



MMM GROUP

Prepared for: Town of White City

WHITE CITY TRAFFIC STUDY

5415204-000 | December 2015

STANDARD LIMITATIONS

This report was prepared by MMM Group Limited (MMM) for the account of the Town of White City. The disclosure of any information contained in this report is the sole responsibility of the client, Town of White City. The material in this report reflects MMM's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. MMM accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

DISTRIBUTION LIST

Association / Company Name	# of Hard Copies	# of PDF Copies
Town of White City		1

REVISION LOG

Revision #	Revised By	Date	Issue / Revision Description
1	D. DeWalt	September 1, 2015	Draft Report
2	N. Gray	September 29, 2015	Revision
3	D. DeWalt	October 22, 2015	Revision
4	D. DeWalt	November 13, 2015	Revision
5	B. Belmore	November 30, 2015	Final Report

MMM GROUP LIMITED SIGNATURES

Report Prepared By:



Destiny DeWalt, Engineer-in-
Training

Project Engineer

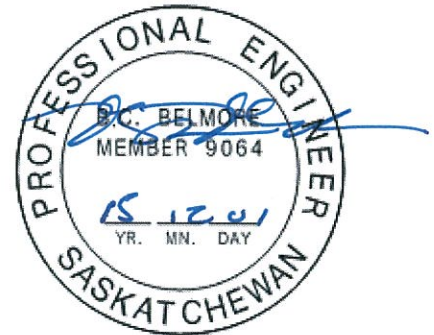


Report Reviewed By:



Bruce Belmore, P. Eng., PTOE

Regional Manager, Saskatchewan



Association of Professional Engineers & Geoscientists
of Saskatchewan

CERTIFICATE OF AUTHORIZATION

MMM Group Limited

Number C0860

Permission to Consult held by:

Discipline

Sk. Reg. No.

Signature

TRANSPIRATION

9064



TABLE OF CONTENTS

- 1.0 INTRODUCTION..... 1**
- 2.0 STUDY PROCESS..... 1**
- 3.0 EXISTING CONDITIONS..... 1**
 - 3.1 Road Network.....2
 - 3.2 Multi-use Pathway System.....2
 - 3.3 Traffic Volumes and Speeds5
 - 3.4 Collision History7
 - 3.5 Growth of the Municipality.....7
- 4.0 WORKSHOP SUMMARY..... 9**
- 5.0 LOTT ROAD EAST..... 10**
- 6.0 ACTIVE MODES NETWORK REVIEW 13**
 - 6.1 Schools 13
 - 6.2 Off-street Pathways and Sidewalks..... 14
 - 6.3 Transit 14
- 7.0 ROAD NETWORK PLAN..... 14**
- 8.0 GUIDELINES FOR CONTROLLING TRAFFIC..... 17**
 - 8.1 Application of Traffic Control Devices 17
 - 8.1.1 Yield Signs..... 19
 - 8.1.2 Stop Signs..... 20
 - 8.1.3 Pedestrian Crossings..... 21
 - 8.2 Controlling Traffic Speed.....26
 - 8.3 Development of a Town Centre.....27
- 9.0 RECOMMENDATIONS 29**



LIST OF FIGURES

Figure 1 - Study Area 3

Figure 2 - Multi-Use Pathway Network 4

Figure 3– Daily Two-Way Traffic Volumes and Traffic Speed Map..... 6

Figure 4 - Five-Year Collision History 8

Figure 5 – Recommended Road Network / Road Hierarchy16

Figure 6 – Existing Signage Inventory.....18

Figure 7 – TAC’s School Area.....23

Figure 8 – TAC’s Transverse Crosswalk Markings25

Figure 9 - School Crosswalk in Saskatoon, Saskatchewan26

Figure 10 – Downtown Urban Cross-section with Angle Parking28

LIST OF Tables

Table 1 – Priority Ranking of Transportation Network Issues 9

Table 2 – Lott Road East Traffic Data Characteristics11

Table 3 – Road Hierarchy Table.....15

APPENDICES

Appendix A Background Material

Appendix B TAC Characteristics of Urban Roads



1.0 INTRODUCTION

MMM Group Limited (MMM) was retained by the Town of White City to conduct the *White City Traffic Study*. The purpose of the study is to provide a transportation network that is sustainable, safe, and efficient while providing an appropriate transportation system that is administratively, physically, and financially responsible. In addition, the project was to provide a transportation policy framework that addresses the local, regional, and provincial transportation goals and objectives and examine the effects of planned and future development in relation to automobile, pedestrian and cyclist network requirements.

2.0 STUDY PROCESS

The White City Traffic Study was an independent review of White City's transportation system. The study process was based on the sequential order of activities to gather the necessary information for the development of the recommendations. The main steps of the study were:

- ▶ obtain and review traffic data, background materials and reports provided by the Town;
- ▶ conduct a workshop with staff and councillors to confirm key issues for resolution;
- ▶ conduct a road network assessment to document the existing road network, traffic control, signage, operation, and pedestrian network;
- ▶ liaise with the Lott Road East Delegation group to understand the main issues regarding Lott Road East;
- ▶ establish a roadway classification system based on daily traffic volumes, function of the road, and frequency of intersection roads; and,
- ▶ develop a transportation policy recommendation, including guidelines for application of stop signs, traffic calming, and pedestrian crossings.

3.0 EXISTING CONDITIONS

The Town of White City is a unique municipality located approximately 10 kilometers east of the city of Regina. Situated next to the community of Emerald Park, the town contains a mixture of residential and commercial development. White City has opted for a complete rural cross section for their roadways; no sidewalks, curb, gutter or underground storm sewers will be found within White City.

The town has had significant growth in the past several years, which has increased traffic pressure on community roadways. The type and amount of traffic using residential streets is changing, and there is concern that traffic issues will continue to grow with continued population growth and residential development.

3.1 Road Network

White City is located adjacent to Highway 1, as illustrated in Figure 1. The junction of Highway 1 and Highway 48 is a full access intersection that provides access and egress to the community from within the municipal boundaries. A full access intersection can be described as an intersection that allows all turning movements. A second entrance point is provided through a small braid from Highway 1. The longevity of this braid is unknown due to the proposed construction taking place on Highway 1, but the braid is anticipated to be removed by the completion of construction in 2019.

Adjacent to White City is the community of Emerald Park. Emerald Park has one full access intersection at Highway 1 and Great Plains Road, and one right-in / right-out intersection at Emerald Park Road. Due to the proximity of these two communities, all four access points are used by residents throughout the communities. These access points provide adequate north-south continuous roadways throughout the community. Specifically in White City, Highway 48 and White City Drive provide adequate continuous north-south movement.

Between the four access points on Highway 1 there exists a lack of east-west connectivity. Great Plains Road / Ramm Avenue and Betteridge Road are the two main east-west roads that connect the two full access intersections. Gregory Avenue and Lott Road are the main east-west connectors in White City as they intersect with Highway 48.

3.2 Multi-use Pathway System

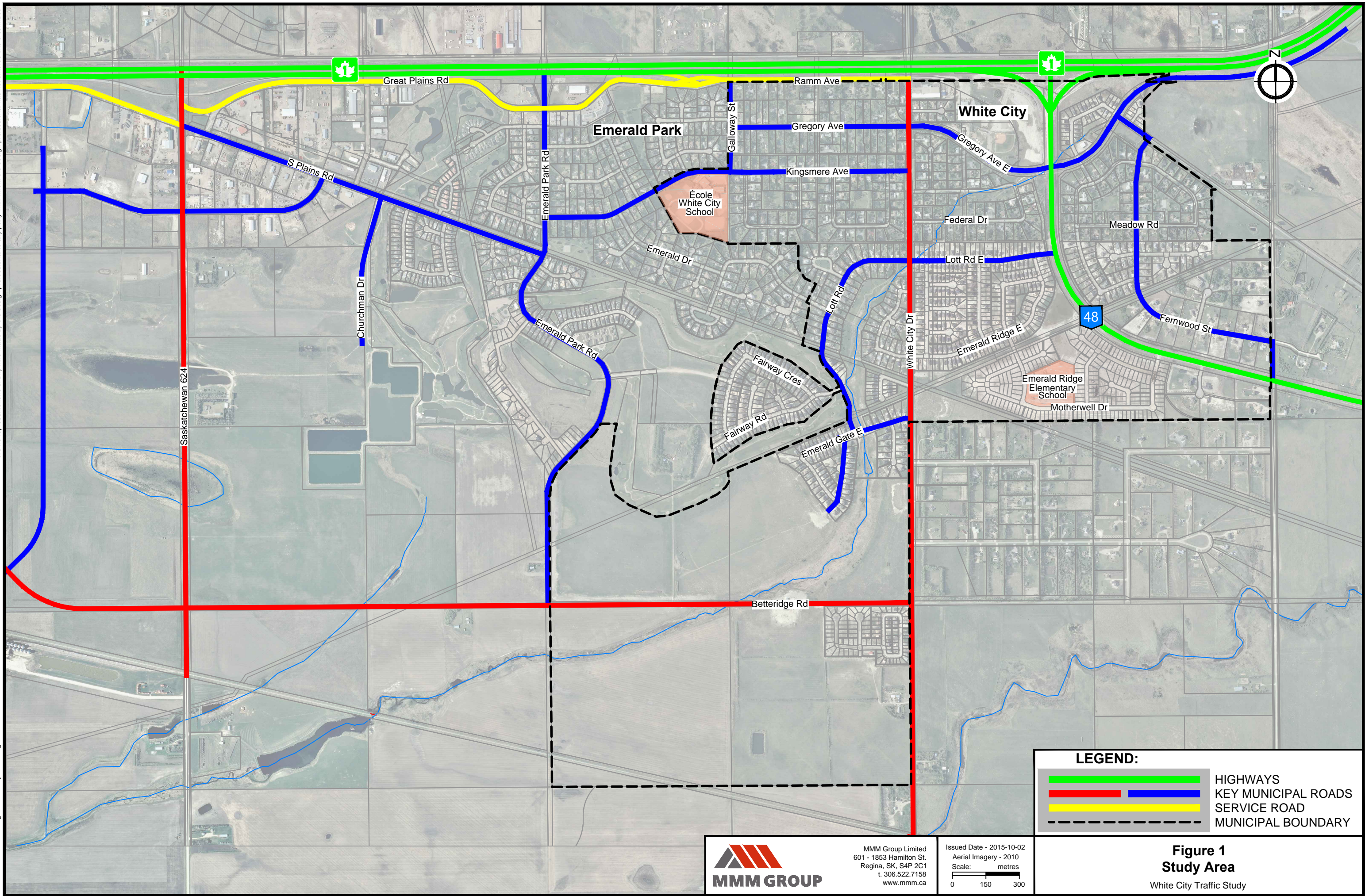
The Town of White City has provided a comprehensive multi-use pathway system throughout their community in the absence of providing sidewalks to maintain the rural profile.

