TOWN OF FORT SMITH

Integrated Transportation Master Plan

August 2022

Fort Smith
UNEXPECTED. UNFORGETTABLE.

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1. Introduction

1.1. Town of Fort Smith Context

The town of Fort Smith has a long history of Indigenous culture and development associated with the fur industry. Fort Smith has served as a transportation corridor for Indigenous peoples and an important portage route. As a modern town, Fort Smith serves as an educational and tourism center for the Northwest Territories. The town of 2,500 lies on the Slave River at the border of the Northwest Territories with Alberta. South and west of Fort Smith is the Wood Buffalo National Park, which is the largest National Park in Canada, a UNESCO World Heritage Site, and home to a dark sky preserve.

Fort Smith is accessed via Highway 5 from the west and the Fort Smith Airport. Highway 5 extends south to Fitzgerald in Alberta and there is a winter road which extends to the south to Fort Chipewyan for a portion of the year.

The Town completed a Strategic Plan in 2018 which sets the vision and values for Fort Smith, as well as goals and actions for the community. The vision and values of the strategic plan are carried forward and guide the Integrated Transportation Master Plan and the implementation of transportation aspects.

Values

Welcoming – we are a friendly community which embraces our visitors, students and residents alike.

Innovative – we take on new challenges in the pursuit of excellence.

Sustainable – we are committed to sustainability in our Town's operations and development.

Unified – we work with Indigenous governments and our partners to implement our plans and achieve our goals.

Committed – we operate professionally and to the highest ethical standards.

STRATEGIC PLAN VISION

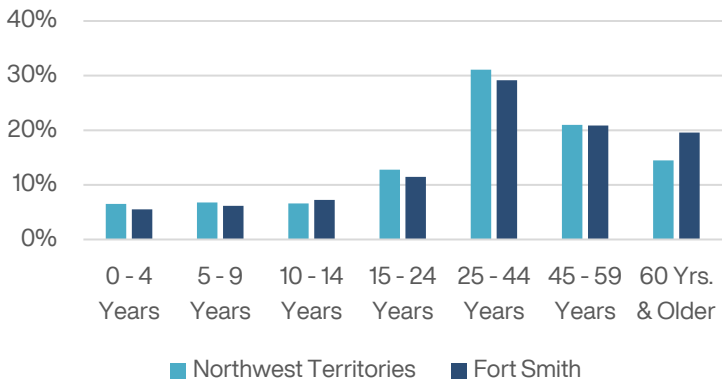
The Town of Fort Smith will work with our partners to enhance our excellent quality of life by respecting values, traditions, and healthy lifestyles. We will continue to advance as a unified, active, and prosperous community.

Slave River Valley

1.2. Demographics and Climate

The 2020 Northwest Territories census identified that 59% of residents in the Town of Fort Smith identify as Indigenous, which exceeds the provincial rate of citizens who identify as Indigenous, currently at 50%. In Fort Smith, Council, administration and citizens have placed a priority on reconciliation. Increasing Town infrastructure that supports community will support reconciliation. In implementing the ITMP, completion of capital projects will honour the role of Indigenous groups as stakeholders and support diversity in engagement activities.

Figure 1: 2021 Population Profile



The population in Fort Smith has a higher educational level than the wider Northwest Territories. Fort Smith has a greater number of seniors than the wider Northwest Territories, and more or less average proportion of children. Infrastructure selection and planning must prioritize these groups to ensure access for the full population.

The Town of Fort Smith is a Northern community that experiences significant shifts in the amount of daylight throughout the year. In winter, lighting can be a big challenge for sightlines and the perception of safety, as well as influencing people's choices of transportation mode.

As a northern community, Fort Smith also experiences some very low temperatures in the winter, with record low temperatures below -50 C December through April. However, the average high temperature is above zero from April to October and the summer temperatures average above 20°C in the summer months. While there are extreme cold temperatures in the winter, temperatures are moderate through much of the year and summers are warm.

Snowbanks Pose a Challenge for Pedestrian Visibility

Fort Smith also experiences a fair volume of snow, at an average of 150cm per year, focused on the months between October and February. Out of an average year, there are seven months where open spaces and infrastructure are clear of snow. In the winter months, however, the volume of snow which does not melt between snowfalls represents a challenge in snow clearing operations and maintaining sightlines.

1.3. Travel Modes

Transportation data was available for Fort Smith and the full Northwest Territories from the 2016 Federal Census.

Compared to many municipalities in Canada, Fort Smith and the Northwest Territories have high levels of walking and cycling.

Figure 2: Fort Smith
Main Mode of Commuting

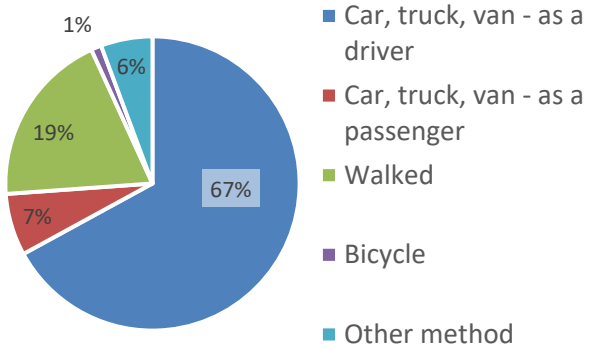
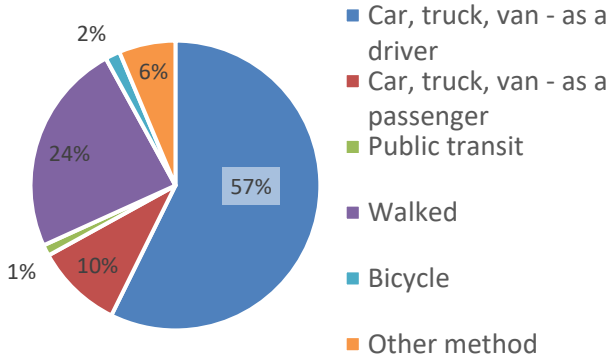
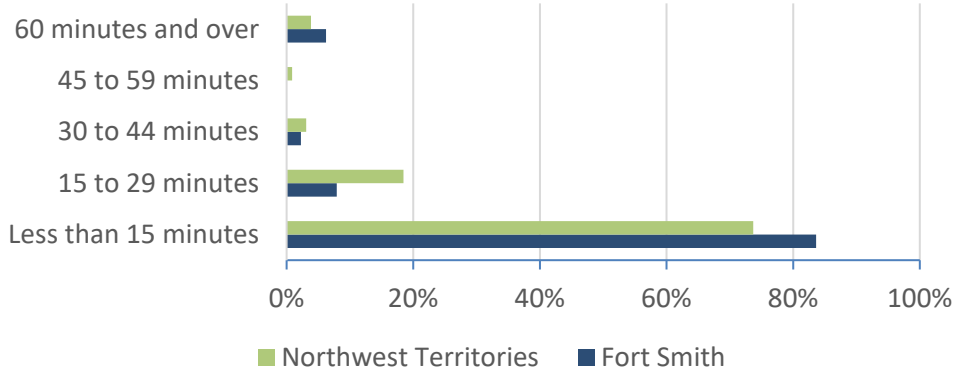


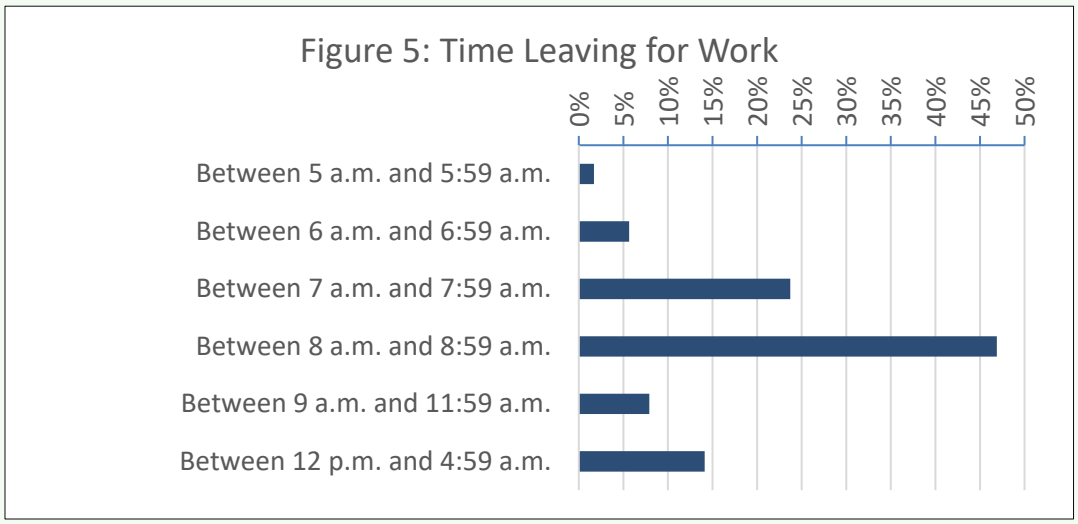
Figure 3: Northwest Territories
Main Mode of Commuting



A high proportion of residents in Fort Smith commute for less than 15 minutes, reflecting the proximity and integration of businesses, employment and residential areas. As is anticipated, the peak AM volumes are between 7am and 9am.

Figure 4: Commuting Duration





1.4. Goals

The Integrated Transportation Master Plan (ITMP) supports the implementation of the 2018 Strategic Plan including goals of being the healthiest community in the NWT, being a leader in sustainability, and enhancing livability. The plan provides the direction to:

Enhance the quality of life and safety for the people who live, work, and play in the Town

The transportation networks in Fort Smith are designed to be efficient for residents to access all areas of town and support businesses operating in Fort Smith. The transportation network is accessible for all users and supports all residents in reaching their destinations safely and securely. The ITMP encourages sustainability and environmental stewardship to honour Fort Smith's unique and compelling natural environment and support quality of life within the community. Implementation of the ITMP will provide the opportunity for connection within the community and will be undertaken with reconciliation in mind.

