Street Performance by approach**

Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.1	0.0
Total Delay (hr)	0.5	0.0	0.4	0.9
Total Del/Veh (s)	6.8	2.4	36.7	9.9
Stop Delay (hr)	0.4	0.0	0.3	0.7
Stop Del/Veh (s)	5.1	2.0	33.6	8.1



**21: 2nd Street & Oak Street Performance by approach**

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.5	1.2	0.2	0.3
Total Delay (hr)	0.1	0.4	0.1	0.9	1.5
Total Del/Veh (s)	1.6	4.7	13.7	44.3	8.2
Stop Delay (hr)	0.0	0.1	0.1	0.9	1.2
Stop Del/Veh (s)	0.4	1.5	13.3	44.2	6.4

**95: 2nd Street & Lewis Street Performance by approach**

Approach	EB	All
Denied Delay (hr)	0.0	0.0
Denied Del/Veh (s)	0.0	0.0
Total Delay (hr)	0.0	0.0
Total Del/Veh (s)	0.1	0.1
Stop Delay (hr)	0.0	0.0
Stop Del/Veh (s)	0.0	0.0

**96: 2nd Street & Main Street Performance by approach**

Approach	EB	SB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.6	0.8	0.6
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.4	0.2

**97: 1st Street & Park Street Performance by approach**

Approach	EB	NB	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.5	0.5
Stop Delay (hr)	0.0	0.0	0.0
Stop Del/Veh (s)	0.0	0.2	0.2

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Total Network Performance

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Denied Delay (hr)	0.8
Denied Del/Veh (s)	1.6
Total Delay (hr)	29.1
Total Del/Veh (s)	51.5
Stop Delay (hr)	23.0
Stop Del/Veh (s)	40.7