Chapter 5
Transportation System Recommendations

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The Hamilton Transportation Plan 2002 contained a wide variety of transportation system projects that were recommended for future implementation. Specific projects were recommended within the general confines of the following two categories:

- Major Improvement Projects
- Transportation System Management (TSM) Improvement Projects

Within this chapter a brief summary as to the status of the previously recommended projects is provided, as well as whether they have been carried forward for consideration in the 2009 Transportation Plan Update. In addition, newly identified transportation system projects are presented.

5.1 Status of Major Improvement Projects (MIP) from 2002 Hamilton Transportation Plan

A list of recommended major street network (MSN) projects that were recommended as part of the 2002 Hamilton Transportation Plan and their status as of this plan update are listed in this section. The 2002 Transportation Plan included 18 recommended Major Improvement Projects. Of these projects, 3 were completed and 15 have not been completed. The various 18 projects recommended from the previous plan and their resultant status is shown below in **Table 5-1**.

Table 5-1
MIP Projects from the 2002 Transportation Plan and Status for 2009 Update

Project ID	Location of Past Project	Past Recommendation	Status for this Plan Update
1	Fairgrounds Road / S-269 (Eastside Highway)	Signalize intersection and re-align Airport Access Road to line up across from Fairgrounds Road	Not completed, modified and included herein as **MSN-1**
2	Kurtz Lane / S-269 (Marcus Street)	Add a designated northbound left-turn lane and a designated southbound right-turn lane	Not completed, modified and included herein as **TSM-11**
3	Adirondac Avenue / Fairgrounds Road / US 93	Option A: Modify signal phasing to allow protected movements on westbound Fairgrounds Road Option B: Add a protected left-turn lane on westbound Fairgrounds Road and a protected right-turn lane on northbound US 93	Not completed, modified and included herein as **TSM-12**

Project ID	Location of Past Project	Past Recommendation	Status for this Plan Update
4	Pine Street / US 93	Signalize the intersection and add a designated pedestrian crossing	Completed
5	Ravalli Street / US 93	Signalize the intersection and add a designated pedestrian crossing	Completed
6	Golf Course Road / US 93	Add a designated westbound right-turn lane & provide protected signal time for the north/south movements	Not completed, modified and included herein as **TSM-10**
7	Big Corral Road (Golf Course Road to S-269)	Widen to a collector standard with urban features (sidewalks, curb and gutter, relocation of utilities, etc.)	Not completed, modified and included herein as **MSN-17**
8	Kurtz Lane (Golf Course Road to S-269)	Widen to a collector standard with urban features (sidewalks, curb and gutter, etc.)	Not completed, modified and included herein as **MSN-18**
9	Daly Avenue (Golf Course Road to S-269)	Widen to a collector standard with urban features (sidewalks, curb and gutter, relocation of utilities, etc.)	Not completed, modified and included herein as **MSN-13**
10	Old Corvallis Road (Fairgrounds Road to Riverside Cutoff)	Widen to a collector standard with urban features (sidewalks, curb and gutter, etc.)	Not completed, modified and included herein as **MSN-3**
11	Seventh Street (Adirondac Avenue to Desta Street)	Replace roadway pavement and construct sidewalk & curb and gutter.	Not completed, modified and included herein as **MSN-14**
12	S-269 (Freeze Lane to US 93)	Install center left-turn lanes on S-269 at Kurtz Lane, Daly Avenue & Skeels Avenue	Not completed, modified and included herein as **MSN-15**
13	Ravalli Street (US 93 to Daly Avenue)	Widen the street to urban collector standards with two lanes of travel, on-street bike lanes, and sidewalks	Not completed, modified and included herein as **MSN-16**
14	Freeze Lane (S-269 to Fairgrounds Road)	Widen the roadway to a minimum 60 feet residential collector standard with adequate travel lanes, on-street parking, sidewalks & curb and gutter	Not completed, and not carried forward in this Plan Update
15	Kurtz Lane (S-269 to Fairgrounds Road)	Widen the street to urban collector standards with two lanes of travel, on-street parking and bike lanes, sidewalks & curb and gutter	Completed

Project ID	Location of Past Project	Past Recommendation	Status for this Plan Update
16	Providence Way (North of Fairgrounds Road)	Widen the street to urban collector standards with two lanes of travel, on-street parking and bike lanes, sidewalks & curb and gutter	Not completed, modified and included herein as **MSN-11**
17	Skeels Avenue Extension (S-269 to Fairgrounds Road)	Extend the street to Fairgrounds Road and construct to commercial collector standard	Not completed, modified and included herein as **MSN-5**
18	Connector Road (US 93 to Old Corvallis Road)	Construct a public street between US 93 and Old Corvallis Road to provide east-west connectivity	Not completed, modified and included herein as **MSN-7**

5.2 Recommended Major Street Network (MSN) Improvement Projects

During the preparation of this Plan Update, a number of MSN projects were identified. Estimated project costs are included for each project. These costs are "planning level" estimates and do not include possible right-of-way, utility, traffic management, or other heavily variable costs. They do include mandatory "incidental & direct cost (IDC)" factors as required by federal requirements.

It is important to acknowledge that many of the recommended roadway improvements call for "urban" type roadways in areas that are currently "rural" in nature. In many cases, urban roadway typical sections have been identified to match existing Hamilton Department of Public Works standard typical sections. This is not an effort to force urban roadway sections on all rural roadways, however as the community grows these corridors will likely require certain urban features as traffic volumes increase, in context with adjacent land uses.

The following list of MSN projects are **not** in any particular order with respect to priority:

MSN-1 Fairgrounds Road and Eastside Highway (S-269)

Identified Concerns: Operational, Capacity, & Safety
Project Timeline: Long Term Implementation (> 10 years)

Project Description: This intersection currently experiences operational issues due to its location at the base of a rising grade on southbound S-269, the increasing volumes of traffic on S-269, and the speed of vehicles travelling S-269. There are two recommendations that should be considered for this intersection. Recommendation number 1 could be considered a short-term, interim improvement until which time recommendation number 2 can become feasible. Recommendation number 1 consists of the addition of a southbound right-turn lane on S-269 at the intersection to allow right-turning vehicles to get out of the traffic stream. This movement is a predominant movement at the intersection due to the location of the high school and Fairgrounds Road being the first primary route into Hamilton from S-269. This short-term improvement would greatly improve the operations of the intersection. To implement this improvement, a right-turn lane warrant analysis will need to be completed in accordance with MDT policies and procedures. Additionally, for this to be feasible, the intersection would have to be signalized, which means signal warrants would have to be met. It would also be desirable to separate the left-turn and right-turn movements via designated lanes on the Fairgrounds Road leg of the intersection. Recommendation number 2 can be considered a long-term improvement and is subject to cooperation of the landowner located on the northwest quadrant of the intersection. If and when the private property develops, it is recommended that Fairgrounds Road be relocated to the north of its present location to position it farther away from the rising grade of S-269 south of the existing Fairgrounds Road. This should be coupled with the relocation of the Hamilton Airport Road across the newly relocated Fairgrounds Road. This is a long-term project that will be subject to private landowner cooperation. The resulting intersection may or may not meet traffic signalization warrants.

Estimated Cost (Recommendation No. 1): $475,000
Estimated Cost (Recommendation No. 2): $925,000

MSN-2 Fairgrounds Road (Old Corvallis Road to Eastside Highway)

Identified Concerns: Operational, Capacity, Safety, & Multi-Modal
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Reconstruct this road to an urban “business collector” standard with on-street bicycle lanes, curb and gutter, and sidewalks. It is envisioned that this roadway facility will utilize an 80 foot right-of-way. This project will improve east-west travel in this portion of town via improved drainage, improved non-motorized features, and better visibility for vehicles and pedestrians. This route is an important link connecting the west side of US Highway 93 to Eastside Highway, and receives considerable traffic due to the location of the high school. Note that the portion from Freeze Lane to Eastside Highway is under Ravalli County jurisdiction, and roadway improvements may be more “rural” in nature until traffic volumes suggest otherwise. Also of note is the portion between US Highway 93 and Old Corvallis Road should be assessed for improvements and channelization with this particular project's development, however right-of-way constraints are highly likely on the east leg of US Highway 93 and Old Corvallis Road.

Estimated Cost: *$2,700,000*

MSN-3 <u>Old Corvallis Road (Fairgrounds Road to GSK)</u>

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: Given the long-term growth potential along Old Corvallis Road, the facility should be reconstructed to an urban "business collector" standard. A large majority of the growth predicted within the study area boundary is predicted to occur along Old Corvallis Road. The area commonly referred to as "Area 3" will be served primarily along this route. The existing route is narrow with no room for non-motorized travel and limited shoulders. The newly constructed roadway should exhibit urban features to include curb and gutter, on-street bicycle lanes (each direction), sidewalk, and appropriate signage/pavement markings. Additional right-of-way may be needed for a reconstructed facility. It is envisioned that this roadway facility will utilize an 80 foot right-of-way. The route would begin at Fairgrounds Road and traverse to just past the Glaxo Smith Kline (GSK) eastern property boundary.

Estimated Cost: *$5,800,000*

MSN-4 <u>Tammany Lane (Golf Course Road to Lovers Lane)</u>

Identified Concerns: Maintenance
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: This is the only portion of Tammany Lane that is gravel. Although a low priority, this remaining section of Tammany Lane should be paved with asphalt for dust control and improved ride ability.

Estimated Cost: *$60,000*

MSN-5 <u>Skeels Avenue (Foxfield Street to Fairgrounds Road)</u>

Identified Concerns: Operational & Multi-Modal
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: Extend Skeels Avenue from Foxfield Street to Fairgrounds Road. This should be extended as an urban "residential collector" standard to the geometrics of the existing paved portions of Skeels Avenue, which utilize a 60 foot right-of-way and a 41 foot "back of curb" to "back of curb" street section. This extension will serve to relieve traffic pressure at the intersection of Fairgrounds Road and US 93, and will improve access for the industrial uses at the northern end of Skeels Avenue.

Estimated Cost: *$565,000*

MSN-6 New North-South Connector (Golf Course Road to Tammany Lane)

Identified Concerns: Operational, Capacity, & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: It is suggested that a new north-south connector roadway be constructed between Tammany Lane and Golf Course Road when development of private land occurs. Currently, there is no through connection in the area as shown on **Figure 5-2**. A new urban "residential collector" route would be desirable near the theoretical extension of Skyline Drive, straight north to Tammany Lane. The exact location would be dependent on private development plans, however the intent would be to provide another north-south connection in the area. This is especially important for emergency services response times. It is envisioned that this roadway facility would require an 80 foot right-of-way.