Enhance mobility and accessibility for various transportation users

All modes of transportation are considered the ITMP, including drivers, pedestrians, recreational vehicles, cyclists and all wheeled users. The transportation network provides opportunities to use alternative modes of transportation by connection key locations. All people, across all demographic, socio-economic, and mobility spectrums, will be able to move efficiently in Fort Smith, at any season. Particular attention to the needs of children, seniors, those with mobility constraints, and other vulnerable users is central to the ITMP.

Improve the overall sense of livability and safety in the public realm

In addition to providing connectivity from one point to another, the transportation network provides a desirable public realm to encourage community connections. The transportation network supports livability in Fort Smith, where transportation and land use are integrated. The plan will support development of spaces that are aesthetic, bright, and accessible, encouraging an active public realm.

Promote active lifestyles

There will be more opportunities for walking, cycling and all active transportation modes within Fort Smith. Common routes will offer multiple options of transportation modes to provide residents a mode choice for their needs. The active transportation network will be continuous and will connect to community hubs. The active transportation network will encourage the use of active modes for both recreation and to access social, educational, recreational, employment, and health opportunities.

Address the current and future needs of all residents

The ITMP is informed by residents' desires and needs for the transportation network. The implementation plan addresses potential improvements and priorities for the next 20 years, while having flexibility to adapt to available funding and future development within Fort Smith. Implementation of the plan is established holistically to be efficient in managing land and resources.

2. Methodology and Public Engagement

The development of the Town of Fort Smith TMP was a communication-based project, accompanied by technical guidance and reporting. By focusing on listening to the local perspectives, the TMP best directs transportation improvements over the next 20 years to suit citizen needs within anticipated budgets.

The following methodology was undertaken.

Gather Background Information

The project team reviewed Alberta Transportation data and Town policies and bylaws. A map and summary of existing transportation infrastructure was developed and the function of current transportation network infrastructure and traffic control devices was assessed. A community visit informed the data collection and provided the opportunity for real-time user experience. The lighting levels were reviewed through site assessment.

Stakeholder and Public Engagement Phase One

Originally, the first round of stakeholder and public engagement was planned to occur in person. Due to the ongoing pandemic and gathering restrictions within the Northwest Territories, and to honour the comfort levels of residents, the engagement activities were pivoted to on-line. The focus was on:

- Identifying how the current transportation network worked for citizens including potential safety concerns, areas of conflict, missing links, or low-light areas; and
- Reviewing and prioritizing potential improvements to meet transportation network goals

Website content was developed and postcards were mailed out to residents to encourage participation. Four stakeholder group meetings were held, and an on-line survey was developed and open

STAKEHOLDER GROUPS

Salt River First Nation
Fort Smith Métis Council
Smith's Landing First Nation
Mayor and Council
Sustainable Development Board
Economic Development Advisory Board
Community Services Advisory Board
School Administrations
District Education Authority
Aurora College

for two weeks. A What We Heard Report was developed summarizing the input received.

Perform Analysis

The first phase of stakeholder and public engagement informed the analysis of the transportation network. Performance hot spots and current transportation issues were identified. A network analysis of existing infrastructure was completed.

Identify Opportunities and Generate Options

Informed by the stakeholder and public engagement and the technical analysis of the existing infrastructure, opportunities to advance Town goals were identified and developed. The focus was on identifying and scoping opportunities to:

- Further incorporate alternative transportation modes and increase safety for all users;
- Develop potential updates to cross-sections;
- Develop design aspects to address speeding;
- Identify potential intersection improvements;
- Identify potential lighting improvements; and
- Recommend posted speed changes.

Stakeholder and Public Engagement Phase Two

The focus of the second round of engagement will be on presenting the recommendations and seeking feedback. A digital survey was developed and was open for two weeks. A What We Heard Report was developed summarizing the input received.

Report

Identified options and recommendations were refined to develop proposed transportation network including vehicle, active transportation, signal, signage, and lighting aspects. An implementation plan was developed identifying priority improvements with high-level cost estimates in the:

- Near-term (2-5 years)
- Mid-term (5-10 years)
- Long-term (10-20 years)

The draft was circulated to Town representatives and the project team met to discuss the recommendations.

Town Council Presentation

The ITMP was presented to Town Council on September 13, 2022.

Thebacha Trail in Early Spring

2.1. Reconciliation

In conducting public engagement, Town administration and the project team were mindful of the potential barriers for Indigenous residents and Nations. Through public and stakeholder engagement, the ITMP process can support reconciliation. The goals and recommendations of the ITMP are also supportive of community building by developing a public realm accessible and welcoming for all. The following efforts were implemented in the development of the ITMP to honour ongoing reconciliation and include Indigenous voices in the outcomes:

- The project team was able to build on relationships with Indigenous Nations and elders established by the Town team members and direct stakeholder workshops were held.
- Postcards were delivered to all residences within Fort Smith to ensure all residents were contacted.
- The stakeholder events were focused on listening to community member's ideas and those ideas and suggestions were incorporated into the plan.
- Reviews of engagement and communications materials were conducted with accessibility in mind.
- Due to the Town size, the surveys were formatted with many questions with open fields rather than multiple choice questions allowing for greater opportunity to voice input unrestricted. This format provided a more fulsome understanding of the inputs received.
- Although the project team would have preferred to meet in person, the pandemic restrictions limited in person contact. In an effort to offset this impact, in addition to on-line engagement opportunities, paper forms were delivered to local community organizations and locations to seek out input representative of the full community.

3. Roadway Network

Motorists, both drivers and passengers, are the most common users of the transportation network, and a network that manages vehicles effectively will result in efficiency for many residents. The roadway network will ensure that roadways meet the needs of motorists, connecting common destinations safely. Vehicle travel is the mode of choice in the coldest of seasons and for longer trips.

Some of the most costly investments for the Town are related to the vehicle network, as part of new construction, paving and upgrades, and maintenance, making it important to manage the network and upgrades.

The design of the roadway network and the driving habits of motorists are highly impactful for other users within the transportation network. Incorporating and improving infrastructure for all modes to travel safely is a priority. The ITMP considers the transportation network for all modes including personal vehicles, industry trucks, ATVs, snowmobiles and other recreational vehicles, cyclists, and pedestrians. At times there will be trade-offs required to ensure the transportation network is safe and attractive for everyone.

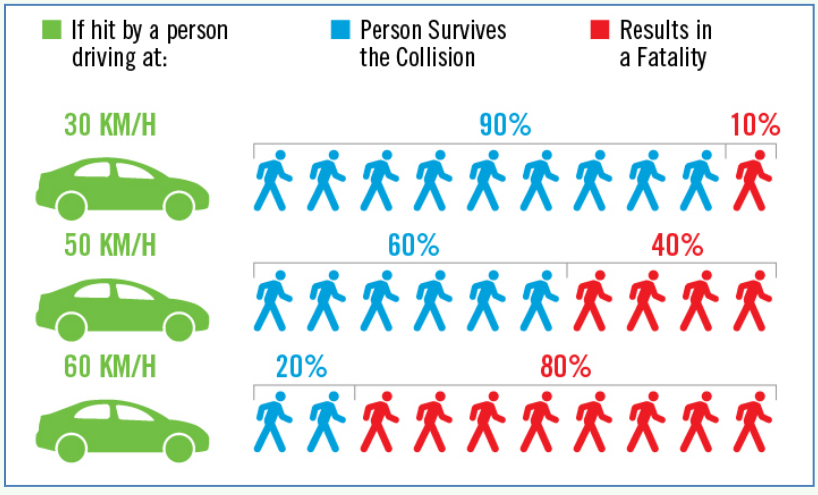
For more information on active transportation, see Section 4.

For more information on recreational vehicles, see Section 5.

There is a priority placed on developing active transportation networks with separation from vehicles, such as a shared-use path. However, conflict points between transportation modes are inevitable. Some examples are crosswalks, trail connections, and intersections.

Speed is a significant factor in collision fatality rates between automobiles and pedestrians. As speed increases, so does the severity of collisions. All modes, especially vulnerable users, benefit from reduced speeds, as indicated in Figure 6. To support posted speed limits, infrastructure can be installed or updated to discourage speeding.

Figure 6: Vehicle Speeds and Pedestrian Safety



Source: Institute of Transportation Engineers

To support posted speed limits, infrastructure can be installed or updated to discourage speeding. When roads are experienced as being narrower and more pedestrian-oriented, people adapt their driving accordingly. Some of the potential traffic calming and placemaking infrastructure considered includes pedestrian facilities, raised crosswalks,

marked crosswalks, bollards, speed cushions, permitted parking, and landscaping/planting. All Recommendations will be suitable for winter conditions and requirements for winter maintenance.

As with many rural communities, the Town of Fort Smith is served by a highway through town. The Town benefits from having the highway at the periphery of the town and a connection to the Fort Smith airport. Connections with the airport and other regions will continue to be important into the future.

3.1. Current Roadway Network

The roadway network within Fort Smith is made up of roadways with rural cross-sections of varying widths organized in two intersecting modified grid patterns. Most roadways are paved, and plans are in place to pave the remainder of the chip-sealed roadways. For the purposes of the ITMP, paving of roadways, except Marine Drive, is assumed to be complete.

Highway 5, the Fort Smith Highway, borders the Town along the south edge and is paved within the Fort Smith area. Highway 5 is under the Government of Northwest Territories authority.