To ensure safety of the pedestrians and cyclists, the Town has passed a bylaw prohibiting on-street parking within the community. Prohibiting cars from parking on-street provides a clear line of sight down the length roadway and increases the visibility of both pedestrians and motorists. The multi-use pathways have been provided in such a manner that they are located along several roadways which lead to key destinations such as Ecole White City School and Emerald Ridge School. During the course of this study, it is understood that White City and the Ministry of Highways and Infrastructure have agreed to provide an at-grade crossing on Highway 48 to connect the pathway systems.

White City's existing and proposed multi-use pathway network is presented in Figure 2.

NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 1 - Study Area.dwg DATE: 2015-10-02 DRAWN BY: hurrell



LEGEND:

	HIGHWAYS
	KEY MUNICIPAL ROADS
	SERVICE ROAD
	MUNICIPAL BOUNDARY

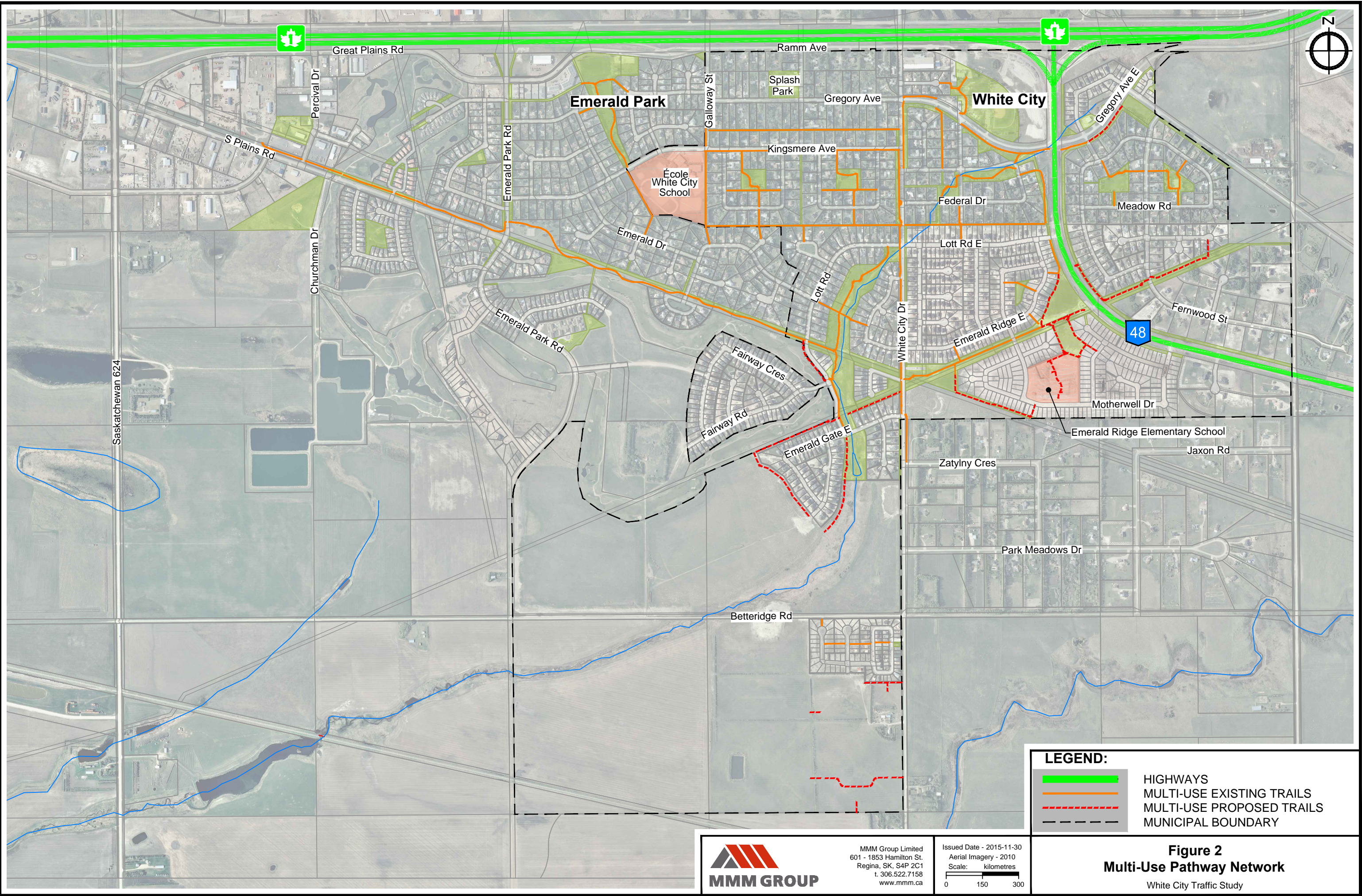
MMM Group Limited
601 - 1853 Hamilton St.
Regina, SK, S4P 2C1
t. 306.522.7158
www.mmm.ca

Issued Date - 2015-10-02
Aerial Imagery - 2010
Scale: metres
0 150 300

Figure 1
Study Area
White City Traffic Study

NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 2 - Multi-Use Pathway Network.dwg DATE: 2015-11-30 DRAWN BY: morrowke



MMM Group Limited
601 - 1853 Hamilton St.
Regina, SK, S4P 2C1
t. 306.522.7158
www.mmm.ca

Issued Date - 2015-11-30
Aerial Imagery - 2010
Scale: kilometres
0 150 300

LEGEND:	
	HIGHWAYS
	MULTI-USE EXISTING TRAILS
	MULTI-USE PROPOSED TRAILS
	MUNICIPAL BOUNDARY

Figure 2
Multi-Use Pathway Network
White City Traffic Study

3.3 Traffic Volumes and Speeds

Daily traffic volume data and speed data were collected along major roadways within White City between March 2014 and May 2015. In total, the traffic data was collected at 29 locations by municipal staff, with a typical data collection period of one week. The traffic data was reviewed to ensure the data collected was representative of typical traffic conditions. A representative day was selected during a mid-week count, such as a Tuesday, Wednesday or Thursday, to assess the typical traffic conditions of the roads within White City. Traffic counts adjacent to long weekends, holidays, or large events that may alter traffic patterns and traffic volumes were avoided. Traffic counts completed around these events, or on a Monday or Friday, generate uncharacteristic data (e.g. lower or higher traffic volumes than typically experienced).

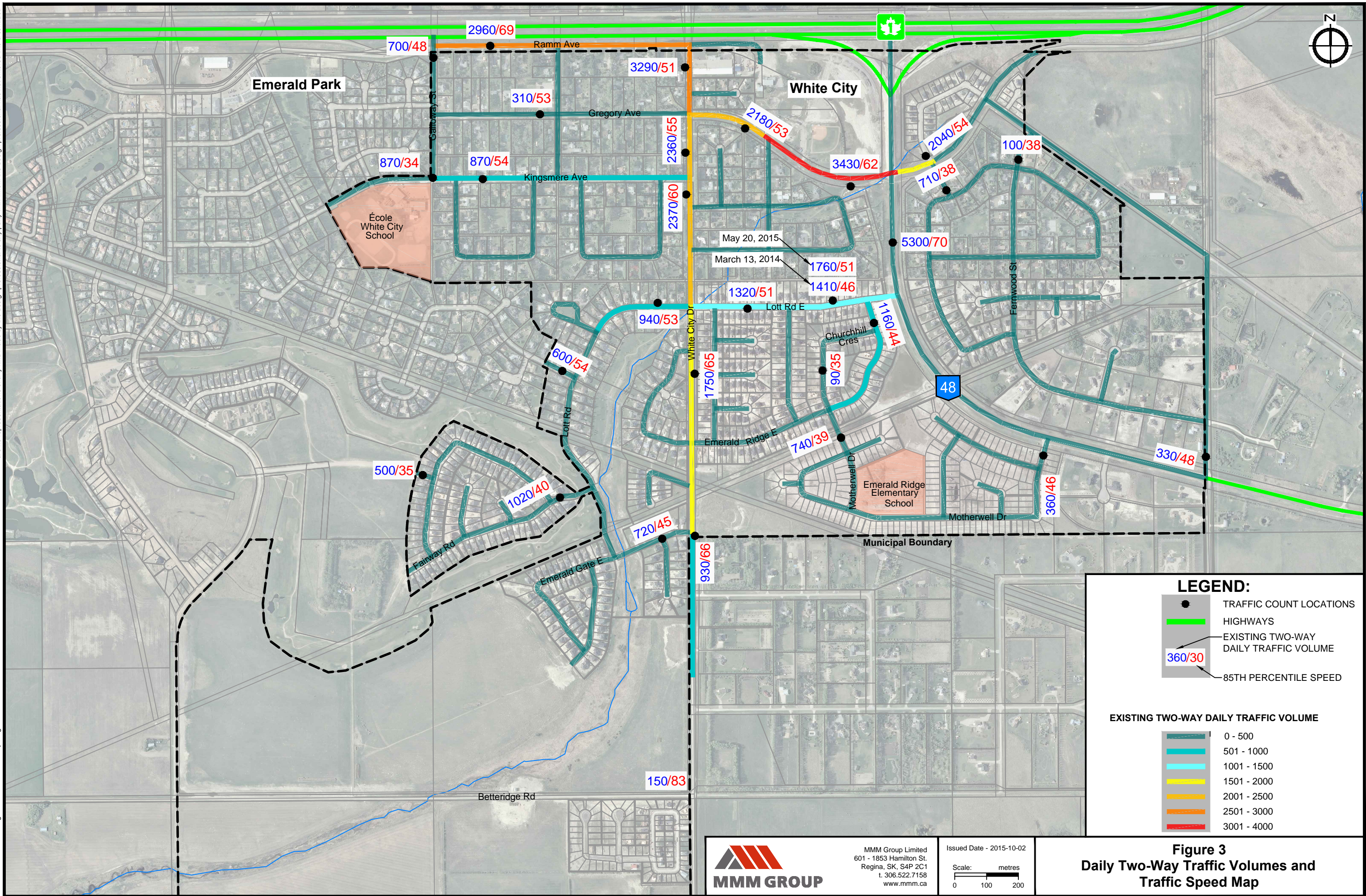
The traffic data analyzed for this study included daily traffic volumes and the 85th percentile speed. Figure 3 summarizes the daily two-way traffic volumes and speed data for each of the roadways collected.