Estimated Cost: *$1,350,000*

MSN-7 New East-West Connector (Old Corvallis Road to US Highway 93)

Identified Concerns: Operational, Capacity, & Access
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: Given the growth projected for areas north and east of Old Corvallis Road, it is suggested that a new cross-connector be designed and constructed to provide an alternate route between Old Corvallis Road and US Highway 93. This new connection would potentially relieve some traffic at the intersection of Fairgrounds Road and Old Corvallis Road as well. The new road should be built to urban "business collector" standards, and should be located just north of the railroad track crossing on Old Corvallis Road. It is envisioned that this new connection would utilize an 80 foot right-of-way. The route could potentially be placed between the Massa Ace Building Supply building and the First American Title building. This location would necessitate a slight shift south of the current graveled roadway to not affect parking at the Ace Hardware location. Some right-of-way acquisition would be required. An alternate location may be at a location farther south, where Ravalli County retains a 60 foot roadway easement. This location is approximately directly east of the southernmost approach to the existing K-Mart store.

The formalization of any access point between US Highway 93 and Old Corvallis Road may require an access permit from Ravalli County and/or the Montana Department of Transportation. As part of the permitting process, a comprehensive analysis would be required to confirm that US Highway 93 operations would not be degraded to unacceptable levels of service.

Estimated Cost: *$155,000*

MSN-8 Westside Highway (US Highway 93 to West Bridge Road)

Identified Concerns: Maintenance
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: This facility is in various stages of surface deterioration. This is a low volume road with several alignment changes along the route, low density adjacent land uses, and limited potential for further development. Because of this, a full reconstruct of this facility will not likely be warranted out to the planning horizon of this plan. It is suggested, however, that routine mill and overlay be completed on the facility as funding becomes available and in accordance with the County's overall priority system. Ravalli County does have it in their capital improvement plans to complete an overlay project for a portion of this route.

Estimated Cost: *$335,000*

MSN-9 Ricketts Road (Blodgett Camp Road to east of Arbor Lane)

Identified Concerns: Maintenance
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: It is suggested that this segment of Ricketts Road be milled and overlaid as funding becomes available and in accordance with the County's overall priority system. The completion of this segment should complement the recently overlaid section of Ricketts Road between West Bridge Road and Blodgett Camp Road.

Estimated Cost: *$65,000*

MSN-10 New East-West Connector #1 (Old Corvallis Road to Eastside Highway)

Identified Concerns: Operational, Capacity, & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: Given the growth projected for areas north and east of Old Corvallis Road, it is suggested that a new cross-connector be designed and constructed to provide an alternate route between Old Corvallis Road and Eastside Highway. The new road should be built to urban "residential collector" standards, and should be located approximately opposite and directly west of the existing Stock Farm Road intersection with Eastside Highway. It is envisioned that this roadway facility would utilize an 80 foot right-of-way. Because there is a significant water body located about one-half mile west of Eastside Highway along this alignment, the new route would potentially have to have several curves in it as it approached Old Corvallis Road. This will be an important connection as development occurs, and it must be noted that it will only happen when private development activities commence, if and when they do. Without private developer participation, it is unlikely that this connection could ever come to fruition. Additionally, the exact route isn't important to know at this time, however some type of east-west connection in the general vicinity is important as the community grows. Note that an access permit would be required for any new connection to Eastside Highway from the Montana Department of Transportation.

Estimated Cost: *$2,640,000*

MSN-11 <u>Providence Way Extension (Fairgrounds Road to MSN-10 Roadway)</u>

Identified Concerns: Operational, Capacity, & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: Providence Way should be extended north of Fairgrounds Road and connect up with the future east-west route identified under MSN-10. This road should be constructed to an urban "residential collector" standard and include curb and gutter, storm drainage, sidewalks, and two travel lanes (one in each direction). It is envisioned that this roadway facility would utilize a 60 foot right-of-way. This will be an important connection as development occurs in the area. It must be noted that it will only happen when private development activities commence, if and when they do. Without private developer participation, it is unlikely that this connection could ever come to fruition.

Estimated Cost: *$835,000*

MSN-12 <u>New East-West Connector #2 (Old Corvallis Road to Eastside Highway)</u>

Identified Concerns: Operational, Capacity, & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: Given the growth projected for areas north and east of Old Corvallis Road, it is suggested that a second "new" cross-connector be designed and constructed to provide an alternate route between Old Corvallis Road and Eastside Highway. The new road should be built to urban "residential collector" standards, and should be located near the new Council on Aging (COA) facility and traverse approximately directly east to Eastside Highway. It is envisioned that this roadway facility would utilize an 80 foot right-of-way. The new route would potentially curve northeast as it approaches Eastside Highway to create a new intersection just north of the existing curve on S-269. This will be an equally important connection to MSN-10, as development occurs. It must be noted that it will only happen when private development activities commence, if and when they do. Without private developer participation, it is unlikely that this connection could ever come to fruition. Additionally, the exact route isn't important to know at this time, however some type of east-west connection in the general vicinity is important as the community grows. Note that an access permit would be required for any new connection to Eastside Highway from the Montana Department of Transportation.

Estimated Cost: *$3,000,000*

MSN-13 Daly Avenue (Golf Course Road to Marcus Street)

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: As a long-term project, it is recommended to reconstruct this street to an urban "residential collector" standard with curb and gutter and sidewalk. This is an extremely narrow corridor, and for a complete reconstruction of the facility, additional right-of-way will be needed to attain a minimum 60 foot right-of-way limit. This would be a difficult design project as irrigation ditches, on-street parking, and multiple utilities abound within the existing right-of-way limits, which are estimated to be approximately 42 feet. This long-term project does have value to the community, especially as a major access route to the elementary school.

Estimated Cost: *$1,950,000*

MSN-14 Seventh Street (Adirondac Avenue to Desta Street)

Identified Concerns: Maintenance
Project Timeline: Long Term Implementation (> 10 years)

Project Description: This collector facility has deteriorating sections of asphalt along the route and some drainage issues. It is recommended to mill and overlay this facility for its entire one-mile length to improve rideability and encourage better drainage.

Estimated Cost: *$2,340,000*

MSN-15 <u>Marcus Street (Freeze Lane to US 93)</u>

Identified Concerns: Operational, Capacity, & Safety
Project Timeline: Long Term Implementation (> 10 years)

Project Description: Install center left-turn lanes along Marcus Street at Kurtz Lane, Daly Avenue, and Skeels Avenue. This will require pavement widening at various locations along the facility. Available right-of-way along the route varies from 60 feet at the west end to 70 feet at the east end. There has been some public sentiment expressed about the speed differentials between US Highway 93 and Daly Avenue on this route, as some vehicles are increasing speeds heading eastbound (generally to rural areas) and some decrease their speeds heading eastbound (to turn onto Daly Avenue). A speed zone study was completed for this section of road in 2009, partially in response to these sentiments, and approval of signing modifications are currently pending with the Montana Transportation Commission.

Estimated Cost: *$175,000*

MSN-16 <u>Ravalli Street (US Highway 93 to Daly Avenue)</u>

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: As a long-term project, it is recommended to reconstruct this street to an urban "residential collector" street standard with curb and gutter and sidewalk. This is an extremely narrow corridor, and for a complete reconstruction of the facility, additional right-of-way will be needed to attain a minimum 60 foot right-of-way limit. This would be a difficult design project as on-street parking and multiple utilities abound within the existing right-of-way limits. This long-term project does have value to the community, especially as a major access route to the elementary school.

Estimated Cost: *$600,000*

MSN-17 <u>Big Corral Road (Golf Course Road to Marcus Street)</u>

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: As a long-term project, it is recommended to reconstruct this street to an urban "residential collector" standard with curb and gutter and sidewalk. Additional right-of-way will be needed to attain a minimum 60 foot right-of-way limit. This is a narrow corridor with several roadside hazards present. Additional right-of-way will be needed to attain for this improvement.

Estimated Cost: *$2,325,000*

MSN-18 Kurtz Lane (Golf Course Road to Marcus Street)

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: As a long-term project, it is recommended to reconstruct this street to an urban "residential collector" standard with curb and gutter and sidewalk. This is a narrow corridor with several roadside hazards present. Additional right-of-way will be needed to attain a minimum 80 foot right-of-way limit. Additionally, irrigation facilities are present in the corridor. Additional right-of-way will be needed to attain for this improvement.

Estimated Cost: *$1,240,000*

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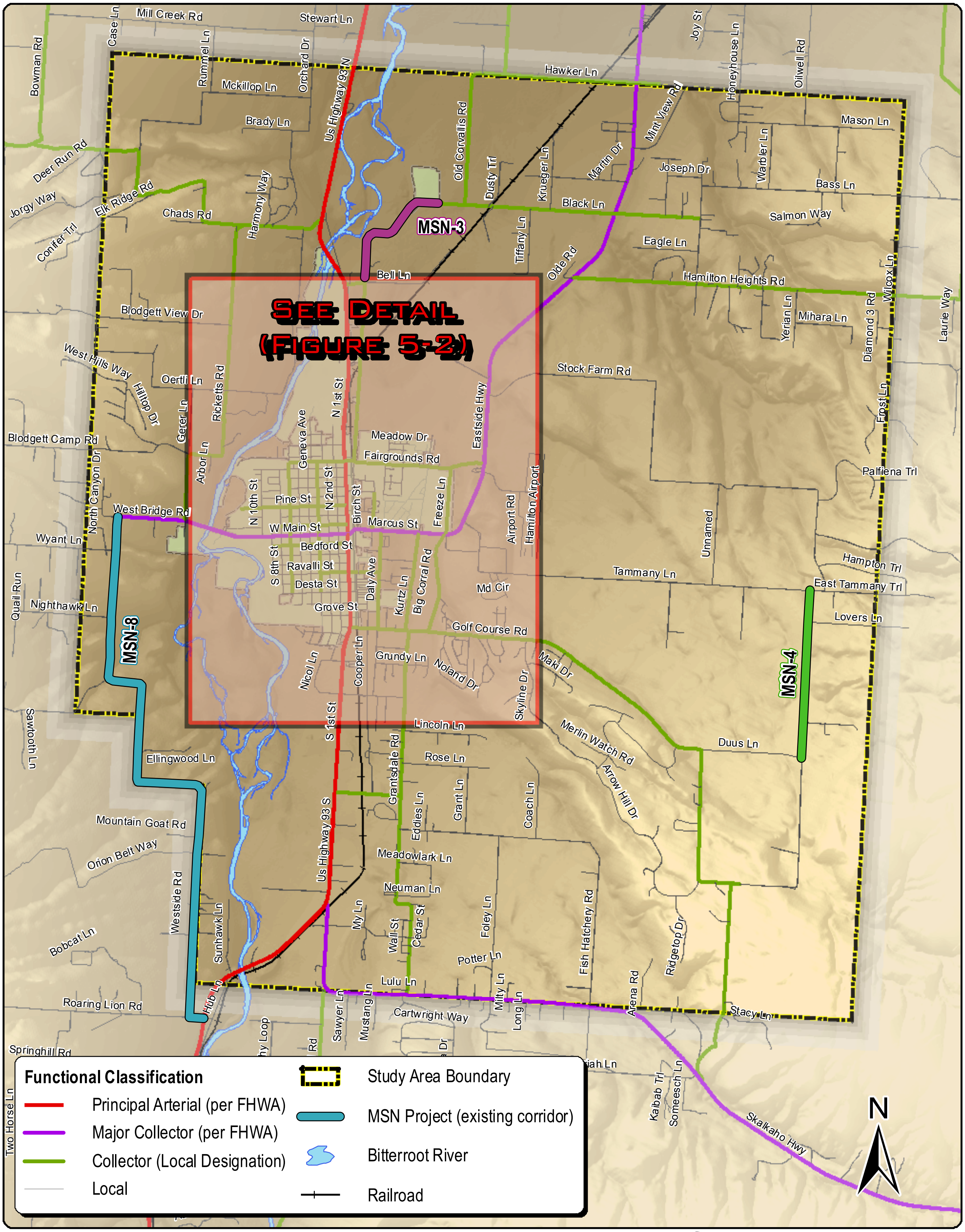