McDougal Road provides connectivity from the Fort Smith Airport through town paralleling the Slave River, to the elementary and high schools, and the downtown. Calder Avenue provides a parallel route east-west through Fort Smith. There are regularly occurring north-south connections between McDougal Road, Calder Avenue, and Highway 5. There is a complementary network of minor roadways providing residential, commercial, and industrial access.

In some areas, the roadways with narrower widths are an issue in the winter as snow is cleared to the roadway shoulders. Snowbanks are a concern for visibility for drivers, pedestrians, and all users in general.

3.2. Proposed Network

The proposed road network is identified in Figure 7 on the following page.

Calder Avenue is identified as a collector roadway, planned to operate as the primary roadway for access across Town. This emphasis supports McDougal Road as an access route for areas central to Town.

Portions of Breynat Street and McDougal Road are identified as downtown roadways. These segments are identified for potential development that develops a character and sense of place. Narrower roadway widths and/or reduced road shoulder, landscaping, and placemaking may be considered in these segments to enhance the downtown.

Mercredi is retained in its current one-way operation. Additional signage could be considered to clarify the function of the roadway for drivers.

Simpson Street is proposed to be signed and line painting provided to limit operations to one-way southbound. The one-way operation will ensure adequate road widths for through traffic along Simpson Street adjacent to the angle parking. In addition, the operations of the angle parking will be improved. At a future date, when Simpson Street is reconstructed, it is recommended that Simpson Street be widened to restore two-way operations. Parking options will need to be reviewed with this change to two-way operation.

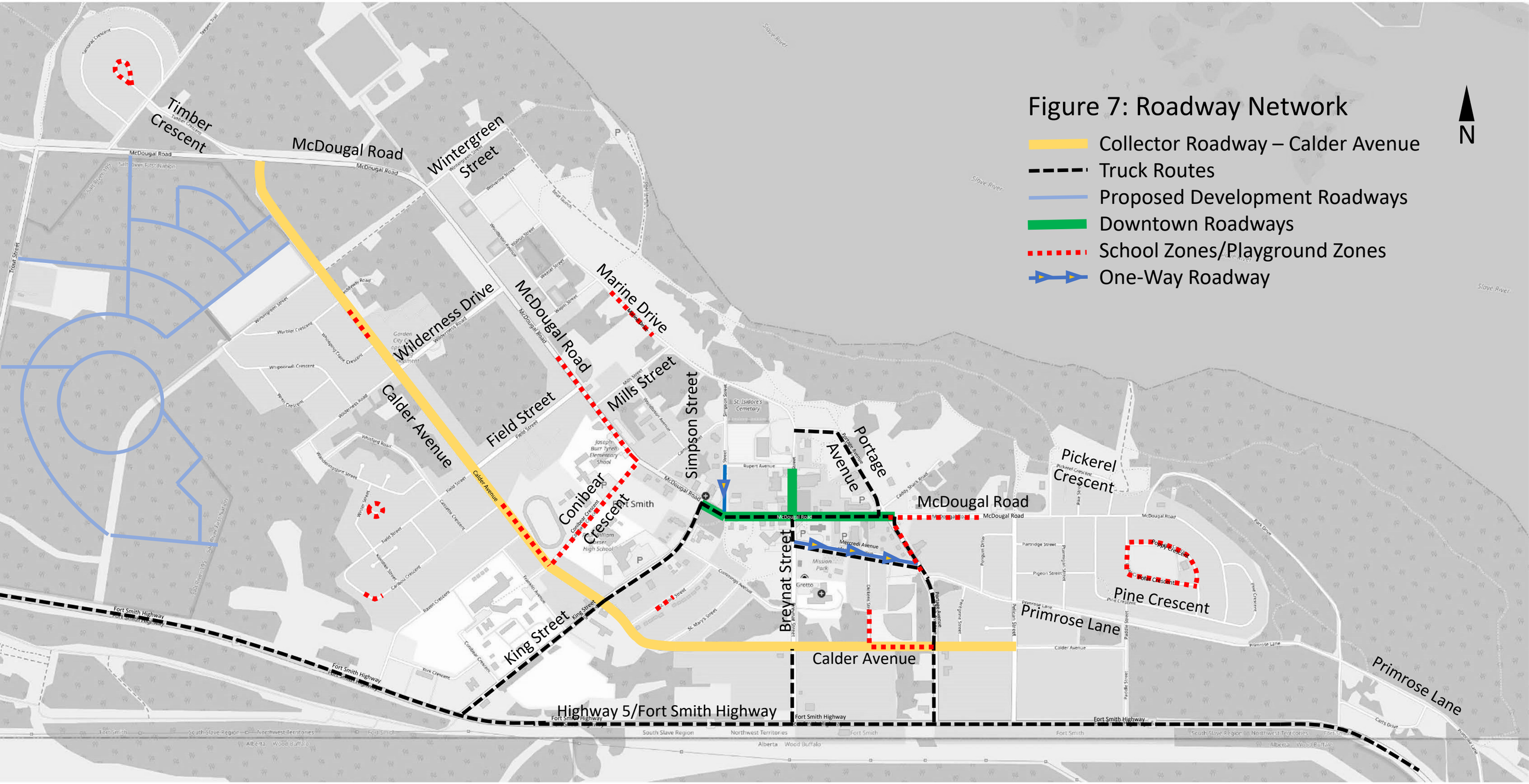


Figure 7: Roadway Network
Collector Roadway – Calder Avenue
Truck Routes
Proposed Development Roadways
Downtown Roadways
School Zones/Playground Zones
One-Way Roadway
N
Timber Crescent
McDougal Road
Wintergreen Street
Wilderness Drive
McDougal Road
Marine Drive
Mills Street
Simpson Street
Field Street
Calder Avenue
Conibear Crescent
Portage Avenue
Pickerel Crescent
McDougal Road
Breynat Street
Primrose Lane
Pine Crescent
Calder Avenue
King Street
Highway 5/Fort Smith Highway
Fort Smith Highway
Fort Smith Highway
Fort Smith Highway
Primrose Lane

Marine Drive is located within an historical slide zone. Until such time as the area, or portions of the area, are deemed stable through engineering study, development along Marine Drive is not permitted. Should the area be deemed stable in the future, paving is recommended.

It is recommended that roadways intersect at angles as close to 90 degrees as practicable, with 70 degrees being the minimum. There is an existing skew intersection at McDougal Road and Portage Avenue which has difficult sightlines and operations. It is recommended that the intersection be replaced with two near 90-degree intersections to improve operations, as shown in Figure 8. Other skew intersections within the Town, such as at King Street and Calder Avenue, and Primrose Lane and Park Drive, appear to function adequately in their current configurations.

Figure 8: McDougal Road and Portage Avenue Intersections

The existing truck routes are maintained. While the routes do not loop, it is recognized that trucks are required to use these routes to the extent possible to reach destinations. If needed to reach a destination, trucks are able to use all roadways. There is an existing truck route that coincides with a playground zone on Portage Avenue south of McDougal Road. As the truck route is assessed as an important connection between Highway 5 and businesses downtown, the truck route has been retained in this location. In recognition of the potentially conflicting mode priorities, special attention to balancing the modes will be required.

Within the Salt River 195 First Nation lands at the west of town, the currently planned roadways are included for information.

3.3. Vehicle Transportation Recommendations

Speed Limits

The Town of Fort Smith Traffic Regulation Bylaw, Bylaw 872, identifies that all roadways, unless otherwise marked, have a speed limit of 40km/h. To encourage compliance, reduce enforcement requirements, and increase clarity for drivers, it is recommended that the variations from this bylaw be few. The following exceptions and speeds are recommended:, as shown on Figure 9.

- School zones and playground zones shall be posted at 30km/h;
- Roadways adjacent to industrial development can be posted at 50km/h; and
- Highway 5, which under the GNWT authority, is posted at 60km/h.

School zones and playground zones shall only be located adjacent to park spaces. This uniform application will provide a consistent visual indication and expectation for the reduced speed limit. The default 40km/h speed limit is appropriate for all residential areas where children may be playing.

In addition to the pedestrian facilities identified in the ITMP, speed cushions, parking (if used), landscaping/planting, and rubble strips are traffic calming options identified for the Fort Smith context. In considering alternatives, aspects such as operations, cost, and impacts to other modes need to be considered.

For more information on pedestrian infrastructure, see Section 4.

Pace Car Program

Residents most passionate about the potential risks and impacts of speeding can be invited to pledge to drive within the speed limit and act as community pace cars. These community leaders could potentially be offered an vehicle identification sticker to identify themselves. This community-based program would support residents as well as draw attention to speeding issues.

Portable Speed Monitoring

Portable speed monitors are effective at reducing operating speeds by drawing attention to a driver's speed. Purchase and implementation of such a device is recommended, particularly in school and playground zones and other areas with high pedestrian volumes.

South Regional Connectivity

Currently, the municipalities south of Fort Smith in Alberta are accessible from Fort Smith via winter roads. The ITMP further supports the recommendations of the Town of Fort Smith 2018 Strategic Plan in developing a year-round roadway to Fitzgerald and Fort Chipewyan. Such a significant project, south of the Northwest Territories-Alberta border would need to be sought through lobbying and collaboration with the Government of the Northwest Territories and the Government of Alberta.

