MMM Group Limited

Highway No. 1 Southeast Regina Bypass Location Review Study

Final Report

Prepared for: Saskatchewan Ministry of Highways and Infrastructure

COMMUNITIES

TRANSPORTATION

BUILDINGS

INFRASTRUCTURE

MMM GROUP

September 2012 | 5412010-000

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September 24, 2012

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800 – 1855 Victoria Avenue
Regina, SK S4P 3T2

Dear Harold,

Re: Highway No. 1 Southeast Regina Bypass Location Review – Final Report

MMM Group Limited (MMM) is pleased to submit seven (7) hard copies and one (1) electronic copy of the final report for the *Highway No. 1 Southeast Regina Bypass Location Review*.

If you have any questions regarding this submission, please do not hesitate to contact the undersigned at (306) 522-7158.

Sincerely,

MMM Group Limited

Bruce Belmore, P. Eng., PTOE
Regional Manager, Transportation

BB/cb

STANDARD LIMITATIONS

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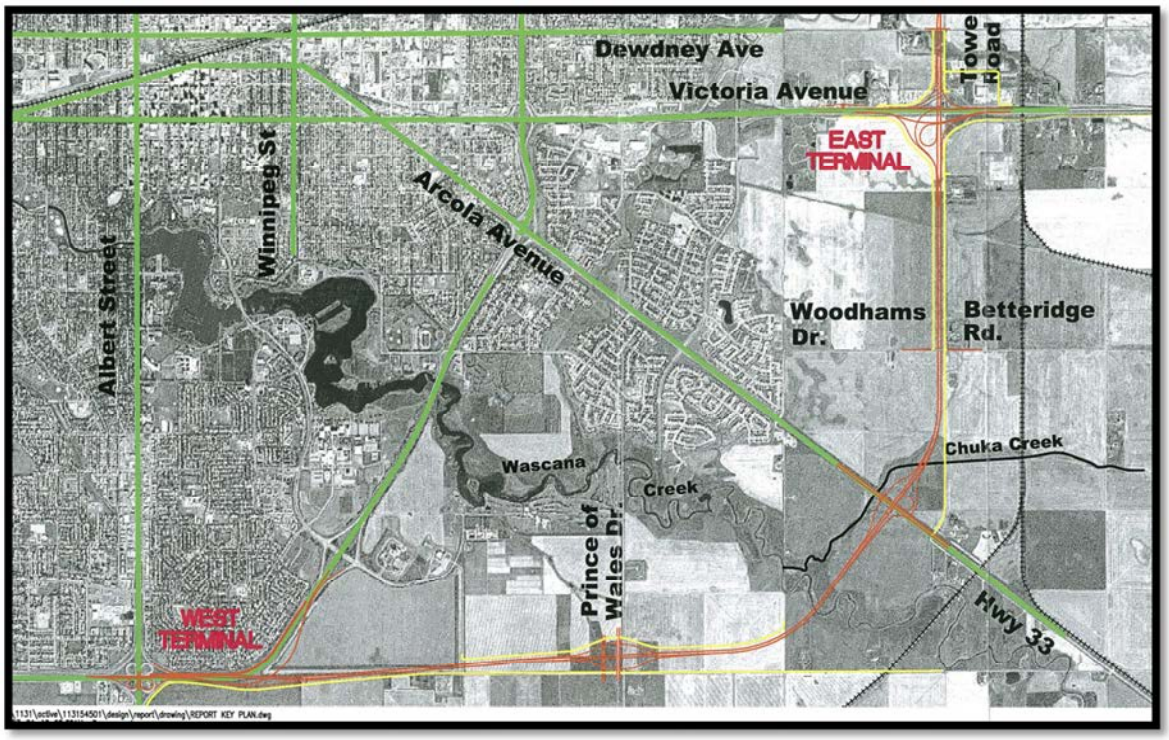
EXECUTIVE SUMMARY

MMM Group Limited was commissioned early in 2012 by the Saskatchewan Ministry of Highways and Infrastructure (MHI) to complete the *Highway No. 1 Southeast Regina Bypass Location Review*. The Highway No. 1 Southeast Regina Bypass (Southeast Bypass) is a proposed highway segment that will re-align Highway No. 1 around the city of Regina. The current alignment of the Southeast Bypass, shown in the figure below, was approved by MHI in 2004.