Figure 5-1
Major Street Network (MSN) Recommendations

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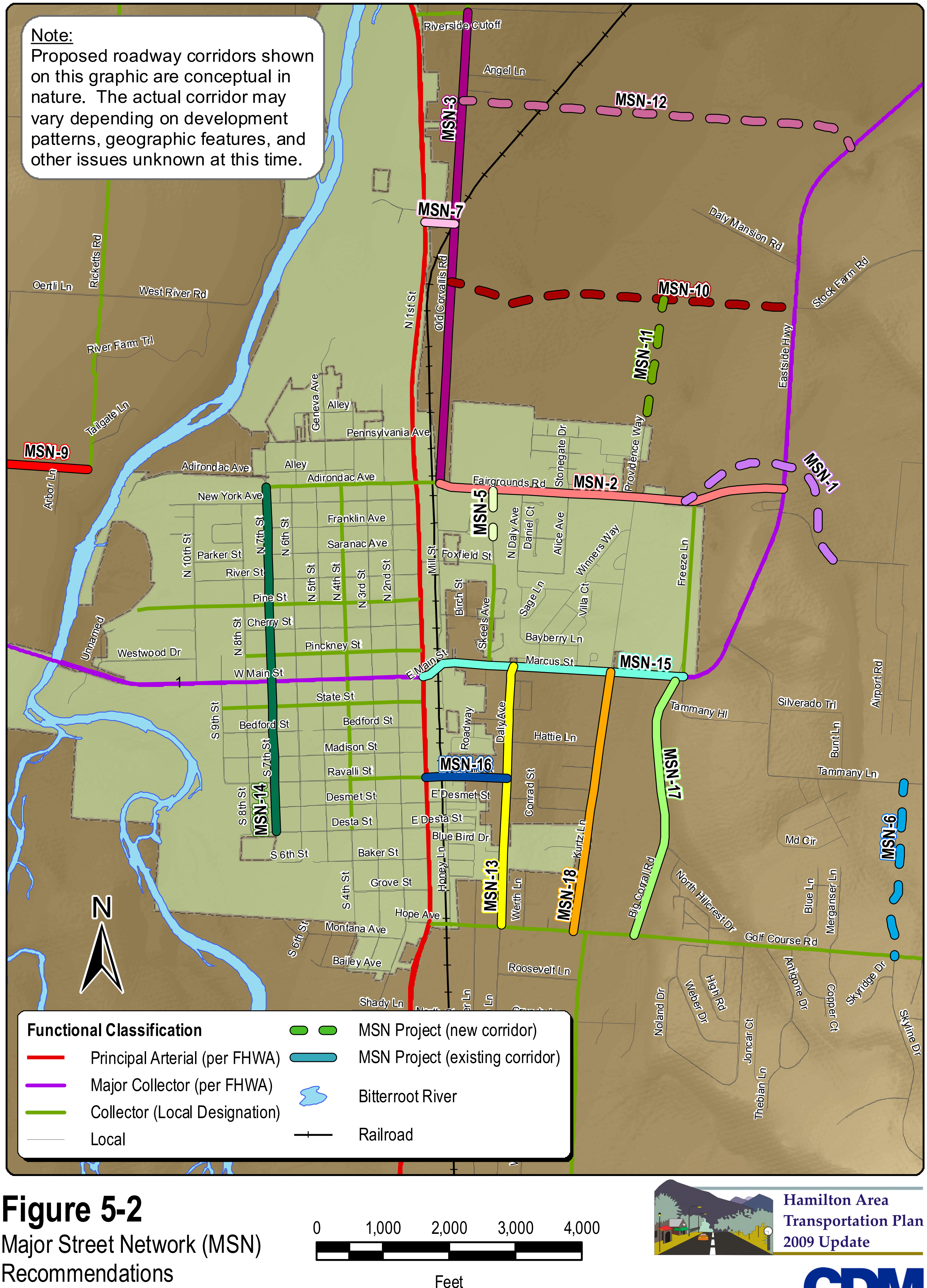

Figure 5-2

Major Street Network (MSN) Recommendations Inset Area

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5.3 Status of Transportation System Management (TSM) Projects from 2002 Hamilton Transportation Plan

A total of 6 TSM projects were recommended in the 2002 Transportation Plan. The status of these projects were reviewed to determine which have been completed, which are no longer valid, and which projects should be included as part of this plan update. Of the 6 projects, 2 were completed and 4 were not completed. The complete listing of the 6 projects, and their subsequent status for this 2009 Update to the Transportation Plan, are listed in **Table 5-2**.

Table 5-2
TSM Projects from the 2002 Transportation Plan and Status for 2009 Update

Project ID	Location of Past Project	Past Recommendation	Status for this Plan Update
19	S-531 (Main Street) & 3rd Street	Remove flashing span-wire and place four-way stop signs	Completed
20	S-531 (Main Street) & 4th Street	Add additional stop signs on Main Street to make a four-way stop sign controlled intersection	Completed
21	Pinckney Street & 2nd Street Stop Signs	Option A: Remove stop signs from Pinckney Street and place on 2nd Street Option B: Implement four-way stop sign control	Not completed, not carried forward in Plan Update
22	Pinckney Street & 3rd Street Stop Signs	Option A: Remove stop signs from Pinckney Street and place on 3rd Street Option B: Implement four-way stop sign control	Not completed, not carried forward in Plan Update
23	US 93 Signal Interconnect	Connect hard wire or telemetry interconnect between US93 signals (five total)	Not completed, modified and included herein as **TSM-22**
24	Ravalli Street / US 93 Crossing Guard Pilot Project	Pilot project to provide a crossing guard and document pedestrian volumes to satisfy signal warrant for potential new signal	Not completed, not carried forward in Plan Update (signal now installed at Ravalli Street)

5.4 Recommended Transportation System Management (TSM) Improvement Projects

During the preparation of this plan, a number of transportation system management (TSM) projects were identified. Estimated project costs are included for each recommended project. These costs are "planning level" estimates and do not include possible right-of-way, utility, traffic management, or other heavily variable costs.

They do include mandatory "incidental & direct cost (IDC)" factors as required by federal requirements.

The following list of TSM projects are not in any particular order with respect to priority:

TSM-1 US Highway 93 Access Management Plan

Identified Concerns: Access Management
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: A comprehensive Access Management Plan should be completed along US Highway 93, beginning just south of the Bitterroot River where the recent US 93 construction project ends, near reference post (RP) 49, all the way to the Angler's Roost Bridge (RP 43.7) area. This entire length of US 93 is categorized by multiple driveway approaches, numerous driveway turning movements, and vehicle stacking in the center two-way, left-turn lane (TWLTL), resulting in conflicting operations due to the prevalence of private driveways. A formal Access Management Plan would allow for one-on-one dialogue with each property owner to devise a strategy to combine drive accesses, restrict problematic accesses, and/or totally remove unneeded accesses. The potential also exists to install raised medians in the center turn lanes at strategic locations to control access operational issues. The success of a formal Access Management Plan depends on aggressive outreach to all affected parties, plus a basic strategy on why access control will benefit both the adjacent land uses as well as the traveling public. It is envisioned that the MDT would be responsible for initiating this project, with significant participation from the City of Hamilton, Ravalli County, and affected landowners along the corridor.

Estimated Cost: *$130,000*

TSM-2 US Highway 93 and Marcus/Main Street

Identified Concerns: Operational & Safety
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Remove the large tree located on the northeast quadrant of this intersection. It presents a sight obstruction for eastbound traffic on Main Street desiring to turn left (i.e. northbound) onto US Highway 93.

Estimated Cost: *$2,500*

TSM-3 Daly Avenue and East Ravalli Street

Identified Concerns: Operational & Safety
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Modify the fencing and vegetation located at the northwest quadrant of this three-legged stop controlled intersection. The height of the private landowner fence and associated vegetation creates a sight obstacle that should be removed for better visibility. This will require landowner cooperation.

Estimated Cost: *$5,000*

TSM-4 Development of Access Management Regulations

Identified Concerns: Access Management
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Section 8.2 of this report offers guidance on access management principles and why access management is needed within a community. The narrative contained in section 8.2 are guidelines only, and to add substance to the discussion a community generally needs to adopt access management regulations through both an Access Management Ordinance and also a Corridor Preservation Ordinance. The MDT and Ravalli County have access management regulations in place for facilities under their jurisdiction, however most local jurisdictions do not. It is highly recommended that the City of Hamilton pursue developing its own access management regulations through adoption of both an Access Management Ordinance and a Corridor Preservation Ordinance – and that these ordinances closely align with Ravalli County's policy such that when land is annexed in the future, the planning of access's will be complementary.

Estimated Cost: *$15,000*

TSM-5 Kurtz Lane Functional Classification

Identified Concerns: System Management
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Kurtz Lane, between S-269 and Fairgrounds Road, should be functionally classified as a collector route in accordance with the local community functional classification system (i.e. not a Federally designated route). The facility was recently constructed, and functions as a collector route given the location of the recreational fields and adjacent high school.