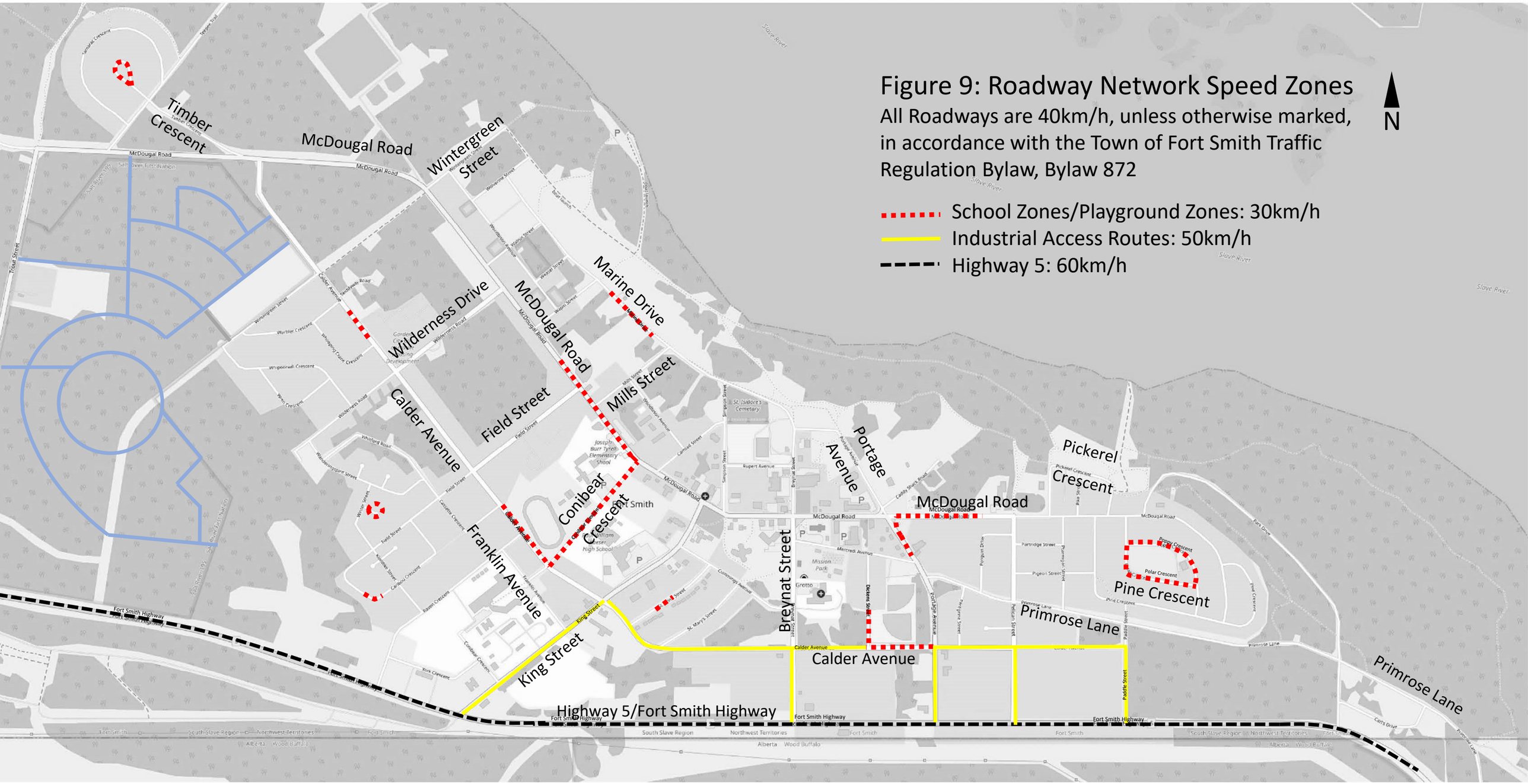


Figure 9: Roadway Network Speed Zones

All Roadways are 40km/h, unless otherwise marked, in accordance with the Town of Fort Smith Traffic Regulation Bylaw, Bylaw 872

- School Zones/Playground Zones: 30km/h
- Industrial Access Routes: 50km/h
- Highway 5: 60km/h

Roadway Standards

Paved roadways are to be the standard in Fort Smith, including paved shoulders. As roadways are reconstructed it is recommended that the design follow a standard cross-section, and that line painting be introduced to delineate travel lanes and shoulders. Shoulders provide space for stopped vehicles, for vehicles to swerve, and offer a walkable surface where a separate pedestrian facility is not provided.

Where parking generators are present, a parking lane may be added to provide parking without impeding traffic. Parking lanes shall not be standard through Fort Smith due to the financial implications and in recognition that unused parking lanes increase the effective road width and encourage higher speeds. Parking is not to be provided within 10m of an intersection or a mid-block crossing to ensure sightlines are not impeded.

The following standards shall be met wherever possible, as identified in the cross-section in Figures 10 and 11.

- Lane width: 3.6m
- Shoulder, paved: 1.0m where a separate pedestrian facility is provided, 1.2m where a walkable shoulder is required
- Parking lane, where required: 2.4m
- Offset to utilities: Minimum 1.5m

Stormwater management will continue to be provided through a network of ditches and culverts. Criteria for ditches include:

- Sideslope: Maximum 4:1
- Backslope: Maximum 3:1
- Drainage channel width: minimum 1.0m

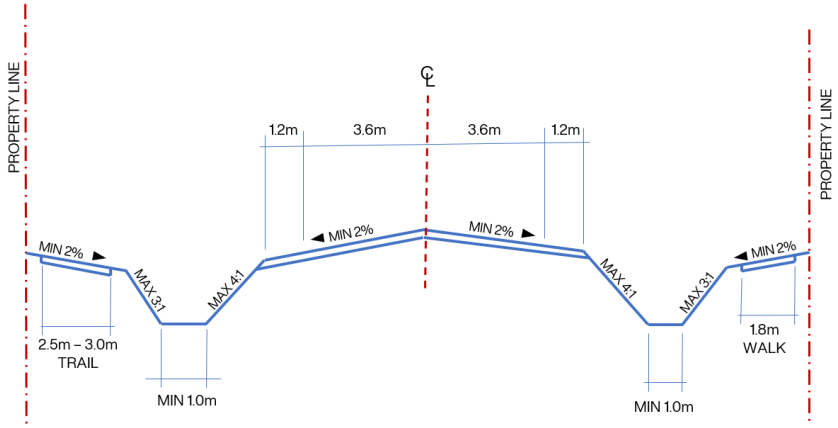


FIGURE 10
STANDARD CROSS-SECTION
SEPARATE SIDEWALK AND/OR SHARED-USE TRAIL

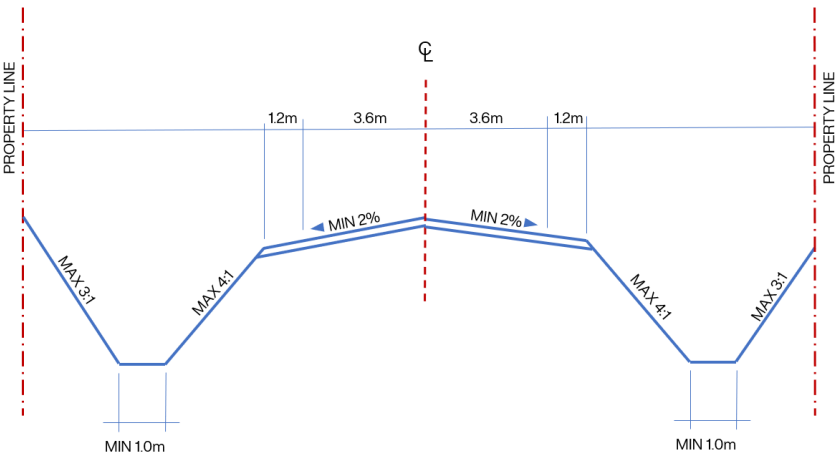


FIGURE 11
STANDARD CROSS-SECTION
WALKABLE SHOULDER

4. Active Transportation

Active transportation, which includes walking, cycling, and all unmotorized transportation modes, are popular choices for Fort Smith residents. Rates of active transportation in Fort Smith are high with community members identifying their main mode of transportation for commuting by bicycle at 1% and by walking at 19%. It is important to note that it is anticipated that rates of walking and cycling for all purposes, including recreation, are higher than for commuting. This statistic correlates with the engagement results which identified walking and cycling as the primary priorities for residents. In addition, the second highest priority was lighting in support of active transportation.

Active Transportation has many benefits for residents and communities, including:

- *Physical and mental health benefits:* Even incremental additions of physical activity are widely accepted to benefit both physical and health.
- *Environmental sustainability:* By using human power rather than fuel, environmental emissions are reduced.
- *Financial:* Active modes do not required gasoline which can be a costly expense.
- *Recreational:* The trail network of Fort Smith is highly valued by residents. In addition, walking and cycling to community events reduces requirements for vehicles.
- *Opportunities for connection:* People using active transportation are more likely to interact with other community members in their travels than motorists. Informal connections provide an opportunity for community building and create a lively public realm.

In the context of Fort Smith, supporting active modes of transportation has specific benefits, including:

- Increasing safety and desirability for kids riding their bikes to school;
- Supporting access to natural areas and connectivity to the open spaces and attractions within and surrounding Fort Smith;
- Supporting desirability for tourism;
- Supporting the continued operations and growth of Aurora College Thebacha Campus

As people are identifying the many benefits of active transportation, engineering and community-building best practices are transitioning to viewing transportation systems in terms of moving people rather than simply vehicles. Developing an active transportation network that provides a variety of route options and connects along desire-lines will encourage active transportation.

4.1. Current Network

The current active transportation network is primarily made up of separate sidewalks and the Thebacha Trail, which runs east-west along the plateau of the Slave River valley.

The Thebacha trail is highly valued by Fort Smith residents who use the facility both as a transportation facility and recreation. There is an existing boardwalk along the north side of Marine Drive as part of the Thebacha Trail. There

were concerns expressed, however on the level of lighting on the trail which discourages use by some residents at various times of the day and year.

There are a number of missing links in the network where facilities end mid-block or represent a terminus that does not loop. Six mid-block crossings are present in the existing network: two Thebacha Trail crossings, three at the schools and college, and one at the post office. Some mid-block crossings have signage identifying the crossing for motorists and an effort has been made to provide adequate lighting – particularly at the schools.