Ramm Avenue, Gregory Avenue near Highway 48, and White City Drive have the highest traffic volumes within the community. The traffic volumes along these streets experience a daily traffic volume of approximately 3,000 vehicles or greater. This traffic pattern is expected as Ramm Avenue, Gregory Avenue, and White City Drive are the main access roads into White City and the traffic volumes begin to decline along the roadways further into the residential neighbourhoods. The morning and afternoon peak hours of the individual roadways are approximately 10% each, of the total daily traffic volumes.

White City's posted speed limit is 50 km/h unless otherwise posted. Anomalies include Ramm Avenue, east of Emerald Park Road, where the speed limit is 60 km/h, and the school zones with a posted limit of 40 km/h. Based on the traffic data collected by the Town of White City, the 85th percentile speed was also reviewed. Of all traffic, 85 percent of all drivers travel this speed or less. This is the speed commonly reviewed when assessing safety. The review of the 85th percentile speed data indicates that most motorists in the area are adhering to the posted speed limit. On Ramm Avenue, White City Drive and Gregory Avenue the 85th percentile speeds are 10 to 15 km/h higher than the posted speed limit.

NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 3 - Traffic Flow Map.dwg DATE: 2015-10-02 DRAWN BY: hurrellb



LEGEND:

- TRAFFIC COUNT LOCATIONS
- HIGHWAYS
- EXISTING TWO-WAY DAILY TRAFFIC VOLUME
- 360/30 85TH PERCENTILE SPEED

EXISTING TWO-WAY DAILY TRAFFIC VOLUME

0 - 500
501 - 1000
1001 - 1500
1501 - 2000
2001 - 2500
2501 - 3000
3001 - 4000

MMM GROUP

MMM Group Limited
601 - 1853 Hamilton St.
Regina, SK, S4P 2C1
t. 306.522.7158
www.mmm.ca

Issued Date - 2015-10-02

Scale: metres
0 100 200

Figure 3
Daily Two-Way Traffic Volumes and
Traffic Speed Map

3.4 Collision History

A collision analysis was undertaken to identify high collision locations within the study area. The Saskatchewan Government Insurance (SGI) provided the Traffic Accident Information System (TAIS) for the town of White City from 2010 to 2014.

A total of 48 collisions were reported in the study area during the five-year analysis period. Collisions occurring along Highway 1 at the intersections of Great Plains Road, Emerald Park Road or Highway 48 were excluded from the count as the construction of interchanges will change traffic collision patterns at these locations. The severity of the collisions was such that 38 resulted in property damage only and 10 resulted in one or more persons injured. No collisions reported resulted in a fatality. Figure 4 identifies the location of the collisions that occurred at an intersection and the number of collisions occurring along a corridor.

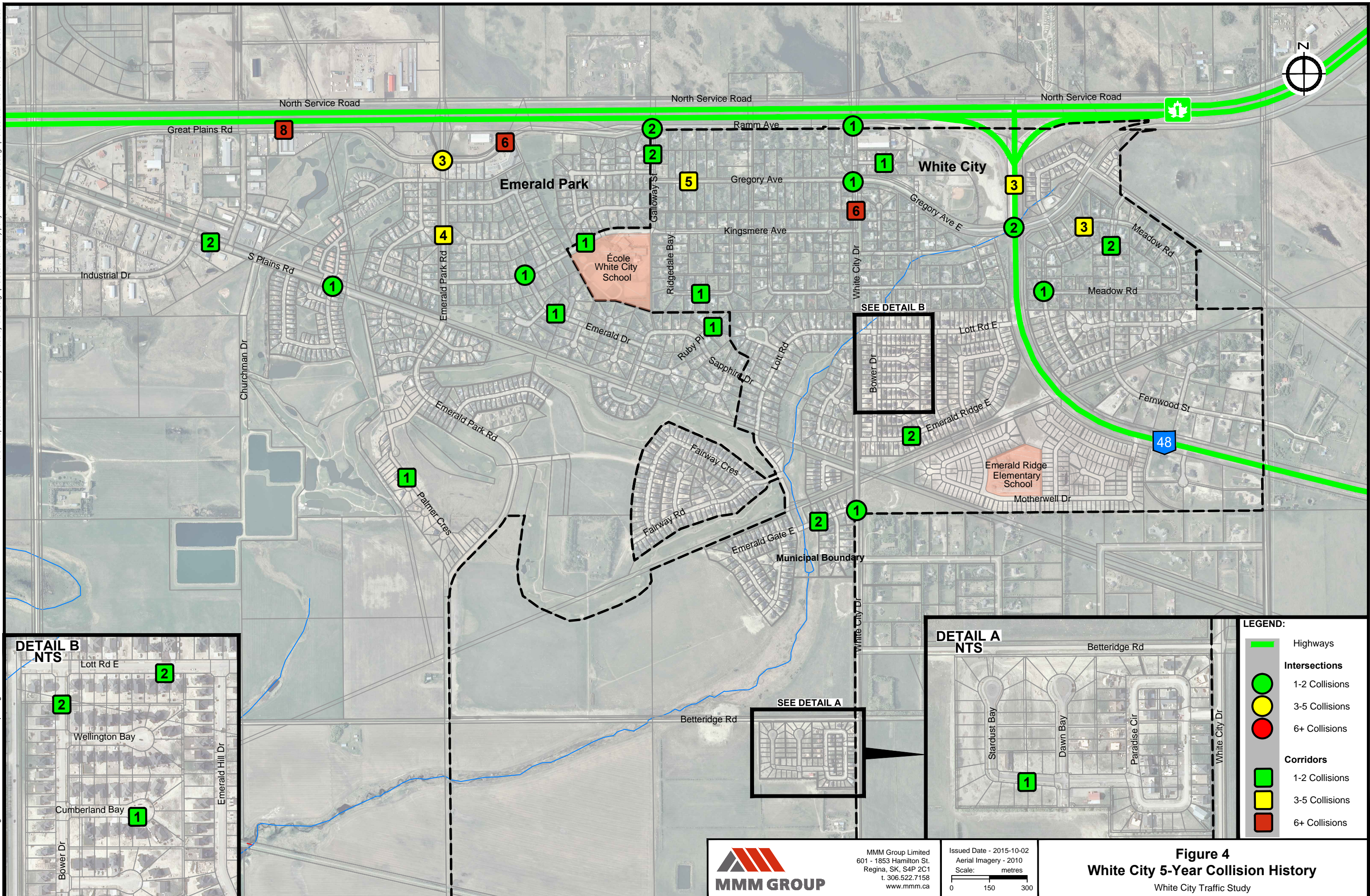
3.5 Growth of the Municipality

The town of White City is a growing community located 10 kilometres east of the city of Regina. The Official Community Plan proposes the new town centre at the intersection of Emerald Park Road and Betteridge Road. The town centre facilitates the growth and development of White City by striving to create the “Heart of the Community”. As part of the planning process, the Town Centre Concept Plan was developed to create a concept plan and provide land use and urban design guidelines for each development area. The town centre is anticipated to feature an urban cross-section and provide several amenities such as retail, entertainment, office accommodation, and professional services. Betteridge Road will create the heart of the town centre and assist in providing the east-west connectivity within the community. The plan proposes that the town centre will be abutted by residential development to the southeast and future, long-term residential to the southwest and northwest. The Official Community Plan and Town Centre Neighbourhood Plan are provided in **Appendix A**.

In 2015, the Province announced the construction of two interchanges, one at the intersection of Highway 1 and Pilot Butte Access, and one at the junction of Highway 1 and Highway 48, as part of the Regina Bypass P3 project. These interchanges will provide free movement for access and egress from the communities while reducing delay, congestion and collision potential at these intersections. The construction of the interchange at Highway 48 will require the removal of the access braid onto Ramm Avenue. The traffic that currently uses this braid will be required to use one of the other access points into the community. In addition, with continued growth and development of the community, more pressure will be placed on the road network resulting in the need of a clearly defined plan on how to address traffic in the future.