The purpose of this review is twofold, namely:

1. Determine if the approved alignment still meets the originally intended purpose; or,
2. Determine if the requirements for the Southeast Bypass have materially changed from the time it was originally approved.

This review involved an assessment of the initial requirements for the bypass, and an examination of the conditions under which the approved alignment was selected. The background information was obtained from existing reports and plans.

The review also included an investigation into the recent changes to regional population, traffic patterns, and development plans. Additional work was conducted to assess the location and design of the east and west interchange terminals.

A performance evaluation of the approved Southeast Bypass alignment was undertaken with these changes in mind. Alternate options for the Southeast Bypass terminals were included in the evaluation for comparative purposes.

The performance criteria used in the evaluation were established to help determine if the approved Southeast Bypass alignment can still meet the needs of the regional road network, given the changes that have occurred since the alignment was developed, and the geometric design issues that were identified.

The investigation results, combined with input from key stakeholders, helped to develop the following recommendations:

1. It is recommended THAT:

- The west half of the Southeast Regina Bypass alignment (from Highway No. 33 to the curve in Ring Road) extend further to the south around Regina; and,
- The west terminal of the Southeast Regina Bypass be moved 7.5 km west, providing a direct connection to the West Regina Bypass.

Required actions:

- A route location study be undertaken to finalize the recommended alignment
- Conduct public consultation for the new route

2. It is recommended THAT:

- Tower Road remain as the east terminal of the Southeast Regina Bypass. No material changes were identified through the review to suggest altering the location.

Required actions:

- Conduct a high level assessment of the Northeast Regina Bypass alignment in relation to a Tower Road connection
- Undertake a review of the interchange design at Tower Road, including a Value Engineering analysis. Consider methods to incorporate City traffic at the east terminal interchange
- Take efforts to preserve the work completed on the Highway No. 1 East Functional Planning Study, including the location of other interchanges. The study was endorsed by study partners and approved by the Ministry

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1.0 INTRODUCTION

MMM Group Limited was commissioned early in 2012 by the Saskatchewan Ministry of Highways and Infrastructure (MHI) to complete the *Highway No. 1 Southeast Regina Bypass Location Review*. The Highway No. 1 Southeast Regina Bypass (Southeast Bypass) is a proposed highway segment that will re-align Highway No. 1 around the city of Regina.

Travel on Highway No. 1 through Saskatchewan includes a section that requires traffic to enter Regina's city limits, and travel on a signalized section of Victoria Avenue East and a free-flow section on Ring Road. The total length is approximately 13 kilometers of roadway within the city limits, which results in the mixing of city and highway traffic. The identified purpose of the Southeast Bypass is to provide uninterrupted flow for traffic on the National Highway System (NHS) while simultaneously reducing traffic congestion on city streets.

The recommended alignment for the Southeast Bypass was approved in November, 2004. Since that time, there has been a surge in population, growth of the bedroom communities to the east of the city, and the development of the Global Transportation Hub to the west. Prior to final design and construction of the Southeast Bypass, it was deemed necessary to confirm the validity of the approved route.

The purpose of this review is twofold, namely:

1. Determine if the approved alignment still meets the originally intended purpose; or,
2. Determine if the requirements for the SE Bypass have materially changed from the time it was originally approved.

This review involves an assessment of the initial requirements for the bypass, and an examination of the conditions under which the approved alignment was selected. The background information was obtained from existing reports and plans, including a key study entitled the *Regina Regional Highway Planning Study* (Reid Crowther, 1996). A fairly comprehensive effort was undertaken to document the history of decisions made surrounding the Southeast Bypass. The inputs and assumptions used to determine the approved bypass alignment were then documented.

The review also determines what, if anything, has changed since the alignment was approved in 2004. This involved an investigation into the recent changes to regional population, traffic patterns, and development plans. Additional work was conducted to assess the location and design of the east and west interchange terminals.

The investigation results, combined with input from key stakeholders, helped to shape an opinion on whether or not the requirements for the Southeast Bypass have changed, and whether or not the existing alignment can still meet the intended need for travel.

It should be noted that traffic forecasting and a detailed evaluation of the alignment was not possible within the scope of this study and the short timeframe for examination. However, fundamental design, operation, and access management principles were applied to determine if there were any issues with the design based on current conditions.

Considering the extensive cost of a four-lane divided bypass facility such as this and the broad implications on regional, provincial and inter-provincial travel, it was always contemplated that such a review would be conducted as the date of construction got closer. If it was determined that the alignment should change at all, options for connections to Highway No. 1 would be identified but a detailed evaluation of alternatives was not to be part of the scope of work.