Marine Drive and Boardwalk

4.2. Proposed Network

Active transportation networks are most used when they connect key nodes, are continuous, and are accessible for all users. All new construction shall provide barrier-free access for pedestrians and all sidewalk users. A range of opportunities and facility types are included in the plan for Fort Smith, as illustrated in Figure 12. Opportunities include walkable shoulders, shared-use paths, trails, and sidewalks. For roadways with higher volumes of vehicle, pedestrian, and cycling volumes are prioritized for separate facilities, where there is a physical distance between the active transportation facility and the travel lanes.

Missing Links

To develop a continuous network of facilities, missing sidewalk and trail connections are proposed including:

- A sidewalk on the south side of Calder Avenue, from McDougal Road to Wintergreen Street to connect the Calder Avenue sidewalk to the Thebacha Trail on McDougal Road;
- A sidewalk from on the north side of McDougal Road, from the existing sidewalk terminus North of Walrus Street to Wintergreen Street;
- A shared-use path on the northside of Wintergreen Street from McDougal Road to the Thebacha Trail, effectively extending the trail to the intersection at McDougal Road and Wintergreen Street;
- A shared-use path on the north-east side of the north end of Breynat Street from Portage Avenue to the Thebacha Trail along Marine Drive, effectively extending the trail to the intersection at Portage Avenue and Breynat Street;
- A sidewalk on the west side of Portage Avenue between Mercredi Avenue and Primrose Lane to connect the existing sidewalk to the intersection of Portage Avenue and Primrose Lane and the walking trail to the south; and
- A sidewalk on the east side of Breynat Street, from Calder Avenue to the existing sidewalk terminus north of Cummings Avenue.

Figure 12: Active Transportation Network

N

- Thebacha Trail
- Walking Path
- Proposed Shared-Use Path
- Existing Sidewalk
- Proposed Sidewalk
- Mid-Block Crossing
- Potential Lighting Enhancement
- Proposed Trailhead
- Painted and Signed Pedestrian Crossing

Teepee Trail
Timber Crescent
McDougal Road
Wintergreen Street
Marine Drive
Wilderness Drive
McDougal Road
Mills Street
Calder Avenue
Field Street
Camsell Street
Simpson Street
Portage Avenue
Pickerel Crescent
McDougal Road
Axe Handle Hill Trail
Conibear Crescent
Brevnat Street
Pine Crescent
Raven Crescent
Klondike Street
Franklin Avenue
King Street
Cummings Street
Calder Avenue
Primrose Lane
Primrose Lane
Highway 5/Fort Smith Highway

Mid-Block Crossings

Mid-block crossings can be challenging for road users as they can be unexpected and have limited sightlines, both of which contribute to risk for pedestrians. All mid-block crossings should have line painting to delineate the crossing and be signed to draw drivers' attention to the crossing.

For pedestrian and shared-use path crossings at intersections in front of Joseph Burr Tyrell Elementary School and Paul William Kaesar High School, raised crosswalks, with signage, line painting, and rectangular rapid flashing beacons are recommended.

For more information on signage and flashing beacons, see Section 6.2.

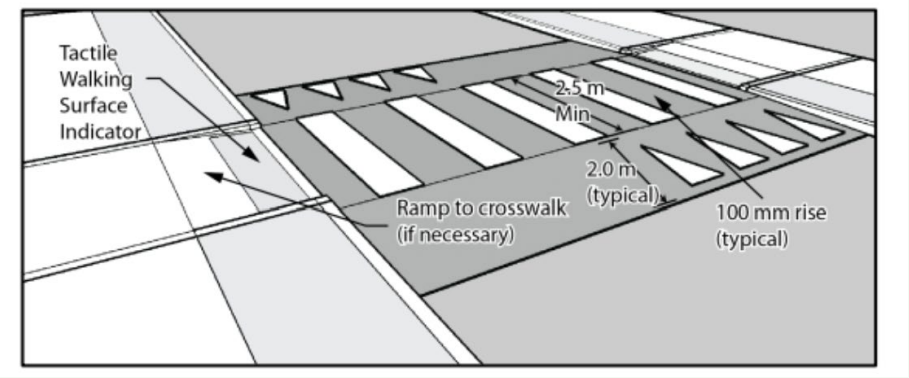


Figure 13: Raised Crosswalk
Source: Transportation Association of Canada: Canadian Guide to Traffic Calming

In addition, to minimize the need for using the mid-block crossings on Field Street and Conibear Crescent, the sidewalks should be extended to the full length between Calder Avenue and McDougal Road.

Proposed Sidewalks and Trails

Additions to the active transportation are recommended to provide important connections between key Town locations and at the highest pedestrian volumes. The following sidewalk and trail connections are proposed:

- A sidewalk along Pine Street, from the north intersection with McDougal Road to the existing sidewalk terminus at the south intersection of McDougal Road and Pine Crescent;
- A sidewalk along Wilderness Road south of Calder Avenue, along Wandering Spirit Street and Winter Street, and north on Field Street to connect to the existing sidewalk terminus;
- Construction of sidewalk on Raven Crescent from Calder Avenue to Franklin Avenue and on Franklin Avenue from Raven Crescent to Conibear Crescent;
- Construction of a shared-use trail to connect to the Thebacha Trail at Mills Street, south along Mills Street, and along the south side of McDougal Road to Portage Avenue. The construction of this section of shared use trail is anticipated to occur as replacement of the existing sidewalk along McDougal Road requires replacement.

Trailheads

To further enhance the user experience and encourage use of the Thebacha Trail, trailheads are proposed at various locations on the trail. Trailheads could include signage, bench, hard surfacing lighting and garbage receptacles. Potential for additional parking should be considered. Trailheads are proposed at Breynat Street, Pickerel Crescent, and the south end of Park Drive.

Marine Drive and Boardwalk

Marine Drive Connectivity

The current boardwalk along Marine Drive, which forms part of the Thebacha Trail, is a popular feature for residents. Ultimately, the boardwalk can be replaced with a shared-use path on northeast side of Marine Drive so that the connection can be cleared of snow and accessible year-round. As Marine Drive is within the slide zone, current analysis of bank stability will need to be completed, and if conditions are favourable, construction of a new shared-use path along the top of bank can be undertaken.

4.3. Active Transportation Recommendations

In addition to capital construction opportunities, a number of recommendations are provided to encourage active transportation in Fort Smith and improve the user experience. As the most vulnerable users in a transportation network, pedestrians, cyclists, and other wheeled users benefit from reduced driving speeds, shortened crossing distances, increased visibility, and accessible infrastructure. All future construction and reconstruction within Fort Smith should follow these principles.

Active Transportation Design Standards

As roadways are repaved or reconstructed, it is recommended that roadways be constructed with a minimum lane and shoulder width to ensure cyclists are accommodated. New pedestrian facilities are recommended to be constructed as close to the property line as reasonable and as existing infrastructure and plantings allow. Sidewalks should be constructed with maximum grades of 8%, and be provided with a minimum of 2% crossfall to ensure drainage. Barrier-free design and age-friendly principles should be applied in all designs for active transportation.

Roadway standards are discussed in Section 3.3.

It is recommended that further construction of infrastructure which encourages crossing mid-block be avoided wherever possible. Where unavoidable, mid-block crossings should include signage and line painting, at a minimum.

To increase visibility at pedestrian crossings, no parking zones are recommended near intersections and midblock crossings. It is recommended that Bylaw 872: Traffic Regulations be updated to reflect that no parking is permitted within 10m of any pedestrian crossing. In areas where parking near crossings is an ongoing concern, no parking signage may be helpful.

Snowbanks and Thebacha Trail on Portage Avenue

Operational Consideration

A continued priority on maintaining the active transportation network year-round will be important in encouraging use.

Young Cyclists

In many jurisdictions, children are permitted and encouraged to ride their bicycles on the sidewalk. The potential for children to ride their bikes to school on the sidewalks along McDougal Road and Conibear Crescent would provide them separation from the traffic. By limiting riding on sidewalks to bicycles with wheels less than 50cm in diameter, it is anticipated that pedestrian comfort on the sidewalk will not be impacted. In order to permit this activity, Bylaw 872: Traffic Regulations would require an update. In addition, the Town would need to pursue changes to Clause 246 of the Northwest Territories Motor Vehicle Act for NWT to permit children to ride bicycles on sidewalks.

Bicycle Parking

It is recommended that all new civic infrastructure and private businesses include bicycle parking to allow for residents to secure their bicycle while accessing services.

Connecting New Development

It is recommended that new developments within and around Fort Smith be connected into the Town multi-use trail and sidewalk systems.

Safety and Security

The limited daylight hours in Fort Smith through the winter months present a barrier to active transportation as many users may feel less secure or at risk in dark conditions. Additional streetlighting for pedestrian routes would increase the users' experience and encourage active transportation.

For more information on lighting, see Section 7.

Crime Prevention Through Environmental Design (CPTED) principles should be applied in design of all active transportation facilities.

Education

As new facilities are constructed and installed, or should the Town pursue changing regulations related to children riding bicycles on sidewalks, education efforts are recommended. Alternatives could include informational materials posted and distributed, on-line resources, mailed notices, and in-person information events.