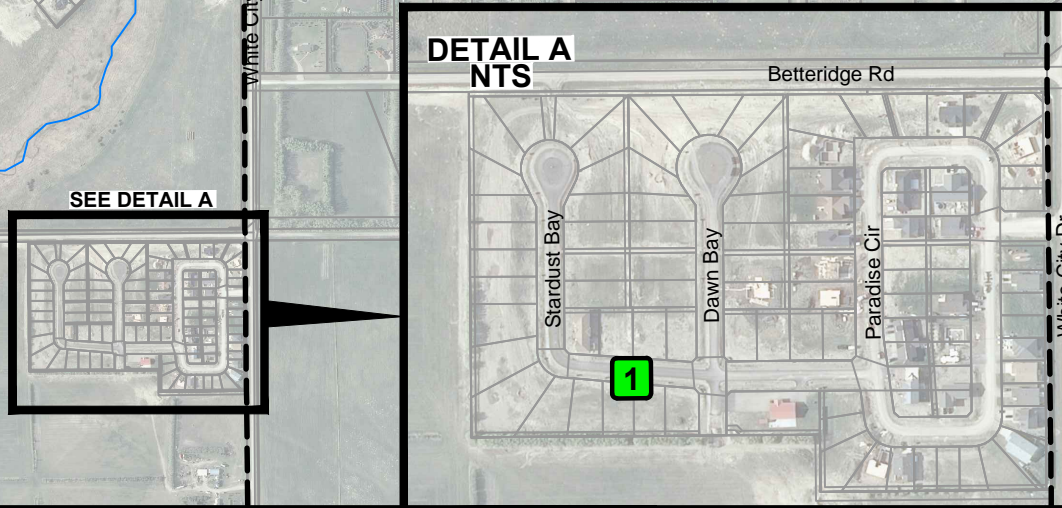
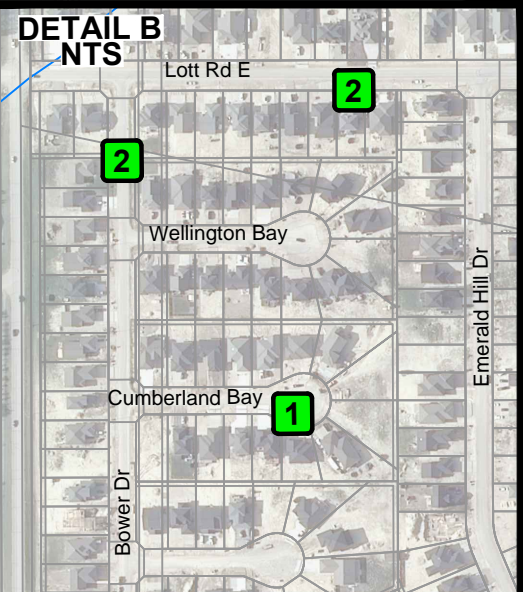
NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 4 - 5-Year Collision Landscape.dwg DATE: 2015-10-02 DRAWN BY: hurrellb



LEGEND:

	Highways
Intersections	
	1-2 Collisions
	3-5 Collisions
	6+ Collisions
Corridors	
	1-2 Collisions
	3-5 Collisions
	6+ Collisions



MMM Group Limited
601 - 1853 Hamilton St.
Regina, SK, S4P 2C1
t. 306.522.7158
www.mmm.ca

Issued Date - 2015-10-02
Aerial Imagery - 2010
Scale: metres
0 150 300

Figure 4
White City 5-Year Collision History
White City Traffic Study

4.0 WORKSHOP SUMMARY

On Friday, June 26, 2015, MMM guided the staff and Councillors of White City through a workshop to identify and confirm key transportation issues within the municipality. The workshop was divided into three main components. The first component was an individual exercise where participants described their top three transportation issues facing the municipality and presented them to the group. The second component divided the participants into two groups. Each group had to identify as many traffic issues in as many locations as they could on a traffic issues map within an allotted timeframe. The final component of the workshop revisited the original transportation issues identified. Each participant was given ten dots to place beside which of these transportation issues were most important to them. Table 1 presents the results of the final exercise.

Table 1 – Priority Ranking of Transportation Network Issues

Transportation Network Issue	Priority (No. of Dots)
Available Guidance for Development	11
Highway 48 Corridor Access & Pedestrians	11
Betteridge Road (Town Centre)	10
East-West Connectivity (Concentrated Access)	7
Signage	6
Vehicle and Pedestrian Interaction	6
Addressing Bad Habits (i.e. speeding)	5
Pedestrian Connectivity	5
Safety	4
On-street Parking	2
Pedestrians On-street	2
Speed	1
Traffic During Construction	0

The top transportation network issues identified during the workshop include guidelines for future development, corridor and pedestrian access on Highway 48 and the future of Betteridge Road with the town centre concept.

5.0 LOTT ROAD EAST

Lott Road East is an east-west municipal road that intersects Highway 48 approximately 380 metres south of Gregory Avenue. The connection of Lott Road East and Highway 48 was part of a subdivision application that was approved in February 2010. This direct access changes the function of Lott Road East into acting as a collector roadway that provides access to Bower West and the remaining neighbourhoods throughout the town.

Lott Road East was designed with a 20 metre right-of-way, a 7.3 metre road surface, and has approximately 49 driveways fronting the roadway. The speed limit along the road is 50 km/h. An all-way stop has been installed at the intersection with Emerald Hill Drive in an attempt to reduce the speed of vehicles.

On July 15, 2015, MMM met with two representatives of the Lott Road East Delegation Group to discuss their concerns for Lott Road. The representatives indicated their primary concern was for pedestrian safety, primarily school aged children sharing the road with vehicles. Lott Road East is within the walk-zone of the new Emerald Ridge Elementary School. There are no pathways provided directly along Lott Road East which requires children to share the road with vehicle traffic. Their secondary concern was how traffic volumes on Lott Road East will be affected with the future development of Emerald Meadows and the proposed town centre.

MMM completed a review of the traffic volumes and speed on Lott Road East by analyzing the data collected by the Town. The 85th percentile speed was found to be approximately 50 km/h which confirms that majority of motorists are not exceeding the posted speed limit. The traffic volumes reported on Lott Road East are consistent with the typical collector volumes as outlined in the Transportation Association of Canada's (TAC) Characteristics of Urban Roads. A 25% increase in traffic was recorded on Lott Road East between March 2014 and May 2015. The additional traffic could be a result of numerous factors, and with the recent construction taking place about White City, including the Regina Bypass, construction of Betteridge Road, and new subdivision applications, the future traffic volumes on Lott Road East could increase, decrease, or remain stationary.

The morning peak hour traffic volumes were also analyzed to compare the traffic volumes in relation to the school pedestrian peak hour traffic. Table 2 summarizes the traffic volume findings from the data collected and the Lott Road East Delegation Material.

Table 2 – Lott Road East Traffic Data Characteristics

	Delegation Material (Jan 21, 2015)	Traffic Characteristics Data Report (Nov 2014)	Traffic Counts	
			March 2014	May 2015
AADT	1,200	1,376	1,410	1,757
Morning Peak Hour	8:00 – 9:00	7:00 – 8:00	7:00 – 8:00	7:00 – 8:00
Traffic Volume (7:00 – 8:00 AM)	N/A	155	201	206
Traffic Volume (8:00 – 9:00 AM)	N/A	132	116	154

The review of the traffic volumes on Lott Road East indicate that the morning peak hour consistently occurs between 7:00 – 8:00 a.m. with approximately 200 vehicles during the peak hour. Teachers’ supervision at Emerald Ridge Elementary School begins at 8:40 a.m. and the entry bell rings at 8:50 a.m. It is anticipated that school children will begin walking to school around 8:25 a.m., when the commuter traffic volumes in the area have dropped considerably. The peaks of the two modes of transportation are staggered in the morning.

Several traffic calming and / or pedestrian accommodation alternatives were explored as potential options along Lott Road East; however, each alternative presented a list of challenges, as described below:

- ▶ Speed humps are raised areas across a roadway, generally 6 metres long, and are typically used to control the speed of traffic. Speed humps are not a viable option because of the current road design of Lott Road East. The location and number of driveways along this roadway would result in a speed hump blocking a resident’s driveway. The speed humps may also indirectly cause rerouting of traffic from Lott Road East onto Emerald Ridge East which was not intended to carry additional traffic. As a result, speed humps are not a recommended solution.
- ▶ Raised intersections cover an entire intersection with ramps on all approaches and are typically used to control traffic speed and assist the motorists in identifying the pedestrian zone. Similar to speed humps, the design of Lott Road East prevents raised intersections as a possible solution. Driveways either abut or are adjacent to each of the three intersections along Lott Road East. The location of the driveways prevents raised intersections as a possible solution.
- ▶ Traffic circles are a traffic calming device used to calm intersections, visually break up a road and control speed while allow traffic to flow freely. However, traffic circles require a

relatively large right-of way while Lott Road East offers a 20 metre right-of-way. There is physically no space available to accommodate a traffic circle along Lott Road East.

- ▶ Medians are a raised centre island used to narrow the road and can often provide pedestrian refuge while crossing the street. The TAC Geometric Design Guide for Canadian Roads recommends that the collector roadways have a lane width of 3.5 metres. The total road surface available is 7.3 metres which would allow a substandard 0.3 metre median. The design of Lott Road East prevents a raised median as a solution because the median will block driveways and prevent certain manoeuvres from the resident's driveways as well as impede the snow removal process. Median treatments are not recommended along Lott Road East.
- ▶ Chokers are curb-extensions located midblock to narrow the street and slow traffic and are primarily used when speeding is a concern. The number of driveways, the total available road surface and rural profile of Lott Road East prevent chokers as a viable option.
- ▶ Bulb-outs are extended curb lines at intersections which narrow the road and reduce the pedestrian crossing distance and can add beautification to the area with the placement of planters. However, due to the design of Lott Road East, the bulb-out could only extend 0.15 metres either side into the road surface and may potentially push pedestrians further into the street since there is no designated walking area.
- ▶ Pathways are walkways along the side of a roadway designated for pedestrians. The TAC Geometric Design Guide for Canadian Roads recommends that all collectors through a residential area have a sidewalk provided on both sides of the road. Lott Road East is a collector roadway and does not have a pathway or sidewalk for pedestrians. Due to the design of Lott Road East, providing a pathway on both sides of the road would not be feasible as there is not enough available space. Reviewing the characteristics of the road, the south side was chosen for a potential pathway placement as it is the side closest to Emerald Ridge School.

Three potential location options were examined along the south side of Lott Road East; the options include adjacent to the far edge of the right-of-way, the bottom of the drainage ditch, and adjacent to the roadway. The pathway placement adjacent to the far edge of the right-of-way is not practical as it would cut halfway through resident's driveways and would be impeded by light poles already in place. The second placement option at the bottom of the drainage ditch would result in several grade changes between the driveways and the pathway bottom. This grade change would make it undesirable for pedestrians and cyclists.