Estimated Cost: *(No Cost Incurred)*

TSM-6 Tammany Lane Functional Classification

Identified Concerns: System Management
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Tammany Lane should be functionally classified as a collector route and added to the functional classification system as shown on Figure 2-1 and Figure 2-2, in accordance with the local community functional classification system (i.e. not a Federally designated route). It is classified as a "rural minor collector" according to Ravalli County's classification system. The facility is predominately paved, and new residential growth and some commercial growth has recently occurred. This is expected to continue over time. The addition of this route to the functional classifications system will establish the future design guidelines as development continues in the area.
Estimated Cost: *(No Cost Incurred)*

TSM-7 Fairgrounds Road and Old Corvallis Road

Identified Concerns: Operational, Capacity, Safety & Multi-Modal
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: This intersection is a very large intersection with poor definition and roadside clutter. It is recommended that the intersection be reconstructed to a true urban intersection with curb and gutter, sidewalks, signing, and turn bays. At a minimum, the following geometric features should be included at the intersection:

- Eastbound left-turn lane (on Fairgrounds Road)
- Eastbound thru/right-turn lane (on Fairgrounds Road)
- Southbound right-turn lane (on Old Corvallis Road)
- Southbound thru/left-turn lane (on old Corvallis Road)

The above lane use changes could be completed with simple pavement marking and signing – without the need for a full-fledged reconstruction project.
Estimated Cost: *$310,000*

TSM-8 Golf Course Road and Kurtz Lane/Grantsdale Road

Identified Concerns: Operational, Safety & Multi-Modal
Project Timeline: Long Term Implementation (> 10 years)

Project Description: This intersection is heavily travelled, especially during school drop-off and pick-up periods. The minor legs of the intersection (i.e. Kurtz Lane and Granstdale Road) are slightly offset. The intersection operation would improve from better sight distance and geometry if the minor legs could be re-aligned such that they are opposite each other. This would necessitate a slight shift of Grantsdale Road to the west, and a slight shift of Kurtz Lane to the east. For this improvement to happen, right-of-way would have to be acquired from the adjacent landowners, so the improvement is dependent on landowner participation. From a planning perspective, this improvement would add to safety and operational characteristics of the intersection. This improvement may also serve to establish the Grantsdale Road/Kurtz Lane corridor as an alternative north/south corridor to US Highway 93 (see MSN-18).

Estimated Cost: *$220,000*

TSM-9 <u>Golf Course Road and Big Corral Road</u>

Identified Concerns: Operational
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: This intersection is operating at an acceptable level of service, however as a "tee" intersection it does have a very large pavement area that is not very well defined. It is recommended that a raised gore island be installed on the north leg (i.e. Big Corral Road) to better define the travel movements. For the southbound movement, there should be a delineated left-turn lane and a delineated right-turn lane. The raised gore island would provide separation between the southbound left-turn movement (off of Big Corral Road) and the westbound right-turn movement (off of Golf Course Road).

Estimated Cost: *$30,000*

TSM-10 <u>Golf Course Road and US Highway 93</u>

Identified Concerns: Operational
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: As development occurs in areas between Tammany Lane and Golf Course Road, traffic will increase along Golf Course Road and affect the larger intersections. This predominately includes the intersection of Golf Course Road with US Highway 93. A westbound right-turn lane should be added to the intersection on the Golf Course Road leg when warrants are met and as approved by the MDT. This would require the relocation of the signal standard on the northeast quadrant of the intersection, and also some delineation work associated with the adjacent gas station, however long-term this will be a predominant movement at this intersection.

Estimated Cost: *$130,000*

TSM-11 Kurtz Lane and Marcus Street

Identified Concerns: Operational
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: At this intersection a northbound left-turn lane should be added on Kurtz Lane, directly opposite the existing southbound left-turn lane on the north side of Marcus Street. An adjacent combination thru- / right-turn lane should also be striped for the northbound movement off Kurtz Lane. Kurtz Lane south of this intersection was recently overlaid with asphalt.
Estimated Cost: *$45,000*

TSM-12 US Highway 93 and Adirondac Avenue/Fairgrounds Road

Identified Concerns: Operational
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: At this intersection a northbound protected left-turn phase should be added as traffic volumes grow and development occurs to the north and west. Under existing conditions, a protected left-turn phase is not warranted at the intersection, however as development occurs along Old Corvallis Road, heavier southbound volumes on US 93 will reduce gaps for northbound left-turning traffic. A protected left-turn warrant analysis should be undertaken every two years to identify the appropriate time for implementation of the protected phase. It is suggested that the City of Hamilton be responsible for completing this warrant analysis, either in-house or through the use of a consultant, as this need will be driven from urban scale growth in the area in the future.
Estimated Cost: *$35,000*

TSM-13 US Highway 93 Crossings

Identified Concerns: Safety & Multi-Modal
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: There are four (4) locations along US Highway 93 through Hamilton proper that are marked as pedestrian crosswalks with flags, as follows:

- Fox Field
- State
- Bedford
- DeSmet

These are separate from signalized crossings. At the flagged crossings, public sentiment expressed has been generally positive and the community appreciates having the flags. It is recommended to heighten the visibility of these four locations by trimming vegetation in and around the pedestrian crossing signs and also replacing these signs, as they are somewhat faded due to their age. In addition, most flags have faded and no longer retain their bright orange color. These should be replaced more frequently.

Estimated Cost: *$5,000*

TSM-14 State Street Traffic Calming

Identified Concerns: Operational, Safety & Multi-Modal
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: State Street is an extremely wide parallel facility to Main Street. Because of its width and traffic volume, some construe the facility as a barrier between downtown Hamilton proper and the multiple destinations south of State Street. It is recommended that curb bulb-outs be installed at the intersections of State Street and 2nd Street, 3rd Street and 4th Street to reduce pedestrian crossing distance and heighten visibility of pedestrians in the area. These could be combined with decorative crosswalks and/or appropriate signage. Note that these types of improvements should be done with sensitivity to storm drainage considerations, snow plowing operations, and the type of traffic found on State Street – including the turning radius needs of the City's fire vehicles.

Estimated Cost: *$105,000*

TSM-15 Riverside Cutoff and Old Corvallis Road Signing

Identified Concerns: Maintenance
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: This "tee" intersection should have a permanent barricade installed on the east leg of the tee intersection, directly opposite Riverside cutoff.

Estimated Cost: *$2,000*

TSM-16 US Highway 93 and Riverside Cutoff Signal Warrant Analysis

Identified Concerns: Operational & Access Management
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: This intersection should be monitored every three years to see if traffic signal warrants may be met. As growth occurs in "Area 3" and development continues, this intersection may realize increased traffic for those wanting to bypass Old Corvallis Road, the predominant movement that may warrant installation of a traffic signal would be the westbound to southbound left-turn movement at the intersection. A traffic signal warrant analysis should be completed every three years to review traffic volumes for the peak-hour warrant. It is suggested that the City of Hamilton be responsible for completing this warrant analysis, either in-house or through the use of a consultant, as this need will be driven from urban scale growth in the area east of Old Corvallis Road in the future.

Estimated Cost: *$5,000*

TSM-17 Hamilton Downtown Master Plan

Identified Concerns: Operational & Multi-Modal
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: In response to several public comments on the need for parking assessments in the downtown, it is recommended that a Downtown Master Plan be completed that includes a detailed parking component, in addition to a wayfinding and signage component. The delivery of a parking supply and demand study cannot be completed under the framework of this Transportation Plan Update. A Downtown Master Plan would be valuable to set goals on land use in the downtown, aesthetics, economics, and infrastructure requirements. Downtown parking supply and demand strategies are most often addressed through a Downtown Master Plan for communities the size of Hamilton.

Estimated Cost: *$65,000*

TSM-18 Eastside Highway and Black Lane/Bass Lane

Identified Concerns: Operational, Capacity & Safety
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: This intersection has had several crashes in recent years, and due to increasing volumes along Eastside Highway, a reconfiguration of this intersection is necessary. It is recommended that designated left-turn bays be provided for both the north and south legs of Eastside Highway, with appropriate tapers. In addition, the minor legs should be modified to separate the left-turn movements. Note that the MDT does have a project programmed to accomplish these objectives in the near future. The project also incorporates roadway grade reductions and the re-alignment of Black Lane and Bass Lane.

Estimated Cost: *$175,000*

TSM-19 Eastside Highway and Hamilton Heights Road

Identified Concerns: Operational
Project Timeline: Long Term Implementation (> 10 years)

Project Description: This intersection exhibits sight distance concerns due to the grading on the east side of S-269. It is suggested that project developers contact the adjacent landowners to obtain a construction permit to lay back the steep back slopes on the northeast and south east quadrants of the intersection. This minor improvement would improve sight distance for all vehicles at this intersection. In addition, in future years and as traffic volumes increase on Eastside Highway, a long-term suggested improvement would be to install a southbound left-turn lane at the intersection, with the appropriate taper length for the speed of the facility. Approval from the MDT is required.

Estimated Cost: *$165,000*

TSM-20 Eastside Highway and Hawker Lane/Corvallis Cemetery Road

Identified Concerns: Operational
Project Timeline: Long Term Implementation (> 10 years)

Project Description: In future years and as traffic volumes increase on Eastside Highway, install a southbound left-turn lane at the intersection, with the appropriate taper length for the speed of the facility. Approval from the MDT is required.

Estimated Cost: *$150,000*

TSM-21 Community Transit Perception Survey

Identified Concerns: Multi-Modal
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: Public transportation is discussed in greater detail in Chapter 6 of this transportation plan update. Two transportation studies were funded by MDT in 2008. Both studies involved public surveys, as well as, transit provider input.

The Five Valleys Regional Transit Study conducted by LSC Transportation Consultants and Highway 93 Corridor Study conducted by Fehr & Peers Transportation Consultants have recommended expanding the vanpool program as "*a reasonable immediate or near-term alternative that could provide commuter service and reduce single occupancy vehicles* ". These findings are supported by the wait list. Through the development of wait lists, MRTMA currently has 217 individuals. The program could be expanded by seven routes:

- Hamilton to downtown Missoula
- Florence to downtown Missoula
- Hamilton to University of Montana
- Stevensville to South Reserve
- Stevensville to North Reserve
- Missoula to Hamilton
- Missoula to Stevensville

The Five Valleys Regional Transit Study recommended a subscription bus service be implemented for Hamilton commuters in the fall of 2011. The US 93 Corridor Study Transit Analysis recommended a Peak Hour Fixed route service to be implemented in 2010, with service being expanded to include non-peak hour fixed route bus service in 2015.

The public should be engaged and queried about the role public transit may have in the community as the area grows. Allocating funds and resources towards a full transit system will not be prudent if it does not capture additional trips and mode share. Until a detailed community survey can be completed, there is no sound, fundamental basis for ridership potential and usage. It would be recommended that this effort is sponsored by one of the project partners to this transportation plan, either in house or by retaining a qualified public relations consultant with experience in transit systems.