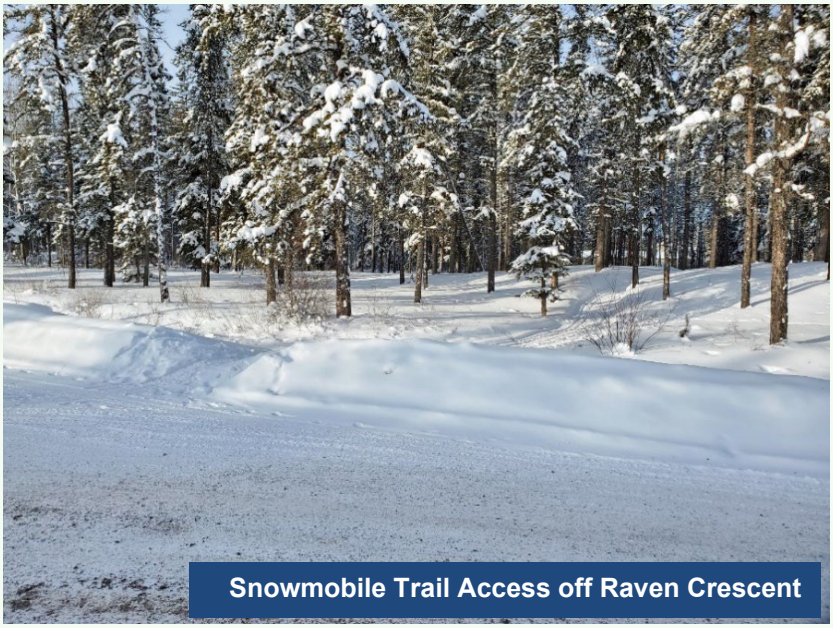
5. Recreational Vehicle Network

In engagement, the recreational vehicle network was identified as adequate and thus less of a priority for capital funding. An available recreational vehicle network connecting to remote locations and the broad open spaces benefits local users and has tourism potential. Development of further recreational vehicle trails, often created informally, should consider environmental and noise impacts.

5.1. Current Network and Future Network

Fort Smith's Bylaw 630 - All Terrain Vehicles governs the operation of recreational vehicles within Fort Smith. The bylaw identifies that recreational vehicles are not permitted on sidewalks or trails. It is understood that access within the Town is limited to the required connection between a residence and the existing trails.

The recreational vehicle routes are located outside of the town development and extend from the edges of Fort Smith into the areas surrounding the Town. There is an established trail paralleling Highway 5 between Fort Smith and Salt River. The trails generally connect to the roadway network at the edges of town where people access the trails from their homes.



Snowmobile Trail Access off Raven Crescent

5.2. Recreational Vehicle Recommendations

The recreational vehicle network is recommended to continue as it does currently, with a network focused on trails in the areas surrounding Fort Smith.

Within the Town, it is important to minimize the potential conflict points with pedestrians and other modes of transportation. It is recommended that at potential conflict points, signage be provided for the recreational vehicles. Reduced-size stop or yield control can be added at common accesses from recreational vehicle trails to the Town roadway network. Such signs must not be readily visible to vehicle drivers to avoid confusion to vehicle drivers. Signage will be consistent with Bylaw 630: All Terrain Vehicles. Signage identifying routes not available to recreational vehicles can be signed as such where non-conformance is a recurring issue.

6. Traffic Control and Signage

Traffic control devices and intersection treatments heavily influence the flow and user experience of a transportation network. Aspects of signage, line-painting, and flashing beacons fall under the umbrella of traffic control.

6.1. Principles for Traffic Control and Signage

Traffic control devices and intersection treatments heavily influence the flow and user experience of a transportation network. They are effective when applied consistently, as needed, and clear. When traffic control does not meet these criteria, and when traffic control measures do not align with roadway users' expectations, the effectiveness and user compliance is reduced. Identical conditions must be marked with the same type of sign. Each sign must be displayed only for the purpose for which it is intended. (Manual of Uniform Traffic Control Devices for Canada, Sixth Edition, 2021)

Sign clutter can be an aesthetic issue, and overapplication of signage discourages compliance. It is best practice to limit signage to that which is required for roadway function.

6.2. Sign Warrants and Usage

The "Right-Hand Rule" identifies that at an uncontrolled intersection, the vehicle at the most right has the right-of-way. It is recommended that given the traffic volumes of Fort Smith, the default intersection treatment should be without use of traffic control devices.

Yield Signs

A yield sign requires the driver to yield the right-of-way to other drivers at an intersection, only proceeding when conditions are safe to enter the intersection. A yield sign is recommended to be installed based on an engineering assessment considering traffic speeds, traffic volumes, sight lines, and collision statistics. Yield signs are considered for a right-turn channel or when the "Right-Hand Rule" is evaluated as not providing safe and efficient traffic movement.

Stop Signs

Stop signs are provided to regulate the right-of-way for drivers at intersections. There are societal costs associated with stop signs, including costs for fuel, people's time, and the emissions generated. There is also an increased rate of collisions associated with stop signs. Stop signs are not effective nor intended to control speeds. A stop sign is recommended to be installed based on an engineering assessment considering traffic speeds, traffic volumes, sight lines, and collision statistics. Stop signs are used when yield signs are determined through analysis to be inadequate.

Stop Signs on Minor Roadways

Stop signs are to be used on the lower-traffic roadway at intersections, on one approach of a 'T' intersection and on two approaches of a four-way intersection. Subject to engineering judgement, the following identifies intersections where a stop sign is recommended, as identified in the TAC Manual of Uniform Traffic Control Devices for Canada:

- At an intersection where a restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through roadway;
- At an intersection where the application of the normal right-hand rule, which generally requires that when two vehicles enter an uncontrolled intersection at approximately the same time, the driver on the left must yield the right-of-way to the vehicle on the right, would be unduly hazardous;

- At an intersection where the safe vehicle speed on the approach is less than 15 km/h; or
- Where there is an unusually high number of right-angle collisions have occurred and methods of reducing the collision experience, such as improving sightlines, street lighting, parking prohibitions, enforcement, geometric modifications, or a Yield sign, have been tried unsuccessfully.

All-Way Stop Signs

Intersections that warrant stop signs on all approaches are limited to the following, as identified in the TAC Manual of Uniform Traffic Control Devices for Canada:

- Where the traffic volumes on the intersecting roads are approximately equal and the combined pedestrian and vehicular volumes on the minor road average 200 per hour for an eight-hour period;
- Where the average delay to the minor road vehicular traffic entering the intersection exceeds 30 seconds per vehicle during the peak hour;
- Where a collision problem has been identified, defined as a threshold of five collisions per year over a three-year period of a type susceptible to prevention by the implementation of an all-way Stop should be used. Such collisions typically include right-and left-turn collisions as well as right-angle collisions; or
- As an interim measure, for a period of approximately one month prior to switching the stop control from one road to an intersecting road, and the subsequent removal of existing Stop signs on the first road.

All-way stops shall not be installed where there is poor visibility of the signs or within 250m of another stop sign.

Speed Control Signs

Speed control signs shall be placed to identify roadways which vary from the overarching 40km/h speed limit in Fort Smith or at a transition from another speed zone to a 40km/h zone.

Thebacha Trail Crossing on Park Drive

Pedestrian Crossing

A pedestrian crossing sign (RA-4) is used at all crossings with painted markings unless there is stop sign. A pedestrian crosswalk sign is installed in advance of the crossing in both directions, and on both sides of the intersection. The sign is to be placed with the pedestrian on the sign facing the center of the roadway.

RA-4

School Crosswalk

The school crosswalk sign (RA-3) is applied at pedestrian crossings adjacent to schools. The sign is installed in the same manner as the Pedestrian Crossing sign.

School Zones and Playground Zones

The school zone warning sign (WC-1) is to be used in combination with speed reduction sign adjacent to a school.

The playground warning sign (WC-3) is to be used in combination with speed reduction sign adjacent to a playground.

Rectangular Rapid Flashing Beacon

Rectangular rapid flashing beacons are recommended at the mid-block crossing in front of Joseph Burr Tyrell Elementary School. These beacons include bright, flashing LED lights which are activated through a pushbutton and mounted above pedestrian crossing signs. They are installed on both sides of a crossing, in both directions.

A pedestrian pushbutton sign (ID-21) is used to identify the location of the pushbutton.

Operational Consideration

Snow clearing operations are to be completed with consideration of sign visibility.

Line Painting for Pedestrian Crossings

Standard pedestrian crossings are indicated with two parallel paint lines spaced at a minimum of 2.5m apart, at a minimum of 600mm from the travelled lane of the intersecting roadways.

Zebra crosswalks are installed at mid-block crossings near schools or in areas with high pedestrian volumes. The zebra crosswalk is made up of 600mm bars at a 600mm spacing. The minimum width is 2.5m.

In addition to the standard line painting for pedestrian crossings, there is an opportunity to introduce creativity and colour into the crossings. Community members in Fort Smith have been painting rainbow crosswalks in support of the LGBTQ+ and allies in front of Joseph Burr Tyrel School and Paul William Kaeser High School since 2017. Painted crosswalks can continue to be developed at these locations when raised crosswalks are added. Additional locations for painted crosswalks could be considered, and the painting efforts expanded to other themes. Some municipalities have painted crosswalks in orange with white feathers in recognition of the ongoing work of reconciliation. Town representatives or community members could lead a project to identify designs that are custom to Fort Smith.

6.3. Sign Placement

Signs are most effective when placed in close proximity to the feature to be identified. Vertical placement is determined based on a balance for visibility. Signs must be high enough to be visible over snowbanks or other obstructions. At the same time, signs are most effective when low enough to reflect vehicle lights. Signs are recommended to be installed with the bottom of the sign approximately 2m above the roadway surface at the edge of roadway.

Signs are to be installed between 2m and 5m horizontally from the edge of the roadway. The preferred distance is at the lower end of that range. Higher offsets may be selected based on maintenance considerations, such as snow clearing operations and site conditions.