The final placement option, adjacent to the roadway, would require the 0.3 metre road width available and an additional 1.2 metres of asphalt. A painted white line would be required to designate the pedestrian area from the roadway. This placement option would require the least

amount of grade change between driveways. However, this placement option does not come without its drawbacks, such as buried utility lines, conflict with in-ground sprinkler systems, and the additional pavement will make the road wider, which can result in increased speeds. Typically, sidewalk construction is commonly completed as local improvements projects are cost-shared between the lands receiving the benefit and the municipality.

In summary, Lott Road East is a collector roadway, the majority of the traffic does not exceed the posted speed limit, and the traffic volumes have increased by 25% between 2014 and 2015. It is recommended that continual monitoring of traffic volumes occur on Lott Road East due to the potential for traffic volume fluctuations and changing travel patterns that could result from construction activity currently surrounding White City (i.e. Regina Bypass construction, Betteridge Road construction, and new subdivisions). To accommodate pedestrians along Lott Road East, and align with the TAC's collector roadway standards, it is recommended that an asphalt pathway is retrofitted adjacent to the south side of Lott Road East, with a white line designating a 1.5 metre pedestrian zone. Prior to proceeding with construction, the retrofitted pathway solution should be presented to the residents on both the north and south side of Lott Road East due to drawbacks that are present with this option. It is also recommended that 50% of the residents along Lott Road East are in favour of the pathway prior to proceeding. Note that in many jurisdictions, retrofit measures such as repaving, sidewalk construction, etc. are addressed through neighbourhood improvement programs which are an equal sharing of the improvement cost between the municipality and home owners.

6.0 ACTIVE MODES NETWORK REVIEW

6.1 Schools

The Town of White City has provided a comprehensive multi-use pathway system throughout the community. During MMM's field review of the pedestrian and cyclist connections, it was noted that the Town has done an excellent job of providing connectivity between the neighbourhoods, however it was noted that a deficiency was present in Bower West regarding pathways to the Emerald Ridge Elementary School. During the morning field review, there were several children on Emerald Ridge, Emerald Hill Drive, and Motherwell Drive heading towards the elementary school. Although multi-use pathways are provided along White City Drive and within the green space south of Emerald Ridge East, and children were utilizing these pathways, the aforementioned roads appeared to be the desire line for the children in Bower West to get to school.

It was noted that traffic surrounding the school can cause congestion as parents are trying to pick-up and drop-off their children. A loading and unloading facility may be considered on the south side of Emerald Ridge Elementary School to assist in the pick-up and drop-off of school

children. The facility would provide a safe loading area while continuing to provide an efficient movement of traffic around the school.

6.2 Off-street Pathways and Sidewalks

As White City continues to develop and add additional neighbourhoods, the proposed concept plans for the developments should provide a comprehensive multi-use pathway network for the neighbourhood and ensure the system ties into existing pathways system. The town centre should be constructed to accommodate pedestrians complete with an urban profile, bulb-outs, wide sidewalks and mid-block crossing. This profile will facilitate a pedestrian friendly environment that is healthy, liveable, and provides continuous connections with the surrounding neighbourhoods.

6.3 Transit

The growth of White City may facilitate the desire to incorporate a transit system within the town in the future. Planning for the potential transit system should begin with the development of the town centre as to identify potential future transit hub locations and transit operations within the town centre. Potential transit routes should be identified to ensure adequate road structure, road width and curb line are provided, while ensuring continuous routing. Additional routing within White City, with the option for future expansion to Emerald Park and Pilot Butte, will require an evaluation to select appropriate roadways, circulation routing and to provide options to accommodate transit that may require a curb-line stop.

7.0 ROAD NETWORK PLAN

The development of a road hierarchy within a community assists in providing the safe and efficient movement of traffic through a variety of functions such as balancing mobility, accessibility and continuity throughout the road network. Transportation Association of Canada (TAC) has developed a road hierarchy system based on the characteristics of an urban road. There are six main road classifications to describe a road: public lane, local, collector, arterial, expressway and freeway. The service function shifts from focusing on accessibility at the public and local lane level to focusing on mobility of vehicles at the arterial level. The roads located in White City can be classified as a local, collector or arterial roadway. Table 3 summarizes a few basic characteristics of each road hierarchy level. The full TAC Characteristics of Urban Roads is provided in **Appendix B**.

Table 3 – Road Hierarchy Table

	Local	Collectors	Arterials
Traffic Volume (veh/day)	<1,000	<8000	5,000 – 30,000
Primary Function	Land Access	Traffic Movement and Land Access	Traffic Movement
Desirable Connections	Local, Collectors	Local, Collectors, Arterials	Collectors, Arterials
Minimum Intersection Spacing (m)	60	60	200 - 400
Right-of-Way (m) (typically)	15 – 22	20 – 24	20 – 45

It is recommended that the TAC guidelines for geometric design and spacing for roadways, within the traditional hierarchy of roads, are utilized to assist in the future development of all roads within White City and the municipality. Applying the characteristics to the roads within White City, and taking into account the rural nature of the community, Figure 5 presents the draft recommended future roadway development and road hierarchy for the community.

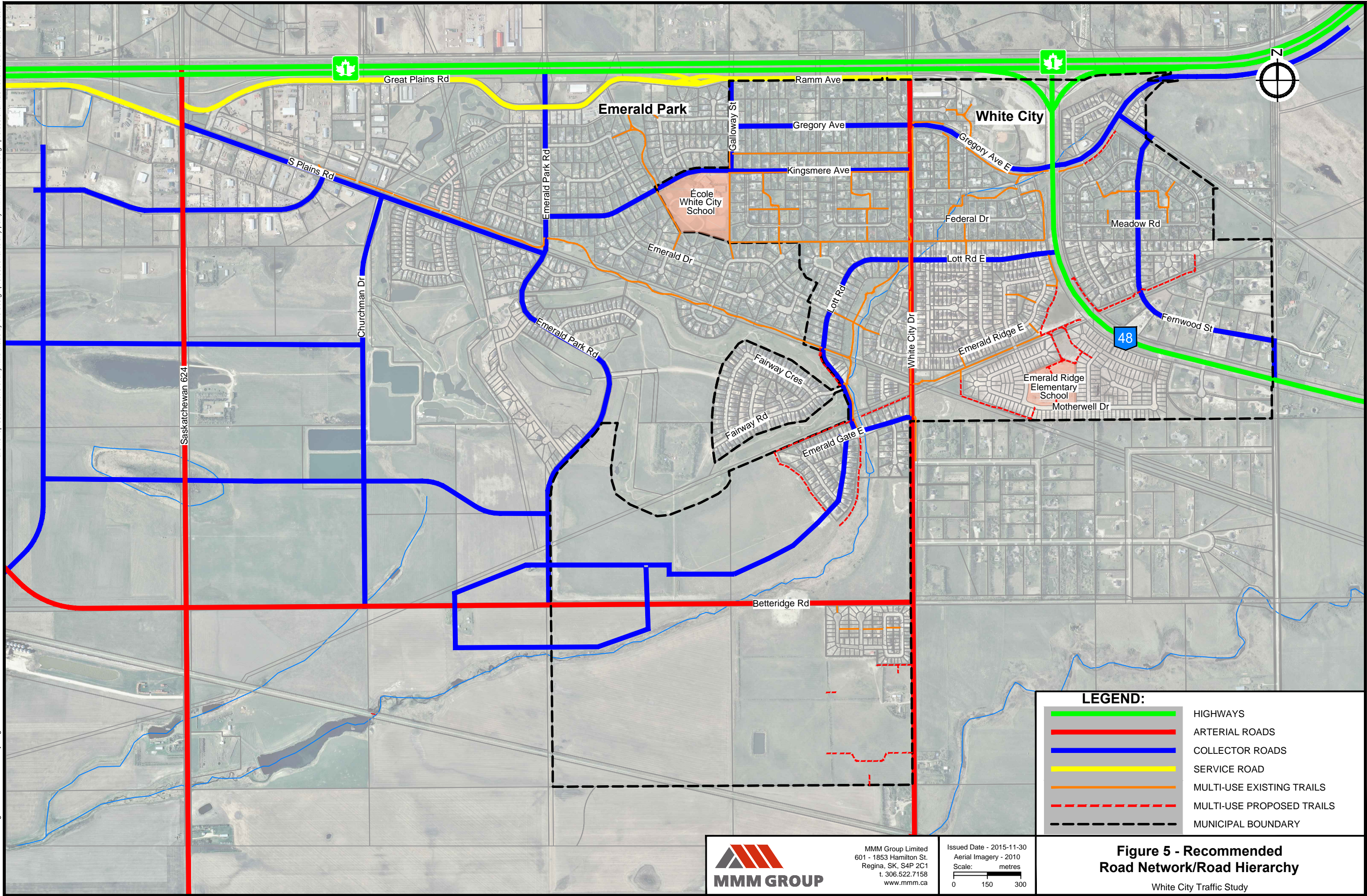
The recommended road network for the lands south of Highway 1 and north of the CNR rail line has been established based on the identified need for an alternate road to facilitate access to Highway 1 and accommodate future development. The alignment and exact location for roadways can be refined through specific development plans as land uses become more definitive, but the recommended network contains several vital components, including:

- ▶ Betteridge Road as a key east-west arterial roadway that should connect to the future interchange at the Pilot Butte Access (Highway 362)
- ▶ East-west connection of a collector road from Emerald Park Road to the west that will link existing and future development
- ▶ Appropriate spacing of key north-south and east-west roadways

It is recommended that a priority be placed on implementing a connection from Betteridge Road to the Pilot Butte Access as this roadway will be a fundamental component of future development south of Highway 1.

NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 5 - Road Hierarchy.dwg DATE: 2015-11-30 DRAWN BY: morrowke



LEGEND:	
	HIGHWAYS
	ARTERIAL ROADS
	COLLECTOR ROADS
	SERVICE ROAD
	MULTI-USE EXISTING TRAILS
	MULTI-USE PROPOSED TRAILS
	MUNICIPAL BOUNDARY


MMM GROUP
 MMM Group Limited
 601 - 1853 Hamilton St.
 Regina, SK, S4P 2C1
 t. 306.522.7158
 www.mmm.ca

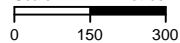
Issued Date - 2015-11-30
 Aerial Imagery - 2010
 Scale: metres


Figure 5 - Recommended Road Network/Road Hierarchy
 White City Traffic Study

8.0 GUIDELINES FOR CONTROLLING TRAFFIC

8.1 Application of Traffic Control Devices

The Manual of Uniform Traffic Control Devices for Canada is used to provide uniformity of traffic control devices throughout Canada to improve safety, provide convenience and promote the efficient movement of traffic. A traffic control device is defined as a sign, signal, pavement marking or other device, placed upon, over, or adjacent to a road, by a public authority or official having jurisdiction; the device is intended to regulate, warn or guide the road user. All traffic control devices must meet five basic requirements to be effective. The five basic needs are:

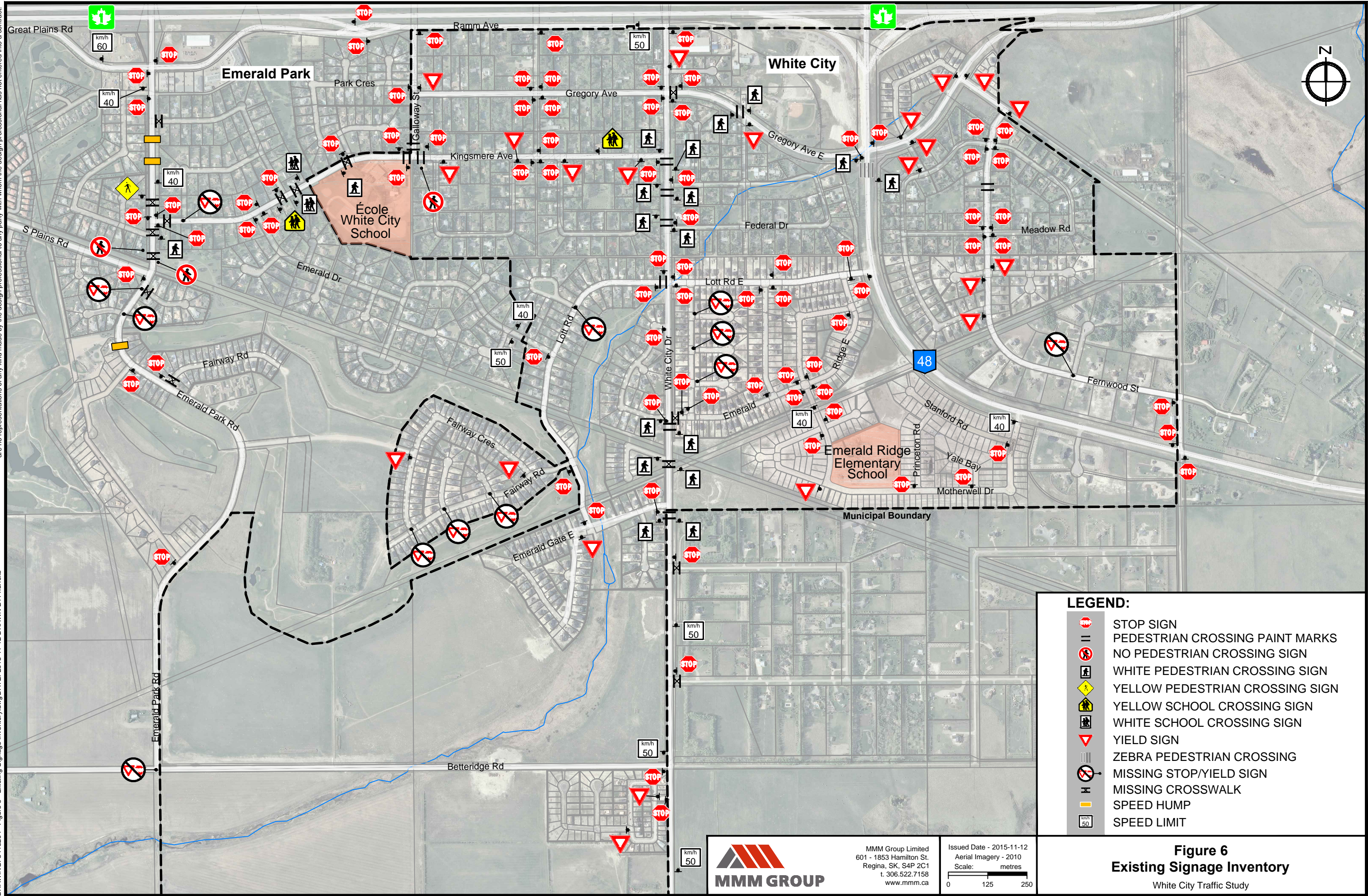
1. fulfil a need;
2. command attention;
3. convey a clear and simple meaning;
4. provide adequate timing for a proper response; and
5. command respect of the road users.

A traffic control device inventory was completed in White City on major roadways to identify the existing conditions and assist in providing guidelines for consistency in the existing network and guide future development. Figure 6 illustrates the traffic control device inventory along major corridors within White City.

The following sections outline the guidelines for yield signs, stop signs and pedestrian crossings, and identifies some deficiencies noted during the field review. The deficiency list is not exhaustive and is provided as examples noted within the community.

NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

DRAWING: 6415204 - Figure 6 - Existing Signage Inventory.dwg DATE: 2015-11-12 DRAWN BY: hurrellb



LEGEND:

- STOP SIGN
- PEDESTRIAN CROSSING PAINT MARKS
- NO PEDESTRIAN CROSSING SIGN
- WHITE PEDESTRIAN CROSSING SIGN
- YELLOW PEDESTRIAN CROSSING SIGN
- YELLOW SCHOOL CROSSING SIGN
- WHITE SCHOOL CROSSING SIGN
- YIELD SIGN
- ZEBRA PEDESTRIAN CROSSING
- MISSING STOP/YIELD SIGN
- MISSING CROSSWALK
- SPEED HUMP
- SPEED LIMIT

MMM Group Limited
601 - 1853 Hamilton St.
Regina, SK, S4P 2C1
t. 306.522.7158
www.mmm.ca

Issued Date - 2015-11-12
Aerial Imagery - 2010
Scale: metres
0 125 250

Figure 6
Existing Signage Inventory
White City Traffic Study

8.1.1 Yield Signs

Yield signs should be considered when the basic right-of-way rules do not provide for safe and efficient movement of traffic, and a stop sign is considered to be too restrictive. Generally, traffic volumes, traffic speed, intersection site lines, and collision history are considered to determine if a yield sign should assign the right-of-way. In White City, a yield sign may be warranted on a minor road approach to an intersection, where the safe vehicle speed on the approach is greater than 15 km/h.



A yield sign should be installed at or near the place the vehicle is required to stop, preferable 5.0 metres from the edge of the intersecting road but not greater than 15.0 metres.

The following inconsistencies in regards to yield signs were noted during the site review:

- ▶ Fernwood Street and Fernwood Place – no signage is provided for the minor road Fernwood Place
- ▶ Fairway Road and Fairway Place – no signage is provided for the minor road Fairway Place
- ▶ Fairway Road and Fairway Bay – no signage is provided for the minor road Fairway Bay
- ▶ Lott Road and Jade Place - no signage is provided for the minor road Jade Place
- ▶ Motherwell Drive and College Crescent – Yield sign provided at south intersection and stop sign provided at north intersection.
- ▶ White City Drive and Rosewood Bay – All other intersections on White City Drive are stopped controlled, while Rosewood Bay has a yield sign.
- ▶ Galloway Street and Park Crescent & Gregory Avenue – intersections are approximately 30 meters apart. The intersection with Park Crescent features a stop sign and the intersection with Gregory Avenue features a yield sign. Consistency should be provided along Galloway Street.

8.1.2 Stop Signs

Stop signs are intended to control the right-of-way conflicts occurring at an intersection and are not intended as a speed control device. Generally, traffic volumes, traffic speed, intersection site lines, and collision history are considered to determine if a stop sign should assign the right-of-way at an intersection. Stop signs may be warranted at the following locations:



- ▶ on a minor road entering a through road;
- ▶ on the road carrying the lesser volume of traffic at an intersection where all roads are of the same functional classification;
- ▶ at an unsignalized intersection in a signalized area except where they would interfere with traffic signal progression;
- ▶ at an intersection where the application of the normal right-hand rule would be unduly hazardous;
- ▶ at an intersection where the safe vehicle speed on the approach is less than 15km/h;
- ▶ as an interim measure at a railway crossing which is schedule for automatic protection or as required by the railway authority;
- ▶ within an intersection of divided highway where a stop sign is present at the entrance to the first roadway, and further control is necessary in the median at the entrance to the second roadway. This additional stop sign would be necessary where the median width between the two roadways exceeds 30 m; and
- ▶ where three or more reportable right-angle collisions per year have occurred and methods of reducing the collision experience, such as improving site lines, street lighting, parking prohibitions, enforcement, geometric modifications or a yield sign have been tried unsuccessfully.

Additionally, stop signs can be placed on all legs of the intersection creating an All Way Stop. All Way Stops may be warranted under one or more of the following conditions:

- ▶ where the traffic volumes on the intersection 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 traffic signals are not warranted, and a collision problem exists, as indicated by five or more reported collisions per year of a type which may be prevented by an All Way Stop sign installation. Such collisions include right and left-turn collisions, as well as right angle collisions;
- ▶ as an interim measure prior to installation of traffic signals; or
- ▶ As an interim measure, for a period of approximately one month prior to switching the stop control from one road to an intersection road, and the subsequent removal of existing stop signs on the first road.

A stop sign should be installed at or near the place the vehicle is required to stop, preferable 5.0 metres from the edge of the intersecting road but not greater than 15.0 metres. If the stop sign is used at a “T” intersection, the stem of the T should normally be stopped.