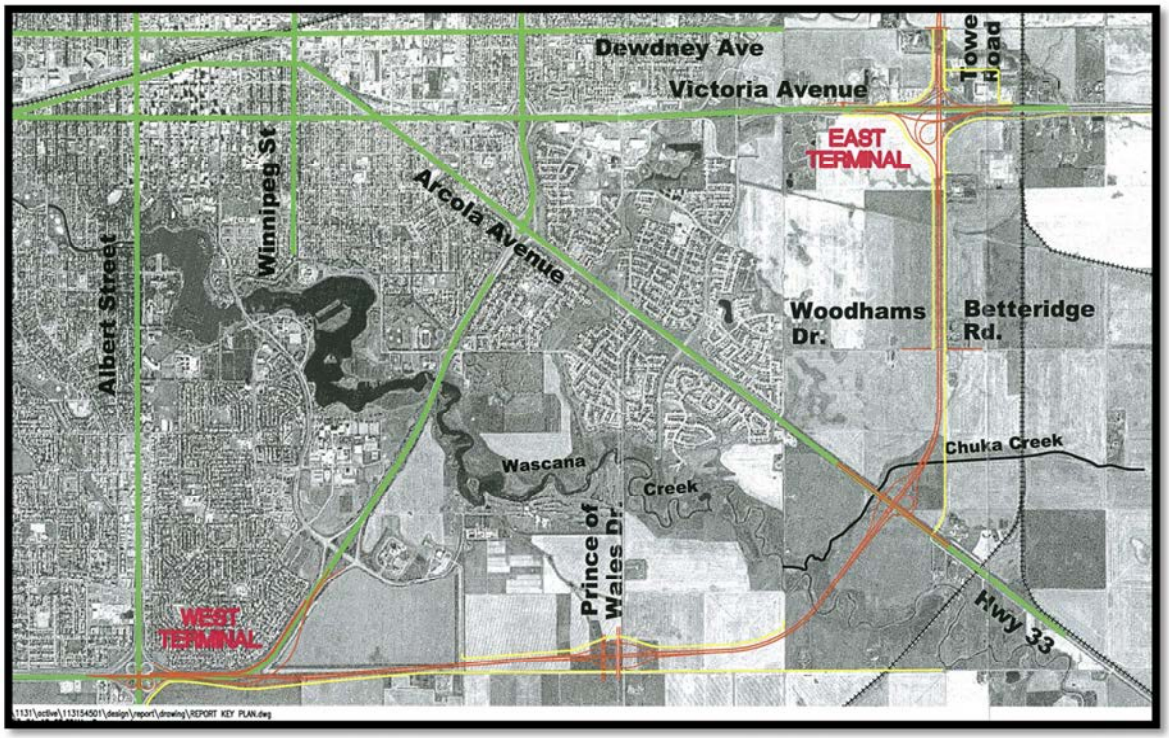
2.0 BACKGROUND

2.1 Approved Alignment

A functional study for the Southeast Bypass was completed in 2004, and MHI approval of the route was finalized on November 22, 2004. The approved location follows the Tower Road alignment from the TransCanada Highway southwest across Highway No. 33 and Wascana Creek and westward to join the existing TransCanada Highway (Ring Road) on the east side of Highway No. 6. The functional study examined two potential corridor options: an inner route (east terminal at Tower Road), and an outer route (east terminal at Gravel Pit Road). The route assessment included stakeholder consultation and a public open house.

In 2007, a detailed location study was completed that defined the land requirements for the new roadway and associated interchanges and service roads. Figure 1 identifies the approved Southeast Bypass alignment as it appears in the *Highway No. 1 Southeast Regina Bypass Detailed Functional Study* (Stantec, 2007).

Figure 1 – Approved Southeast Bypass Alignment



The ultimate configuration of the bypass is a four lane divided controlled access roadway with grade separated interchanges. The plan includes new service roads and alterations to existing service roads in order to maintain access to lands adjacent to the bypass and to ensure that over-dimension routes are available.

The following is a list of the required and proposed access locations along the approved Southeast Bypass route:

East Terminal – The east terminal of the bypass is located at the Highway No. 1 & Tower Road intersection. This terminal consists of a systems interchange that provides for high-speed movement of highway traffic, while also providing access to the city. This is a large, three-level interchange that requires a significant amount of land area.