Estimated Cost: *$35,000*

TSM-22 US 93 Signal Interconnect

Identified Concerns: Operational
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: Through coordination with the MDT, construct hard wire or a telemetry interconnect system between the five traffic signals of US Highway 93 and the intersecting roads noted below:

- Adirondac Avenue/Fairgrounds Road
- Pine Street
- West Main Street/Marcus Street
- Ravalli Street
- Golf Course Road

These improvements will help establish logical platoon flows on US Highway 93 and increase gaps in the traffic stream for side street turning vehicles. Additionally, public sentiment expressed during public outreach is that pedestrian crossing times are bare minimums and that in some areas more pedestrian time is needed due to the presence of school aged children crossing US Highway 93. This may need to be factored in when signal timing changes are explored.

Estimated Cost: *$45,000*

TSM-23 US 93 and Blood Lane Signal Warrant Analysis

Identified Concerns: Operational & Access Management
Project Timeline: Medium Term Implementation (2 – 5 years)

Project Description: This intersection should be monitored every three years to see if traffic signal warrants may be met. As growth occurs in the area, this intersection may realize increased traffic for those wanting to access US Highway 93 southbound from Blood Lane, especially if development occurs in the area. The predominant movement that may warrant installation of a traffic signal would be the westbound to southbound left-turn movement at the intersection. A traffic signal warrant analysis should be completed every three years to review traffic volumes for the peak-hour warrant. It is suggested that the City of Hamilton be responsible for completing this warrant analysis, either in-house or through the use of a consultant, as this need will be driven from urban scale growth in the area in the future. An additional improvement may be the reconstruction of the roadway to a collector standard from Grantsdale Road to US Highway 93. Currently, the roadway is in poor conditions and is within a 30 foot easement.

Estimated Cost: *$5,000 (warrant analysis only)*

TSM-24 Hamilton Stop Sign Removals

Identified Concerns: Operational
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: There are several locations within Hamilton proper that have stop signs at locations that do not meet the intent of the Manual on Uniform Traffic Control Devices (MUTCD), as summarized in Section 2.5 of this Transportation Plan. These locations are defined below, and it is recommended that these stop signs be removed in accordance with MUTCD procedures.

Estimated Cost: *$12,000*

Ravalli Street & S. 8th Street

- Remove NW quadrant stop sign
- Remove SE quadrant stop sign

Ravalli Street & S. 5th Street
- Remove NW quadrant stop sign
- Remove SE quadrant stop sign

Desmet Street & S. 5th Street
- Remove NE quadrant stop sign
- Remove SW quadrant stop sign

Desmet Street & S. 2nd Street
- Remove NE quadrant stop sign
- Remove SW quadrant stop sign

Desta Street & S. 5th Street
- Remove NW quadrant stop sign
- Remove SE quadrant stop sign

Desta Street & S. 4th Street
- Remove NW quadrant stop sign
- Remove SE quadrant stop sign

New York Avenue & N. 3rd Street
- Remove NE quadrant stop sign
- Remove SW quadrant stop sign

New York Avenue & N. 2nd Street
- Remove NE quadrant stop sign
- Remove SW quadrant stop sign

Saranac & N. 2nd Street
- Remove NW quadrant stop sign
- Remove SE quadrant stop sign

River Street & N. 5th Street
- Remove NE quadrant stop sign
- Remove SW quadrant stop sign

TSM-25 <u>Hamilton Area Comprehensive Safety Plan</u>

Identified Concerns: Safety
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: The City should pursue development of a Comprehensive Safety Plan that seeks to address comprehensive safety matters via engineering, education, enforcement, and emergency services. It is highly likely that in the near future grant monies may be

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made available to Montana communities on a competitive basis for the development of safety plans. The development of a Comprehensive Safety Plan will allow for extensive outreach to the community, as well as an assessment of all safety related matters of importance, including but not limited to, seat belt usage, enforcement considerations, emergency service needs, and education. Note that a Comprehensive Safety Plan incorporates much more than a basic infrastructure assessment.

Estimated Cost: *$30,000*

TSM-26 Hamilton Area Non-Motorized Plan

Identified Concerns: Multi-Modal
Project Timeline: Short Term Implementation (0 – 2 years)

Project Description: The City should pursue development of a Non-Motorized Transportation Plan for the community. The current update to the Transportation Plan just begins to explore non-motorized planning in the community, and a full Non-Motorized Transportation Plan will allow the community to achieve a higher level of understanding and planning as it relates to bicyclists and pedestrians. There appears to be enough interest in the community to make non-motorized infrastructure a higher priority as the community grows.

Estimated Cost: *$20,000*

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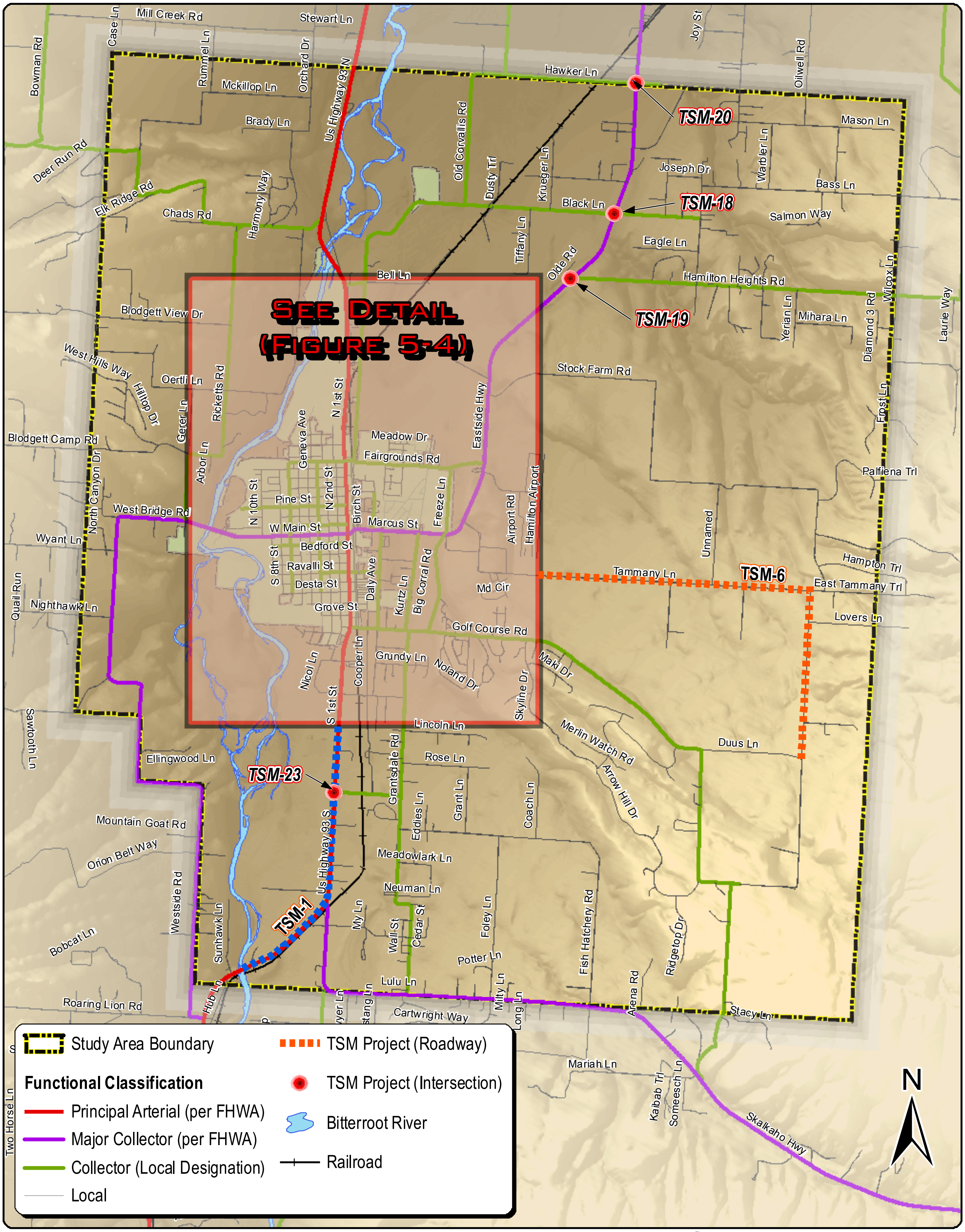

Figure 5-3

Transportation System Management (TSM) Recommendations

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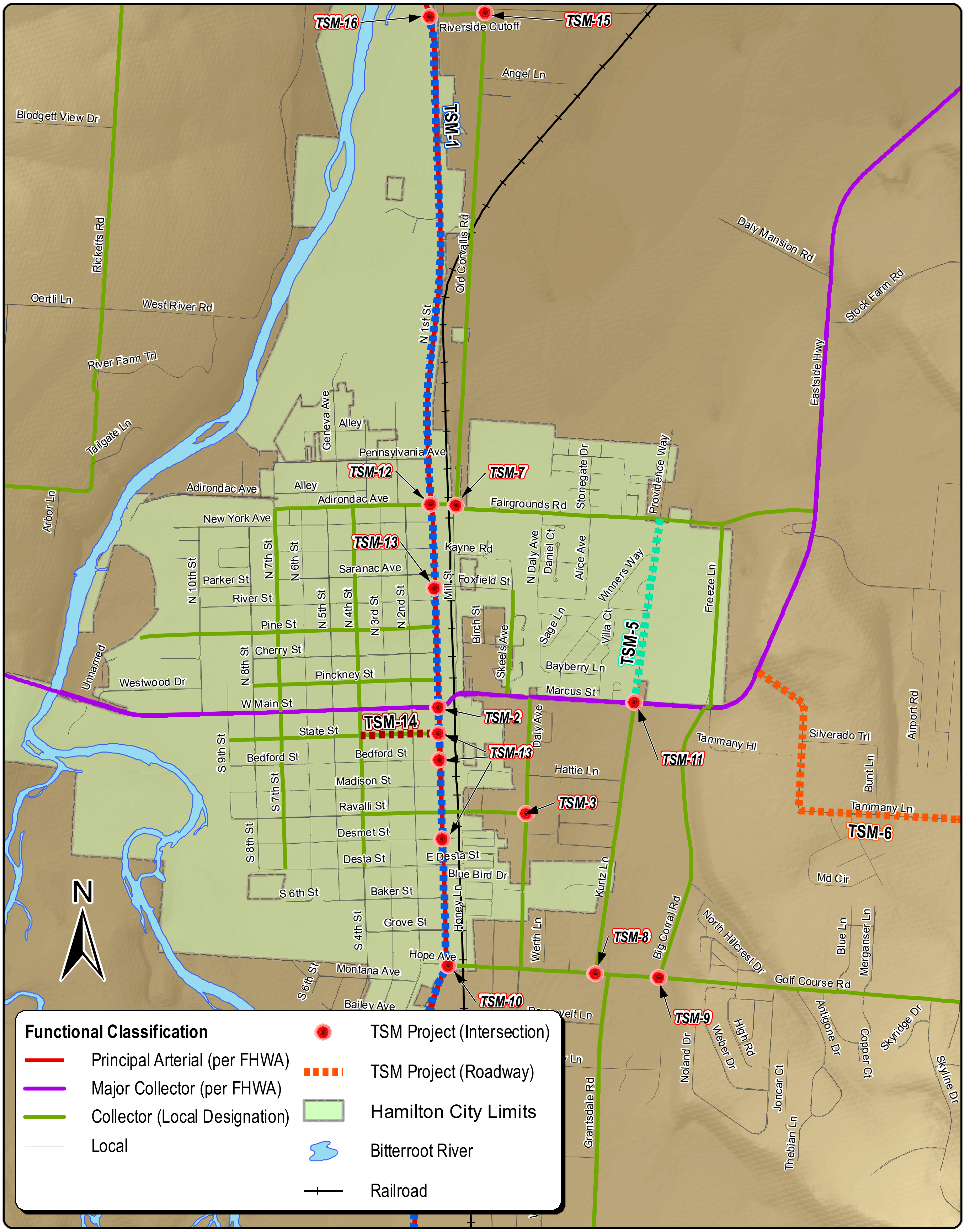