7. Streetlighting

At the south Northwest Territory border on the 60th parallel north, the summer months have many daylight hours providing a inviting transportation network. However, in the winter, the days are shorter and there are many days that both start and end the school and work days in the dark. Given the proximity to the dark sky preserve, on a cloudy night, unlit areas are entirely encased in dark. In winter, lighting can be a big challenge for sightlines and the perception of safety, as well as influencing people's choices of transportation mode. If people do not feel safe walking, they are more likely to use a vehicle.

7.1. Existing Streetlighting

Many areas of Fort Smith have streetlighting, particularly in the central and residential areas. However, there are a number of trail and sidewalk locations without any streetlighting.

7.2. Proposed Streetlighting

The primary priority for streetlighting is those areas related pedestrian safety. Streetlighting is typically adequate to light both the roadway and a nearby sidewalk or shared-use path. The secondary priority for streetlighting improvements is those areas with lower pedestrian volumes and without active transportation facilities. These locations include the south portion of King Street and Primrose Lane. Proposed Streetlighting improvements are included in Figure 12: Active Transportation Network.

Joseph Burr Tyrell School Crossing at 5pm in Winter

7.3. Streetlighting Recommendations

Street Lighting and Dark Sky Preservation

The dark sky preserve is a wonderful attraction and feature for Fort Smith. All new streetlighting should be developed with respect to the proximity of the dark sky preserves by utilizing LED Dark Sky compliant luminaires and certified by Intenational Dark-Sky Association. Luminaires will include an intrusive shield to control light trespassing into the natural habitats. Fixtures should be specified with an excellent bug rating to minimize back light/up light and glare.

Standard light poles can be used and the pole's height should conform with road geometry and to suit the road and ditch profile.

Early engagement with the governing utility is recommended to establish a service entry point and provide the required power from nearby existing power sources.

In development of new street lighting all existing infrastructure that has not reached end of life and not identified as replacement items and should be re-used to the extent possible. Potentially, light poles could be re-used, and outdated luminaires should be replaced with modern more efficient LED luminaires without a need for complete demolition and renewal.

8. Capital Plan

The capital plan summarized below was developed based on the input from the public and stakeholders, input from Town administration and Council, and technical considerations. The priorities are guided by the objectives of the ITMP and lay out an implementation plan to be executed over the coming 20 years.

There are three timelines considered, near-term (2-5 years), mid-term (5-10 years), and long-term (10-20 years). These timeline categories lay out a plan that can be advanced incrementally as needed based on funding and resource availability. Grants that favour some types of projects may advance prioirities to build on current national or territorial priorities. In addition to funding availability, various local factors will impact priorities for the community as the community evolves over the next 20 years.

It is important to note that concept and detailed design has not occurred for these capital priorities. Further analysis and design will refine costing. Project costs are estimated at a conceptual level with an accuracy of –30% to +50%. Pricing includes 15% for engineering and a 20% contingency.

TIMELINE	PROJECT	DESCRIPTION	CONCEPTUAL COST
Near-term (2-5 years)	Missing Pedestrian Connections	Construction of missing pedestrian connections, including: • Sidewalk on the south side of Calder Avenue, from McDougal Road to Wintergreen Street; • Sidewalk from the north side of McDougal Road, from the existing sidewalk terminus North of Walrus Street; • Shared-Use Path on the northside of Wintergreen Street from McDougal Road to the Thebacha Trail; • Shared-use path on the north-east side of Breynat Street from Portage Avenue to the Thebacha Trail along Marine Drive; and • Sidewalk on the west side of Portage Avenue between Mercredi Avenue and Primrose Lane. • Sidewalk on the east side of Breynat Street, from Calder Avenue to the existing sidewalk terminus north of Cummings Avenue.	$900,000
Near-term (2-5 years)	Primary Streetlighting improvements	Additional streetlighting for pedestrian routes	$2,500,000
Near-term (2-5 years)	Pine Street Sidewalk	Construction of a sidewalk along Pine Street, from the north intersection with McDougal Road to the existing	$625,000

		sidewalk terminus at the south intersection of McDougal Road and Pine Crescent	
Near-term (2-5 years)	Wilderness Road, Wandering Spirit Street, Winter Street, Field Street sidewalk loop	Construction of a sidewalk along Wilderness Road south of Calder Avenue, along Wandering Spirit Street and Winter Street, and north on Field Street to connect to the existing sidewalk terminus.	$1,100,000
Near-term (2-5 years)	Midblock crossing enhancements	Construction of enhancements at existing midblock crossings, including: • Raised crosswalk, updated signage, and pedestrian crossing signals in front of Joseph Burr Tyrel School; • Raised crosswalk, updated signage, and pedestrian crossing signals in front of Paul William Kaeser High School; • Enhanced signage and paint markings between the post office and parking on the south side of McDougal Road; • Enhanced signage and paint markings at the mid-block crossing on Field Street • Enhanced signage and paint markings at the Thebacha trail crossing of Park Drive; and • Enhanced signage and paint markings at the Thebacha trail crossing of Wintergreen Street.	$780,000
Near-term (2-5 years)	Implement standard signage, speed zones, and pedestrian crossings at intersections	Update speed limits throughout Town to provide consistency for drivers. Update other regulatory signage to reflect best practices. Replace, remove, and relocate existing signage, as well as add new signage. Paint crosswalks Signage and line painting to update Simpson Street to one-way operation.	$100,000
Mid-term (5-10 years)	Thebacha Trail Trailheads	Trailheads to the Thebacha Trail at Breynet Street, Pickerel Crescent, and the south end of Park Drive. Trailheads would include signage, bench, hard surfacing lighting and garbage receptacles. Potential for additional parking to be considered.	$300,000
Mid-term (5-10 years)	Secondary Streetlighting Improvements	Additional streetlighting predominantly for vehicles	$780,000

Mid-term (5-10 years)	Raven Crescent and Franklin Avenue Sidewalk	Construction of sidewalk on Raven Crescent from Calder Avenue to Franklin Avenue and on Franklin Avenue from Raven Crescent to Conibear Crescent	$220,000
Mid-term (5-10 years)	Westgrove Sidewalks	Construction of sidewalks on Field Street, Klondike Street, and Raven Crescent through the Westgrove Neighbourhood.	$800,000
Long-term (10-20 years)	Cummings Street Sidewalks	Construction of sidewalks on Cummings Street	$400,000
Long-term (10-20 years)	Wilderness Road Street Sidewalks	Construction of sidewalks on Wilderness Road between Calder Avenue and McDougal Road	$400,000
Long-term (10-20 years)	Mid-Block Crossing Mitigation (Sidewalk Connections)	Construction of sidewalk to connect existing sidewalks: • North and South sides of Field Street where sidewalks do not currently exist; and • North and South sides of Conibear Street where sidewalks do not currently exist.	$375,000
Long-term (10-20 years) Or as driven by development	Marine Drive Paving and Upgrade	Ongoing bank stability assessment is being completed for the slide zone. Should Marine Drive be identified as adequately stable for roadway improvements, Marine Drive can be paved. The upgrade is to include a shared-use path on northeast side of the roadway to replace the existing boardwalk.	$1,000,000
Long-term (10-20 years)	McDougal Road & Portage Avenue	Develop two right-angle intersections in place of the existing skew intersections To be coordinated with Conibear Park construction timelines	$575,000
Long-term (10-20 years) Or with re-development	McDougal Road Loop Shared Use Trail	Construction of a shared-use trail to connect to the Thebacha Trail at Mills Street, south along Mills Street, and along the south side of McDougal Road to Portage Avenue. The construction of the shared use trail is anticipated to occur as replacement of the existing sidewalk along McDougal Road requires replacement.	$1,000,000
Long-term (10-20 years) Or with re-development	Operational upgrades to Simpson Street	Simpson Street is to be widened to increase depth of angular parking and drive aisles to improve operations.	$520,000