The following inconsistencies in regards to stop signs were noted during the site review:

- ▶ White City Drive and Rosewood Bay – All other intersections on White City Drive are stopped controlled
- ▶ Lott Road East and Emerald Hill Drive – Stop Signs were installed to control traffic speed

8.1.3 Pedestrian Crossings

Pedestrian crossings are used to designate a location for pedestrians to safely cross the road. Pedestrian crossings can be located at both intersections and mid-block depending on the surrounding facilities, such as pathways. Pedestrian crosswalks are created through a combination of regulatory signage, pavement markings, warning signs and sometimes traffic control signals based on the individual situation. There are four pedestrian crosswalk categories that can be implemented; the categories are:

- ▶ crosswalks which use ground-mounted signs:
 - pedestrian crosswalk; and
 - school crosswalk
- ▶ special crosswalk;
- ▶ pedestrian signals; and
- ▶ full traffic control signals

The Transportation Association of Canada (TAC) Pedestrian Crossing Control Guide 2012 provides a procedure to determine if a crosswalk is warranted and identifies warrants for each type of crosswalk which are based on a variety of factors such as the posted speed limit, number of lanes, traffic volumes etc. The standards for crosswalks that use ground-mounted signs are described below. It was assumed that White City wanted to replace their crosswalks with the

same crosswalk category with updated standards. If there is a desire to consider alternative crosswalk controls, pedestrian and traffic volume data should be collected in the fall when school is back in session.

8.1.3.1 Pedestrian Crossing Signs

The pedestrian crosswalk sign is used to identify the location of a crosswalk and thus the signage must be accompanied by the appropriate pavement markings. A pedestrian crossing sign is not required at intersections with traffic signals or on the intersection leg with a stop sign. The pedestrian crossing signs should be mounted back to back on either side of a two-way road, and so the “pedestrian” depicted on the sign face towards the centre of the road.



The school crosswalk sign is used to identify the location of a school crosswalk. These crosswalks typically lead directly to the school. The school pedestrian crossing signs should be mounted back to back on either side of a two-way road, and so that the “people” depicted on the sign face towards the centre of the road. The pavement markings for a school crosswalk should utilize a zebra crosswalk pattern described in the next section.

A school area sign or a school crosswalk ahead sign can be used in advanced of a school ground to alert motorists of children in the area. Where there is limited visibility of the crosswalk area, the school crosswalk ahead sign must be installed 50 m to 150 m in advance of the pedestrian crosswalk.



Figure 7 presents *TAC’s Pedestrian Crossing Control Guide* recommended layout of a school area crosswalk with side-mounted signs.

The following inconsistencies in regards to crosswalk signage were noted during the site review:

- ▶ Kingsmere Avenue near Hummingbird Bay – the school area sign is 750 metres from school
- ▶ Fernwood Street and Woodland Park – Midblock crossing no signage or paint lines

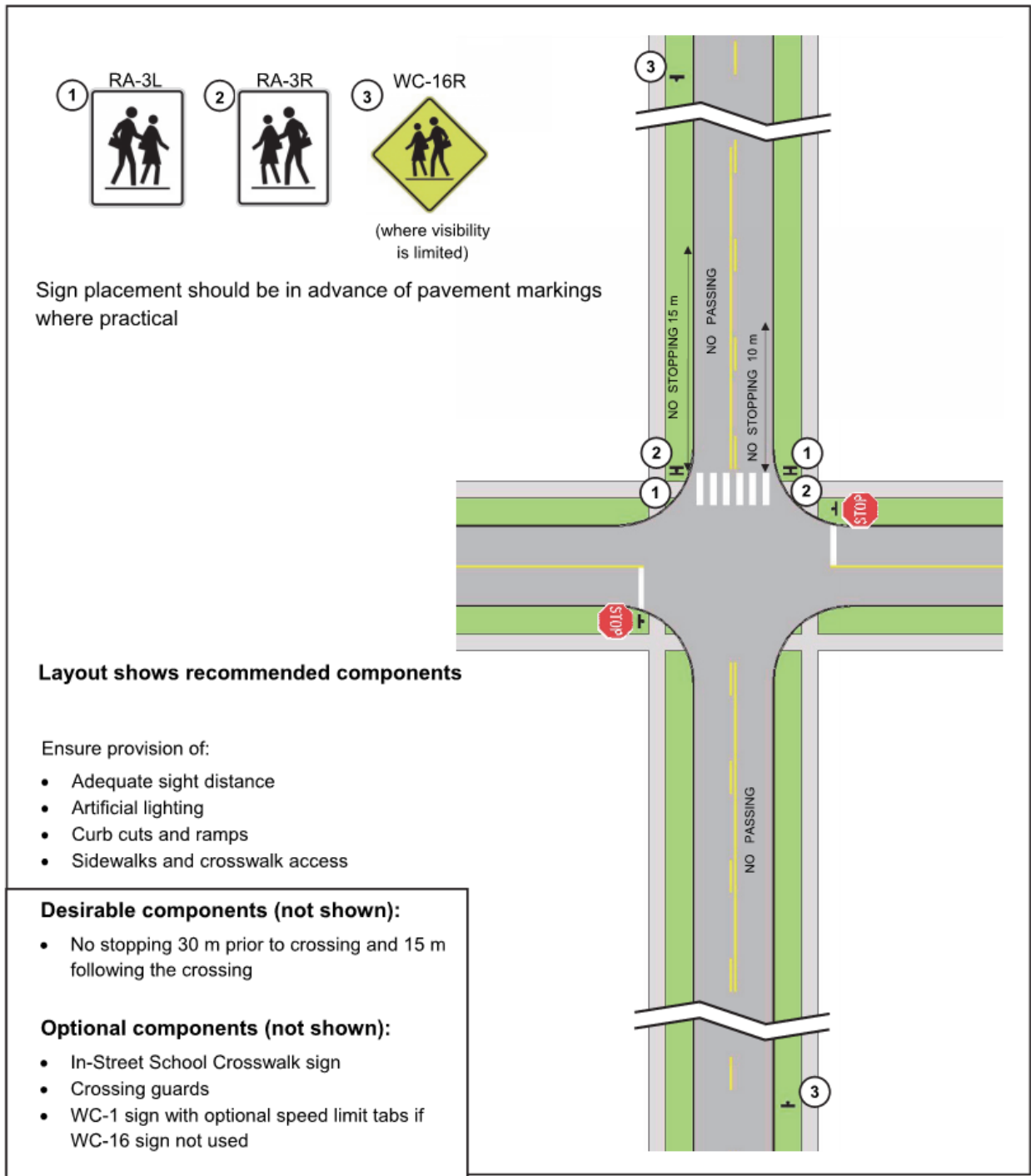


Figure 11: GM1 SCHOOL AREAS - Crosswalk with side-mounted signs 2-lane, 2-way.

Figure 7 – TAC’s School Area

8.1.3.2 Pedestrian Pavement Markings

Crosswalk pavement markings assist in identifying the location of the crosswalk, however, pedestrian pavement markings cannot be provided without the inclusion of the appropriate regulatory signage.

There are two types of pedestrian crossing pavement markings, the traditional twin parallel line crosswalk and the zebra crosswalk. The twin parallel line crosswalk has two white parallel lines that extend from one side of the street to the other, and has a minimum width of 2.5 metres. This crosswalk is utilized in most locations. The zebra crosswalk features wide, white lines aligned parallel to the travel lanes. Zebra crosswalks shall be used at all school crosswalk locations, and may be desirable at locations with large number of older pedestrians or high activity of pedestrians with mobility or visual impairments. The use of retro-reflective and highly skid resistant material for stripes is recommended.

Figure 8 illustrates the length and width dimensions of the crosswalk paint lines as outlined in the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada (TAC manual).

The following inconsistencies in regards to crosswalk pavement markings were noted during the site review:

- ▶ Kingsmere Avenue and Galloway Street – Yellow pedestrian crossings instead of white zebra crossings
- ▶ Kingsmere Avenue and Park Gate – pavement markings missing on Kingsmere Avenue
- ▶ White City Drive and Gregory Avenue East – no pavement markings on east leg of intersection to connect the pathway system
- ▶ White City Drive and Park Meadows Drive – no crosswalk provided on Park Meadows Drive to connect pathway system
- ▶ White City Drive and Zatylny Crescent- no crosswalk provided on Zatylny Crescent to connect pathway system
- ▶ White City Drive and Christopher Place – no crosswalk on White City Drive or Christopher Place to connect pathway system
- ▶ Fernwood Street and Woodland Park – Midblock crossing no signage or paint lines