Figure 5-4
Transportation System Management (TSM) Recommendations
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5.5 Recommended Non-Motorized Network and Considerations

In general terms, non-motorized travel refers to pedestrians and bicyclists within the Hamilton community. This can be furthered supplemented by equestrian users, skateboarders, unicyclists, and others. The Hamilton community has not previously undergone any sort of planning process for non-motorized transportation. The information contained herein is, in reality, the first attempt to plan a true non-motorized transportation network within the community. The focus of this planning is creating a non-motorized network that will provide continuity through the community and connect logical destinations. It is grounded in reality and the recommendations contained have to be balanced with the needs of other travel modes, predominately vehicles.

Bicycle facilities vary dramatically from simply additional signage to separated paved facilities along exclusive rights-of-way. The following projects in **Table 5-3** through **Table 5-6** have been identified through public involvement, existing and anticipated future travel demand, significant destinations for bicyclists, and the existing bicycle network. Detailed engineering cost estimates should be undertaken at the time of project implementation for each project.

5.5.1 Bicycle Lanes

A bicycle lane provides a striped and stenciled lane for one-way travel on a street or highway. Many of the identified bicycle lanes will be completed through roadway improvements funded by new development. Some of the identified projects will need to be completed by the City of Hamilton, Ravalli County, or MDT through retrofit or as part of maintenance activities (striping and signage only). Bicycle lanes can provide the following benefits:

For Pedestrians:

- Greater separation from traffic, especially in the absence of on-street parking or a planter strip, increasing comfort and safety. This is important to young children walking, playing or riding their bikes on curbside sidewalks.
- Reduced splash from vehicles passing through puddles (a total elimination of splash where puddles are completely contained within the bike lane).
- An area for people in wheelchairs to travel where there are no sidewalks, or where sidewalks are in poor repair or do not meet ADA standards.
- A space for wheelchair users to turn on and off curb cut ramps away from moving traffic.
- The opportunity to use tighter corner radii, which reduces intersection crossing distance and tends to slow turning vehicles.

- In dry climates, a reduction in dust raised by passing vehicles, as they drive further from unpaved surfaces.

For Motorists:

- Greater ease and more opportunities to exit from driveways (thanks to improved sight distance).
- Greater effective turning radius at corners and driveways, allowing large vehicles to turn into side streets without off-tracking onto curb.
- A buffer for parked cars, making it easier for motorists to park, enter and exit vehicles safely and efficiently. This requires a wide enough bike lane so bicyclists aren't "doored."
- Less wear and tear of the pavement, if bike lanes are restriped by moving travel lanes (heavier motor vehicles no longer travel in the same well-worn ruts).

For Other Modes:

- Transit: A place to pull over next to the curb out of the traffic stream.
- Emergency vehicles: Additional pavement area to maneuver around stopped traffic, when compared to roadway sections without bicycle lanes, thereby decreasing response time.
- Bicyclists: Greater acceptance of people bicycling on the road, as motorists are reminded that they are not the only roadway users;
- Non-motorized modes: An increase in use, by increasing comfort to both pedestrians and bicyclists (this could leave more space for motorists driving and parking).

For the Community (Livability factors):

- A traffic calming effect when bike lanes are striped by narrowing travel lanes.
- Better definition of travel lanes where road is wide (lessens the "sea of asphalt" look).
- An improved buffer to trees, allowing greater plantings of green canopies, which also has a traffic calming effect.

Opportunities for bicycle lanes are contained in **Table 5-3**.

Table 5-3
Recommended Bicycle Lanes

Street	From	To	Notes *
Fairgrounds Road	Old Corvallis Road	Freeze Lane	Install on-street bicycle lanes on both sides of Fairgrounds Road when the roadway project is developed to an urban collector standard
Old Corvallis Road	Fairgrounds Road	Glaxo Smith Kline (GSK) eastern property line	Install on-street bicycle lanes on both sides of Old Corvallis Road when the roadway project is developed to an urban collector standard
4th Street	Adirondac Avenue	Grove Street	Install on-street bicycle lanes on both sides of 4th Street, with appropriate signage
Golf Course Road	US Highway 93	Big Corral Road	Install on-street bicycle lanes on both sides of Golf Course Road, with appropriate signage
Marcus Street	US Highway 93	Big Corral Road	Install on-street bicycle lanes on both sides of Marcus Street, with appropriate signage
Skeels Avenue	Marcus Street	Fox Field Street	Install on-street bicycle lanes on both sides of Skeels Avenue, with appropriate signage
West Main Street	North 4th Street	US Highway 93	Install on-street bicycle lanes on both sides of West Main Street, with appropriate signage

** Proposed bicycle lanes on MDT routes will require MDT approval.*

5.5.2 Shared Roadways

Shared roadways are any on-street facility where bicycles share the travel lanes with automobiles. Typically, these facilities occur on local roadways or on roadways with low traffic volumes and speeds. Treatments most often include “Share the Road” signs and pavement markings. In addition, wayfinding signage, traffic diverters and other types of traffic calming can be used in urban environments. The level of treatment varies between facilities and is dictated by traffic conditions and safety.

It should be noted that the use of “Share the Road” signs in rural conditions needs to be carefully considered and planned. The use of signs may give the bicycle rider a false sense of security as they may be interpreted as defining a “safe” place for bicyclists to travel. Conversely, the expense and resources of adding “Share the Road” signs may be excessive for some municipal budgets, and as such careful consideration is needed.

Because of these issues, and recognizing the sensitivity to signing rural bicycle routes as "Share the Road" facilities, the following evaluation criteria is suggested when weighing whether to sign predominately rural routes within the study area boundary. This criteria is currently utilized by the Montana Department of Transportation:

Criteria No. 1

Local government, bicycle club, or other interested citizen can submit requests for "Share the Road" signs to the affected jurisdiction (i.e. MDT, Ravalli County or the City of Hamilton). Jurisdiction staff verifies that the route is used by bicyclists on a continuous basis over several seasons. If not, signs will not be installed. If yes, proceed to criteria number 2.

Criteria No. 2

Candidate sites for signage are limited to rural and transitional areas with a posted speed limit of 45 mph or greater. If not, signs will not be installed. If yes, proceed to criteria number 3.

Criteria No. 3

Average annual daily traffic must be greater than 1,000 vehicles per day (vpd). If not, signs will not be installed. If yes, proceed to criteria number 4.

Criteria No. 4

Minimum paved surface width less than 24 feet. If yes, sign may be installed. If not, proceed to criteria number 5.

Criteria No. 5

Usable shoulder width less than 2 feet. If yes, signs may be installed.

Suggested shared roadways are identified in **Table 5-4**.

Table 5-4
Suggested Shared Roadways

Street	From	To	Notes
Old Corvallis Road	Riverside Cutoff	Hawker Lane	This roadway segment should be signed as a "share-the-road" facility
Eastside Highway	Hawker Lane	Big Corral Road	This roadway segment should be signed as a "share-the-road" facility
Big Corral Road	Golf Course Road	Marcus Street	This roadway segment should be signed as a "share-the-road" facility
Daly Avenue	Golf Course Road	Marcus Street	This roadway segment should be signed as a "share-the-road" facility
Ravalli Street	4th Street	Daly Avenue	This roadway segment should be signed as a "share-the-road" facility
North 7th Street	Adirondac Avenue	Desta Street	This roadway segment should be signed as a "share-the-road" facility
North 10th Street	West Main Street	New York Avenue	This roadway segment should be signed as a "share-the-road" facility
New York Avenue	North 7th Street	North 10th Street	This roadway segment should be signed as a "share-the-road" facility
Desta Street	North 7th Street	US Highway 93	This roadway segment should be signed as a "share-the-road" facility
Grove Street	South 2nd Street	South 4th Street	This roadway segment should be signed as a "share-the-road" facility
South 2nd Street	Grove Street	Shady Lane	This roadway segment should be signed as a "share-the-road" facility
Shady Lane/Nicol Lane loop	South 2nd Street	US Highway 93 (South)	This roadway segment should be signed as a "share-the-road" facility
Geneva Avenue	City Park	Adirondac Avenue	This roadway segment should be signed as a "share-the-road" facility
Grantsdale Road	Golf Course Road	Skalkaho Highway	This roadway segment should be signed as a "share-the-road" facility
Westside Highway	West Bridge Road	US Highway 93 (South)	This roadway segment should be signed as a "share-the-road" facility

5.5.3 Shoulder Bikeways

Roadway shoulders can offer many of the benefits of bicycle lanes without the same level of infrastructure cost associated with bicycle lane stencils and signage. Roadway shoulders are ideal for rural roadways where bicyclists are present. Roadway shoulders should be a minimum of 4 feet wide. If a rumble strip is necessary it should be as close to the white (fog) line as possible and have regular skips to allow bicyclists to leave the shoulder to avoid obstructions or obstacles if necessary.

The American Association of State Highway and Transportation Officials (AASHTO) acknowledge the following benefits of shoulder bikeways in three important areas: safety, capacity and maintenance.