Appendix A

Select Signage Installations

Source: TAC Manual of Uniform Traffic Control Devices for Canada

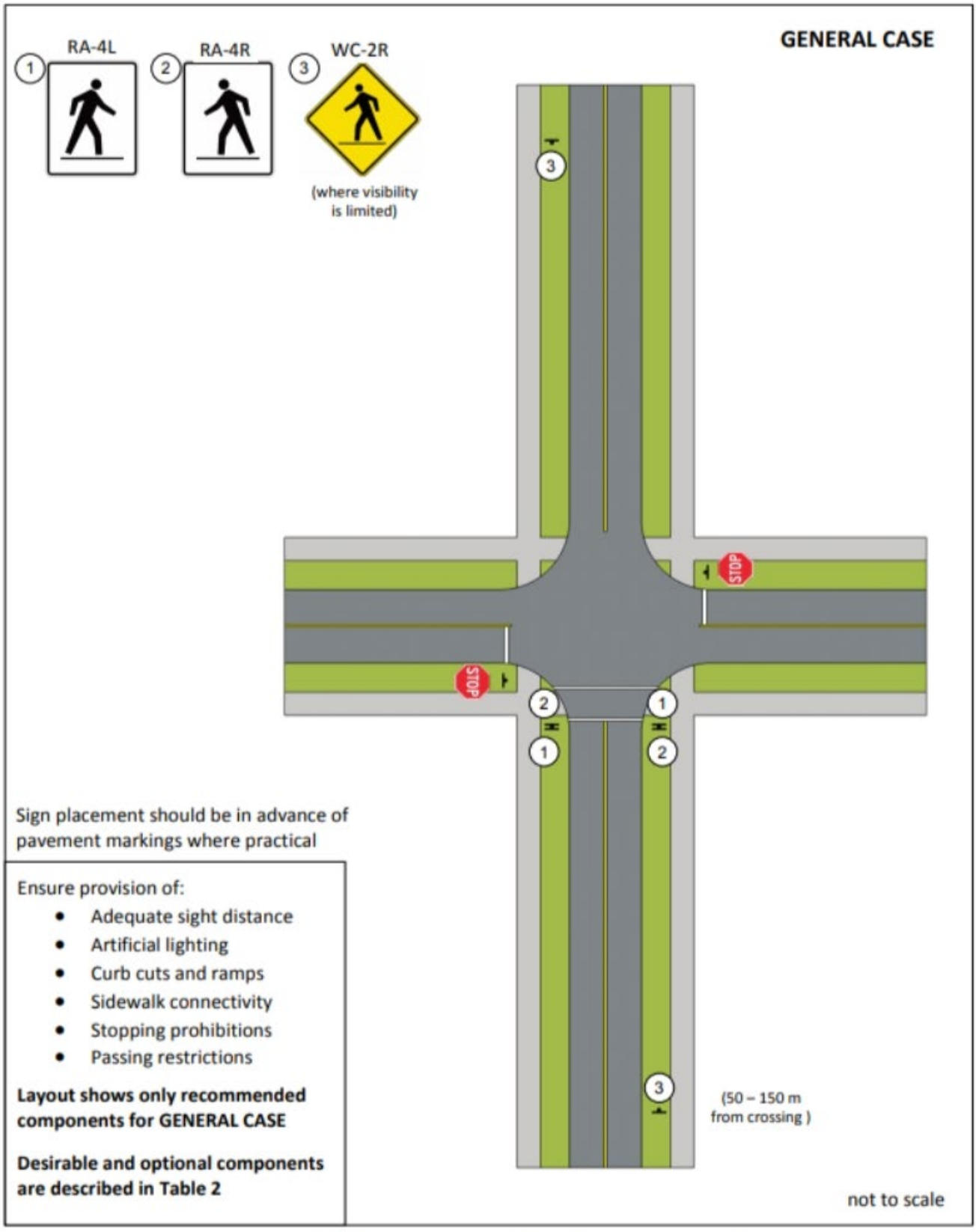


Figure 9: GM – Intersection (two-lane, two-way)

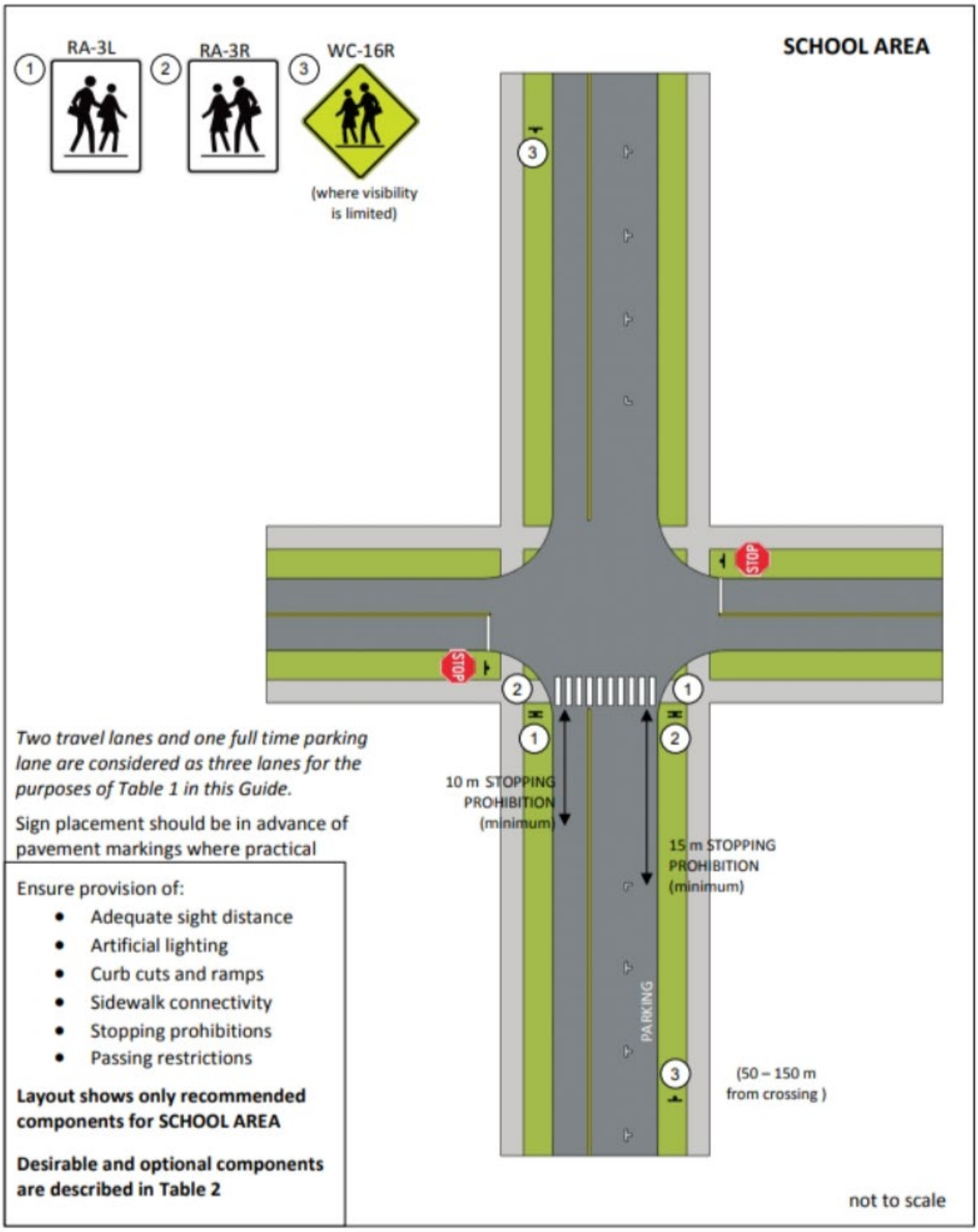


Figure 13: GM – Intersection (school area, three-lane, two-way)

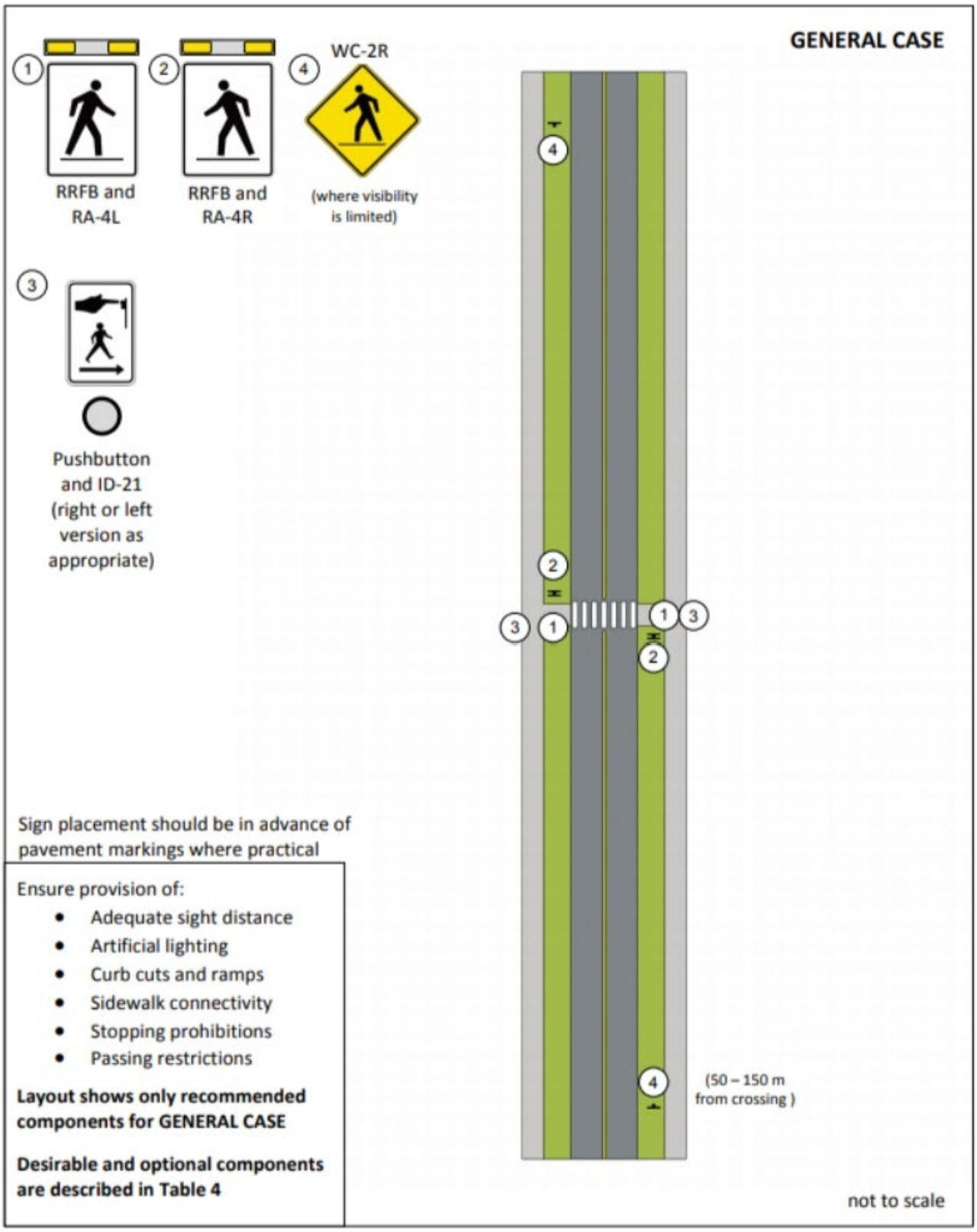


Figure 21: RRFB – Mid-block (two-lane, two-way)