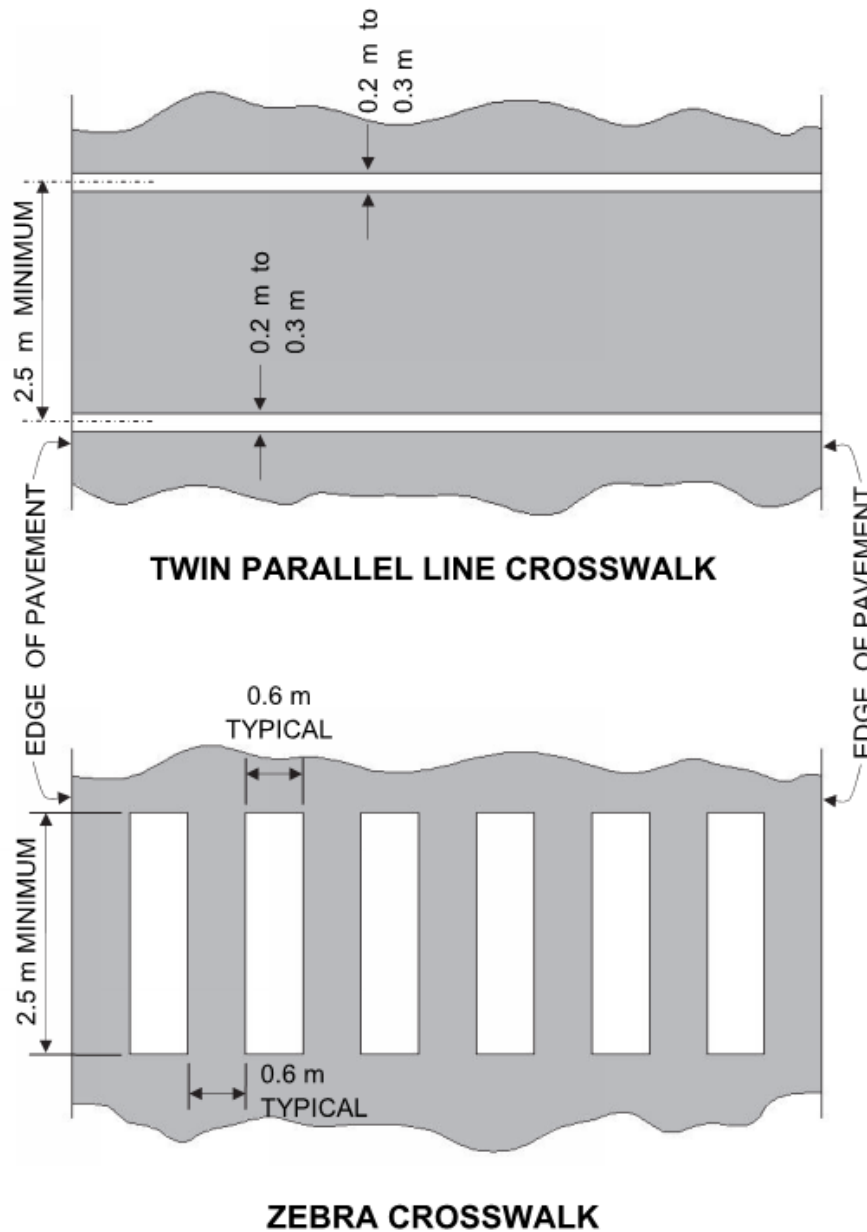


Figure 8 – TAC’s Transverse Crosswalk Markings

Figure 9 presents an example school zone on Taylor Street East in Saskatoon. This school zone features the zebra crosswalk, pedestrian crossing and school area ahead sign. The school area sign is placed in advance of the zebra crosswalk with the school zone speed limit. Note that Saskatoon has chosen a school speed limit of 30 km/h and uses the pedestrian crossing sign in their school zones versus the school crosswalk. The TAC manual indicates the standard is a school crosswalk sign.



Figure 9 - School Crosswalk in Saskatoon, Saskatchewan

8.2 Controlling Traffic Speed

A posted speed limit is of no value unless the driver observes it. For the speed limit to be observed it must be realistic and close to the comfortable speed based on the driver expectancy (i.e. if the road feels like a highway people will drive accordingly). The posted speed limit should be no greater than the 85th percentile and no lower than the 15th percentile. The 15th percentile is used to establish the minimum speed limit as vehicles traveling below this limit tend to obstruct traffic flow. Caution should be used when adjusting the speed limit as it will affect the speed differential. The speed differential is the difference between the 85th percentile and the 15th percentile speeds. An increased speed differential leads to an increased probability of traffic conflict and subsequent accident potential due to the difficulty for driver entering the traffic flow to safely gauge gaps in traffic. The speed differential is also important from a pedestrian perspective, as the issue of crossing roadways safely can often be more about gaging the speed differential in cross traffic than the traffic speed itself. It is important to note that a normal speed differential is 18 km/h.

Reducing the posted speed limit in White City may not have the desired results without the proper measures in place. Reviewing the 85th percentile speeds throughout the town, the majority of drivers abide by the posted 50 km/h limit. Reducing the speed limit to 40 km/h may cause some drivers to adhere to the new speed limit and others will continue to drive as the road suits thus resulting in an increased speed differential.

The review did indicate that the posted speed limit was exceeded by 10 km/h or greater on Ramm Avenue, Gregory Avenue (west of the intersection with Highway 48), and on White City Drive (south of Kingsmere Avenue) based on the 85th percentile speed. At these locations it is

recommended that White City continue to monitor the speed along these corridors and increase enforcement of the posted speed limit.

It is recognized that traffic calming measures could be implemented along these corridors, but as a result, traffic volumes on the surrounding road network may increase. As such, if additional measures are required, White City should review the potential impacts to the surrounding road network, prior to any implementation.

8.3 Development of a Town Centre

The White City Town Centre Neighbourhood Plan (Neighbourhood Plan) is an initiative that will provide a sense of place and serve to concentrate commercial development. The Town Centre's guiding principles envision a healthy, liveable, and pedestrian and cyclist friendly neighbourhood with continuous street and trail network; that features a diverse range of businesses; and continues to promote safe and sustainable development.

Betteridge Road will be a key component in the Neighbourhood Plan as it will be the prime location for the downtown commercial mixed land uses but also become a key east-west arterial roadway for the town. Betteridge Road will be unique in its construction as it will require a transition of a rural cross-section to an urban cross-section within the town centre development boundaries. It is not uncommon for this transition to occur at an intersection at the edge of the development. Upon reviewing the Town Centre Neighbourhood Concept Plan, it was identified that these transition points would be ideal in the areas identified for public space, park and reserve and recreation.

The Neighbourhood Plan indicates a preference for a 2-lane roadway with angled parking and wide sidewalks along Betteridge Road, provided within a 42.0 metre right-of-way. A review of the TAC's Characteristics of Urban Roads and City of Regina's Roadway Design Guidelines indicates an acceptable right-of-way range to accommodate the anticipated traffic volumes and preferred roadway layout is between a 30 m and 45 m right-of-way. The right-of-way outlined in the Neighbourhood Plan should be sufficient to accommodate the Town's desires for Betteridge Road and the final right-of-way would be determined during detailed design.

Upon comparing White City to other communities undergoing a downtown revitalization, it is anticipated a minimum intersection spacing of 100 metres would assist in creating the town centre atmosphere while facilitating the movement of traffic. Appropriate and consistent traffic control will be required to ensure acceptable traffic operations and draw motorists to Betteridge Road as the main east-west roadway. As the development moves forward, traffic signals may be required at which time the signal timing should be established to allow for proper progression along the road.

A compact and walkable neighbourhood using an efficient multimodal transportation network is the vision for the Neighbourhood Plan. The pedestrians and cyclist network will continue to link

new pathways into the existing network, provide wide sidewalks within the town centre, and pedestrian friendly facilities such as bulb-outs, mid-block crossing and clearly designated sidewalks.

The Neighbourhood Plan also indicates a preference for angled parking along Betteridge Road. The advantages and disadvantages of angled parking are listed below for the Town to consider:

Advantages

- ▶ Provides more parking spaces;
- ▶ Less time required for the parking manoeuver; and
- ▶ Occupants must exit the vehicle outside the travelled way.

Disadvantages

- ▶ Restricted site lines while backing out of the parking space;
- ▶ Empty spaces are harder to detect resulting in stop and go movements, and
- ▶ Through traffic speed decreases in anticipation of conflict movements.

Parallel parking is generally preferred for safety and operational considerations, however disadvantages include occupants exiting into the travelled way, parking manoeuvres may take more time to complete, and the potential to interrupt the through movement depending on width of cross section.

If the desire is to implement angle parking for the White City town centre, Figure 10 illustrates how a main street with an urban cross-section can incorporate angle parking in the design.



Figure 10 – Downtown Urban Cross-section with Angle Parking

To kick-start the town centre neighbourhood plan and place the importance of Betteridge Road as a key east-west connector, the municipality should move and locate their town hall to the future town centre and push to have Betteridge Road connect to the Pilot Butte Access.

9.0 RECOMMENDATIONS

The following staging plan provides an implementation of solutions that is prioritized and considers the phasing of the road network. The staging plan is also flexible to allow the council discretion based upon development, yearly budgets and priority.

Reoccurring Action Items

- ▶ Collect traffic data for the following roadways on a yearly basis to monitor traffic growth and traffic patterns within White City:
 - White City Drive
 - Gregory Avenue
 - Lott Road East
 - Ramm Avenue
 - Betteridge Road
- ▶ Collect traffic data on remaining roads every five years to maintain a current database that the Town can draw upon for future development.
- ▶ Collect traffic data on the new roadways and determine the data collection schedule as new roads are developed and new neighbourhood are constructed.
- ▶ Require all future neighbourhood subdivisions to complete a Traffic Impact Assessment to ensure the proposed road layout aligns with the overall goals outlined within this Traffic Study, that appropriate traffic control and pedestrian connect is provided and ensures the safe and efficient movement of traffic.

Short-term (1-5 years)

- ▶ Adopt recommended Road Network Hierarchy.
- ▶ Perform a comprehensive review of all crosswalk locations throughout the community and update, where necessary, the crosswalk signage and crosswalk pavement markings to ensure consistency throughout the community and compliance with the TAC Pedestrian Crossing Control Guide.

- ▶ Perform a comprehensive review of all traffic control signage throughout the community to ensure a consistent application of stop signs and yield signs. TAC signage guidelines should be followed when determining the type of control and placement.
- ▶ Collaborate with the residents of Lott Road East to determine the acceptance of a retrofitted pathway solution on the south side of Lott Road as a local improvement project.
- ▶ Liaise with the Ministry of Highways and Infrastructure so that Betteridge Road will extend west and connect to the Pilot Butte Access. This will assist in providing a key east-west roadway within the community.
- ▶ Design and construct Betteridge Road to facilitate the first subdivision application for the main blocks on the south half of the town centre.
- ▶ Construct a pathway on Motherwell Drive between the existing east-west multi-use pathway (south of Emerald Ridge East) to Emerald Ridge Elementary School
- ▶ Require all arterial and collector roadways to have an external sidewalk, a multi-use pathway adjacent to the street or a sidewalk. The timing of implementation will be determined by the rate of development within White City and will require the continual monitoring of traffic volumes.

Medium-term (5-10)

- ▶ Kick-start the Town Centre development by relocating the Town Hall to Betteridge Road.
- ▶ Require future development (neighbourhood, commercial, industrial etc.) to complete a Traffic Impact Assessment to ensure the proposed road layout aligns with the overall goals outlined within this Traffic Study and ensures the safe and efficient movement of traffic. The City of Regina and the City of Saskatoon have established guidelines regarding the minimum traffic volumes required to require a Traffic Impact Assessment or Traffic Impact Study.

Long-term (10+)

- ▶ Conduct assessment / study of extending Betteridge Road to Highway 48 to provide additional east – west connectivity.
- ▶ Construct recommended solution for the extension of Betteridge Road to Highway 48 .