Safety - highways with paved shoulders have lower accident rates with the following benefits:

- Provide space to make evasive maneuvers
- Accommodate driver error
- Add a recovery area to regain control of a vehicle, as well as lateral clearance to roadside objects such as guardrail, signs and poles (highways require a "clear zone," and paved shoulders give the best recoverable surface)
- Provide space for disabled vehicles to stop or drive slowly
- Provide increased sight distance for through vehicles and for vehicles entering the roadway
- Contribute to driving ease and reduced driver strain
- Reduce passing conflicts between motor vehicles and bicyclists and pedestrians
- Make the crossing pedestrian more visible to motorists
- Provide for storm water discharge farther from the travel lanes, reducing hydroplaning, splash and spray to following vehicles, pedestrians and bicyclists.

Capacity - highways with paved shoulders can carry more traffic with the following benefits:

- Provide more intersection and safe stopping sight distance
- Allow for easier exiting from travel lanes to side streets and roads (also a safety benefit)
- Provide greater effective turning radius for trucks
- Provide space for off-tracking of truck's rear wheels in curved sections
- Provide space for disabled vehicles, mail delivery and bus stops
- Provide space for bicyclists to ride at their own pace

Maintenance - highways with paved shoulders are easier to maintain with the following benefits:

- Provide structural support to the pavement

- Discharge water further from the travel lanes, reducing the undermining of the base and subgrade
- Provide space for maintenance operations and snow storage
- Provide space for portable maintenance signs

Roadways within the study area boundary that are that are recommended for shoulder bikeways are listed in **Table 5-5**.

Table 5-5
Recommended Expanded Shoulder (Minimum of 4-feet)

Street	From	To	Notes
Skalkaho Highway	US Highway 93	Arena Road	Narrow roadway with no shoulders – popular touring route; Skalkaho Highway is a MDT facility - therefore any future shoulder widening would be coordinated/approved by the MDT.

5.5.4 Shared-Use Paths

A shared-use path provides bicycle travel on a rideable surface within a right-of-way completely separated from any street or highway. Shared-use paths should be designed to be ten feet wide. **Table 5-6** lists the recommended shared-use paths to complement the existing network.

Table 5-6
Recommended Shared-Use Paths

Street / Route	From	To	Notes
River Trail	Park	Anglers Roost	This shared-use path is a very long-term vision for a recreational path along the Bitterroot River. There will be several hurdles to development of the entire path, the primary of which is private land ownership at various locations along the route. However from a planning perspective, it is important to identify this amenity for the community and begin the dialogue on how to begin implementation of this potential community asset.

Skeels Avenue	Foxfield Street	Fairgrounds Road	Install shared-use path either prior to or along with the Skeels Avenue extension.
MRL Right-of-Way	Fairgrounds Road	Golf Course Road	Install shared-use path along the existing right-of-way associated with the Montana Rail Link (MRL) right-of-way. There will be several hurdles to this path, the primary of which is MRL actively uses this right-of-way. However as market conditions change and the rail track uses may change, the City should begin the dialogue with MRL on how to begin implementation of this potential community asset.

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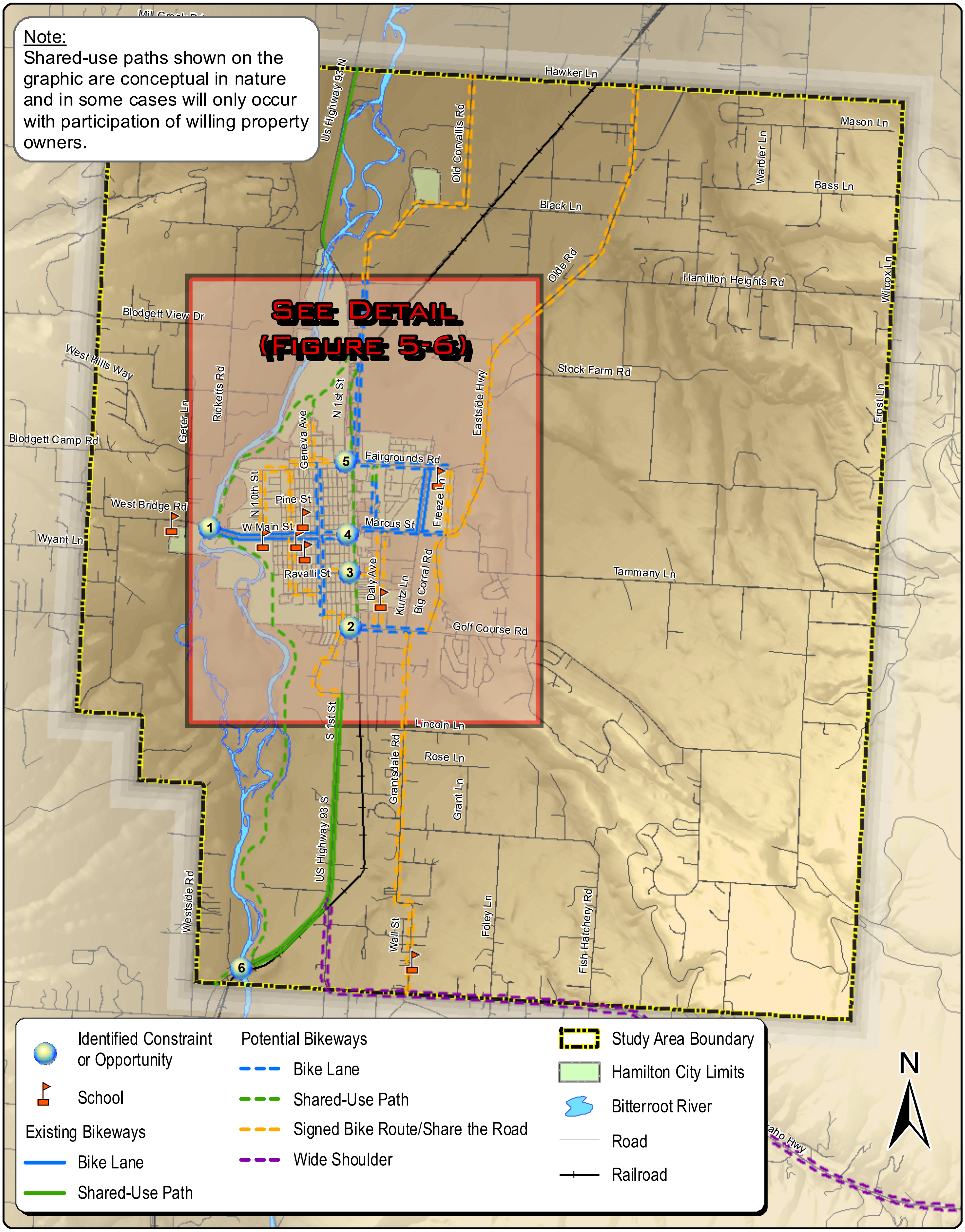

Figure 5-5
Non-Motorized Network

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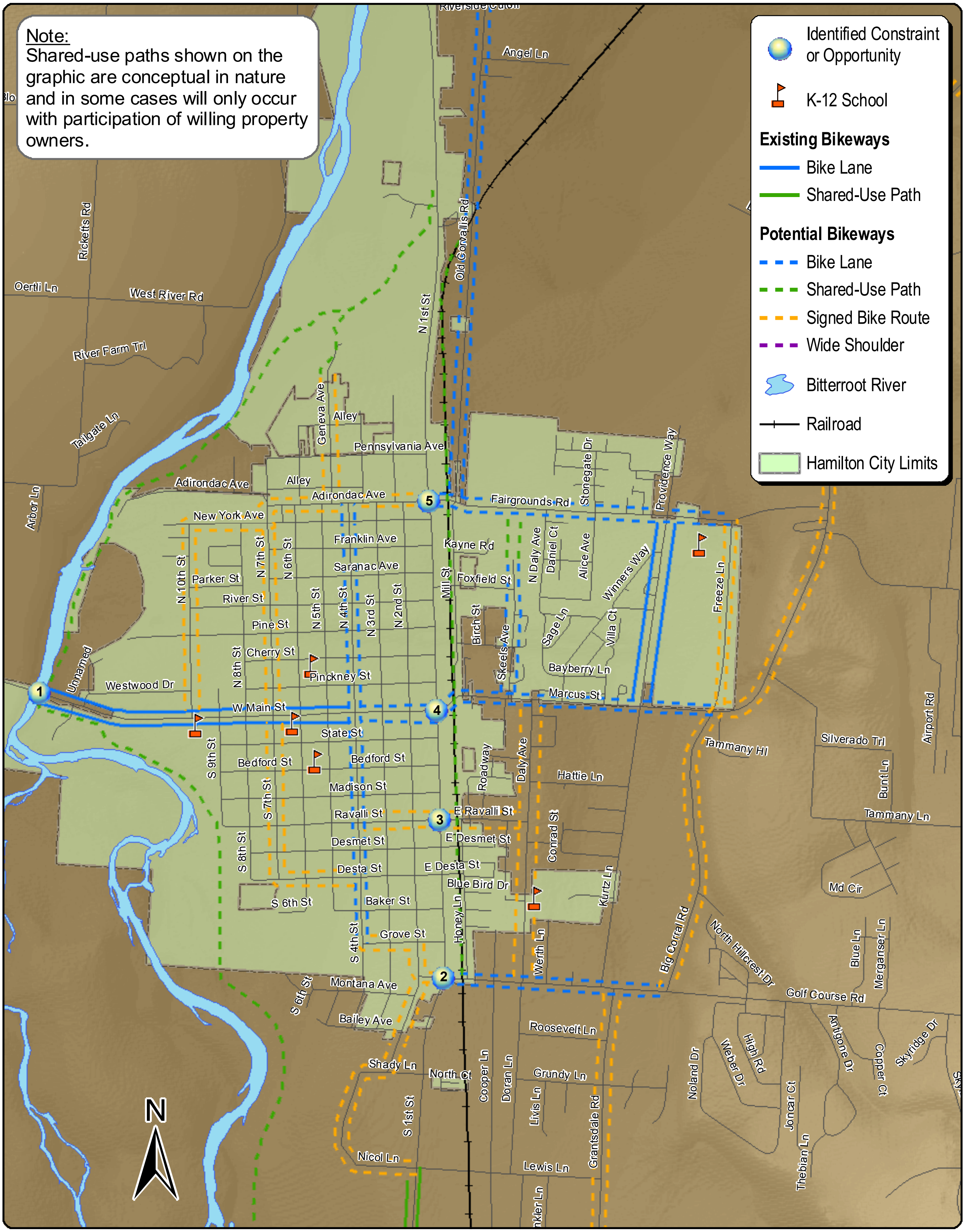

Figure 5-6

Non-Motorized Network
Inset Area

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5.6 Recommended Policies & Procedures

As a general rule, a community transportation plan is an advisory document and as such does not "set" policy. However the plan can recommend policies through language that local elected officials can evaluate for further consideration. This section of **Chapter 5** suggests several policies and procedures for consideration by the local elected officials. The first and perhaps most important of these policies is the setting of a "level of service" standard, as discussed in **Section 5.6.1**.

5.6.1 Level of Service Standard

Level of service (LOS) is a qualitative measure developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles. It provides a scale that is intended to match the perception by motorists of the operation of the intersection. Level of Service provides a means for identifying intersections that are experiencing operational difficulties, as well as providing a scale to compare intersections with each other. The level of service scale represents the full range of operating conditions. The scale is based on the ability of an intersection or street segment to accommodate the amount of traffic using it. LOS values range from an "A" which is the best performing value and has free flow characteristics, to an "F" which represents the worst performing value and has traffic that flows at extremely slow speeds and is considered to be in a forced or breakdown state.

5.6.1.1 Roadway LOS vs. Intersection LOS

Roadway LOS

In order to calculate the LOS of a roadway, a number of characteristics must be looked at. Factors such as lane widths, lateral clearances, access frequency, terrain, heavy vehicle traffic, and driver population characteristics are used to establish base conditions for a roadway. Once these factors are determined, the free-flow speed can be determined. The free-flow speed is the mean speed of traffic on the road when the flow rates are low. After the free-flow speed is determined, the flow rate can be calculated. To determine the flow rate, the highest volume in a 24-hour period (peak-hour volume) is used, with adjustments being made for hourly variation, heavy vehicle traffic, and driver characteristics. Once these parameters are defined, the LOS for the roadway can be calculated using an additional set of calculated factors.

The primary factor for calculating roadway LOS is percent time delay. Percent time delay is defined as the average percent of the total travel time that all motorists are delayed while traveling in platoons due to the inability to pass. Multi-lane highways have a demand for passing that increases as the traffic volume increases. However, the opportunities for passing decrease as the traffic volume increases. This effect causes the LOS to decrease as the traffic levels increase. The secondary factors that go into LOS calculations are average travel speed and capacity utilization. Average travel speed is used to determine the mobility of the roadway. Capacity utilization represents accessibility to the roadway and is defined as the ratio of the demand flow rate to the capacity of the facility. Other factors that go into LOS calculations include terrain type, lane and shoulder widths, heavy vehicle traffic, and the peak hour factor. All of these parameters are used to calculate a single LOS that is used to represent the overall characteristic of the roadway.

The Highway Capacity Manual – 2000 defines the LOS categories for roadways as follows:

- LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent. (Free flow)

- LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desire speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior. (Reasonably free flow)

- LOS C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level. (Stable flow)

- LOS D represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level. (Approaching unstable flow)

- LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because even small increases in flow or minor perturbations within the traffic stream will cause breakdowns. (Unstable flow)

- LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse it and queues begin to form. Operations within the queue are characterized by stopping and starting. Over and over, vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop. Level-of-service F is used to describe operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases once free of the queue, traffic may resume to normal conditions quite rapidly. (Forced or breakdown flow)

Intersection LOS

The current practice to analyze intersection LOS is to use average vehicle delay to determine the LOS of the intersection as a whole. Individual LOS values can also be determined for each approach leg and turning lane for intersections based on the average vehicle delay on that lane. There are multiple types of intersections, all of which receive a LOS value based on vehicle delay.

Signalized intersections are considered to be ones that have a signal control for every leg of the intersection. This type of intersection takes an average of the delay for each vehicle that uses the intersection and determines the LOS based on that average vehicle delay. An unsignalized intersection is one that does not have traffic signal control at the intersection. These intersections use the average vehicle delay for the entire intersection to determine the LOS (for four-way stop-controlled). Two-way stop-controlled (TWSC) intersections utilize stop control on the minor legs of the intersection while allowing free flow characteristics on the major legs. TWSC intersections take the average vehicle delay experienced on the most constrained approach, rather than the average vehicle delay for the entire intersection, to determine the LOS of the intersection. This can cause problems at intersections with high volumes of traffic along the uncontrolled major legs. Left turns off of the minor approach legs may be difficult at these intersections, which may cause high delay values and poor levels of service. The LOS for this type of intersection is based on the LOS for the worst case minor approach leg. Under these traffic conditions the worst case minor approach leg can easily have a high delay from a low number of vehicles wanting to make a left-turn onto the major approach; this may result in a poor LOS for the entire intersection.

A description and average delay range for each LOS value for signalized and unsignalized intersections, as defined by the Highway Capacity Manual (HCM) 2000, is found in **Table 5-7** on the following page.

Table 5-7
Intersection Level of Service Criteria

LOS	Unsignalized Intersections		Signalized Intersections	
	Description	Average Delay (sec/veh)	Description	Average Delay (sec/veh)
A	Little or no conflicting traffic for minor street approach.	< 10	Uncongested operations; all queues clear in a single cycle.	< 10
B	Minor street approach begins to notice presence of available gaps.	10 – 15	Very light congestion; an occasional phase is fully utilized.	10 – 20
C	Minor street approach begins experiencing delay while waiting for available gaps.	15 – 25	Light congestion; occasional queues on approaches.	20 – 35
D	Minor street approach experiences queuing due to a reduction in available gaps.	25 – 35	Significant congestion on critical approaches, but intersection is functional.	35 – 55
E	Extensive minor street queuing due to insufficient gaps.	35 – 50	Severe congestion with some longstanding queues on critical approaches.	55 - 80
F	Insufficient gaps of sufficient size to allow minor street traffic to safely cross through major traffic stream.	> 50	Total breakdown, stop-and-go operation.	> 80

5.6.1.2 Recommended LOS Standard

A LOS standard for the greater Hamilton area is suggested and defined in this section. These standards should be used to determine if there are sufficient transportation improvements being made to meet the requirements for proposed developments. LOS values shall be determined by using the methods defined by the *Highway Capacity Manual – 2000*. A development shall be approved only if the LOS requirements are met by the developer through mitigation measures. In general, LOS will decline at area intersections given normal growth without mitigation to prevent the decline. Accordingly, a list of suggested LOS standards is presented on the following page.

- <u>Signalized intersections</u> shall have a minimum acceptable LOS of "C" for the intersection as a whole; individual movement and approach leg LOS lower than "C" shall be allowed such that the total intersection LOS is a "C" or higher.

- <u>Unsignalized intersections</u> shall have a minimum acceptable LOS of "C" for the intersection as a whole for four-way stop controlled; individual movement and approach leg LOS lower than "C" shall be allowed such that the total intersection LOS is a "C" or higher.

- <u>Two-way stop-controlled (TWSC) intersections</u> shall have a minimum acceptable LOS of "C" or higher for the stop-controlled, minor legs.

- An intersection with a roundabout shall have a minimum acceptable LOS of "C" for higher for the intersection as a whole.

It is recommended that the entire intersection LOS be the controlling factor in determining if an intersection performs at a proper level for all intersections except a "two-way, stop-controlled (TWSC)" intersection. In the TWSC scenario, the intersection LOS should be for the stop-controlled, minor legs.

It is recommended, however, that individual movement and approach LOS still be calculated and presented in the various traffic impact studies to determine if the network as a whole functions properly and if additional steps need be looked at.

It should be noted that these standards should be applied to the peak hour periods of consideration, as these periods are typically the "worst case" operational periods on the transportation system. This period typically coincides with the AM peak hour period (between 7:00 and 9:00 am) and the PM peak hour period (4:00 pm and 6:00 pm). For MDT facilities, these level of service standards are already defined in the MDT Traffic Engineering Manual.

5.6.2 Stop Sign Installation Guidance

The City of Hamilton has a varied use of stop signs for intersection traffic control. During the project development activities there were quite a few public comments on the perceived inconsistent use of stop signs in the community. From a technical perspective, stop signs should only be used in accordance with engineering judgment and as specified in the Manual on Uniform Traffic Control Devices (MUTCD) guidance. Use of signs in situations other than as specified in the MUTCD are typically not warranted and should be avoided.

For completeness, the relevant sections of the MUTCD that address this matter are included on the following pages:

Section 2B.05 STOP Sign Applications

Guidance:

STOP signs should be used if engineering judgment indicates that one or more of the following conditions exist:

A. Intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;

B. Street entering a through highway or street;

C. Unsignalized intersection in a signalized area; and/or

D. High speeds, restricted view, or crash records indicate a need for control by the STOP sign.

Standard:

Because the potential for conflicting commands could create driver confusion, STOP signs shall not be installed at intersections where traffic control signals are installed and operating.

Portable or part-time STOP signs shall not be used except for emergency and temporary traffic control zone purposes.

Guidance:

STOP signs should not be used for speed control.

STOP signs should be installed in a manner that minimizes the numbers of vehicles having to stop. At intersections where a full stop is not necessary at all times, consideration should be given to using less restrictive measures such as YIELD signs.

Once the decision has been made to install two-way stop control, the decision regarding the appropriate street to stop should be based on engineering judgment. In most cases, the street carrying the lowest volume of traffic should be stopped.

A STOP sign should not be installed on the major street unless justified by a traffic engineering study.

Support:

The following are considerations that might influence the decision regarding the appropriate street upon which to install a STOP sign where two streets with relatively equal volumes and/or characteristics intersect:

A. Stopping the direction that conflicts the most with established pedestrian crossing activity or school walking routes;

B. Stopping the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds;

C. Stopping the direction that has the longest distance of uninterrupted flow approaching the intersection; and

D. Stopping the direction that has the best sight distance to conflicting traffic.

Section 2B.07 Multiway Stop Applications

<u>Support:</u>

Multiway stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multiway stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multiway stop control is used where the volume of traffic on the intersecting roads is approximately equal. The restrictions on the use of STOP signs described in Section 2B.05 also apply to multiway stop applications.

<u>Guidance:</u>

The decision to install multiway stop control should be based on an engineering study.

The following criteria should be considered in the engineering study for a multiway STOP sign installation:

A. Where traffic control signals are justified, the multiway stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

B. A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multiway stop installation.

C. Minimum volumes:

   1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but

3. If the 85th-percentile approach speed of the major-street traffic exceeds 65 km/h or exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

<u>Option:</u>

Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;

B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;

C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and

D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multiway stop control would improve traffic operational characteristics of the intersection.

5.7 References

Federal Highway Administration (FHWA). *Manual on Uniform Traffic Control Devices 2003 Edition – Chapter 2B Regulatory Signs,* Washington D.C.

Montana Department of Transportation April 2009. *Bicyclists Signing Guidelines,* Helena, Montana.

Robert Peccia & Associates, Inc. April 2009. *Greater Bozeman Area Transportation Plan (2007 Update) - Chapter 5,* Bozeman, Montana.

Transportation Research Board - National Research Council. 2000. *Highway Capacity Manual (HCM2000) - Chapter 9 Analytical Procedures Overview,* Washington D.C.