Betteridge Road/Woodhams Drive – The approved Southeast Bypass alignment includes an option to provide limited access at Betteridge Road/Woodhams Drive in order to improve connectivity between the city and the land immediately east of Tower Road. Based on city development plans, it is not likely that this connection will be implemented.

Highway No. 33 – A service interchange is required at this location to provide access to/from Highway No. 33 (Arcola Avenue). Arcola Avenue is a key city arterial roadway. The proposed interchange configuration is a modified diamond with a loop in the northeast quadrant to serve the northbound to westbound movement.

Prince of Wales Extension – A service interchange will be required to provide access to/from the future Prince of Wales roadway extension. The exact location of the extension and configuration of the interchange are unknown at this time.

West Terminal – The west terminal of the bypass is located immediately east of the existing clover leaf interchange at Highway No. 6 (Albert Street). This terminal consists of a number of merge/diverge points and a bridge structure that provides a grade separated junction between the southeast bypass and the existing Ring Road facility. The Southeast Bypass will form a continuation of Highway No. 1 around Regina, while the Ring Road will function as a major city arterial.

2.2 Timeline of Key Reports and Decisions

- **1996** – The *Regina Regional Highway Planning Study* recommends Gravel Pit Road as the east terminal and Ring Road east of Highway No. 6 as the west terminal for a bypass around the southeast sector of Regina
- **2001** – The *Regina Road Network Plan Review*, completed for the City of Regina, suggests that Tower Road should be considered as the east terminal for the Southeast Bypass.
- **2001/2002** – MHI begins to consider Tower Road as a potential east terminal for the Southeast Bypass and undertakes several studies related to the operation of that intersection as the east terminal.
- **2004** – The *Southeast Regina Bypass Functional Study* evaluates the benefits and costs associated with placing the east terminal at either Tower Road or Gravel Pit Road. The study recommends the east terminal be located at Tower Road, and the west terminal be located on Ring Road immediately east of Highway No. 6. MHI approves the route in November, 2004.

- **2007** – A detailed Southeast Bypass location plan is developed based on the results of the 2004 functional route location study.
- **2010** – *The Highway No. 1 East Functional Planning Study* is completed based on the assumption that Tower Road will be the east terminal of the Southeast Bypass. This study selected locations for interchanges on Highway No. 1 East between Tower Road and Highway No. 10. The report was approved by MHI.
- **2011** – MHI commissions a review of the Highway No. 1 & West Regina Bypass interchange to determine the feasibility of tying the west terminal of the Southeast Bypass into this facility. The *West Regina Bypass Interchange Report* includes a functional design of a staged systems interchange that incorporates the Southeast Bypass into the West Regina Bypass.

2.3 Review of Existing Plans and Reports

Table 1 provides a list of the key reports that were reviewed in order to determine how the approved Southeast Bypass alignment was selected, and to help document what, if anything, has changed since that decision was made. A brief summary of each report is included below.

Table 1 – Background Reports

Report	Author	Submitted
Origin Destination Survey Preliminary Results	Swanson	1993
Regina Regional Highway Planning Study	Reid Crowther	1996
Regina Road Network Plan Review	Trialpha	2001
Highway No. 1 and Tower Road Traffic Operations Review	Trialpha	2001
West Terminal Traffic Operation Study	Trialpha	2002
Highway No. 1 / Tower Road Interchange Study	Stantec	2002
Southeast Regina Bypass Functional Study	Stantec	2004
Southeast Regina Bypass Detailed Functional Study	Stantec	2007
Highway No. 1 East Functional Planning Study	AECOM	2010
West Regina Bypass Interchange Report	AECOM	2011

There are a number of other reports (e.g. City of Regina Southeast Sector Study) and analysis tools (e.g. City of Regina's EMME/3 traffic model) that were also reviewed as part of the analysis but their direct relevance were of limited assistance in establishing a recommendation and have not been summarized herein.

2.3.1 Origin Destination Survey Preliminary Results (Swanson, 1993)

An Origin-Destination (O-D) study was undertaken as part of the Regina Regional Transportation Study. Roadside surveys were conducted between June 22 and July 8, 1993 on all major roadways leading into/out of Regina, including Highways 1, 6, 11, 33, and 46. Motorists were stopped on their way out of Regina, and were asked questions regarding their origin, destination, and trip purpose. This information was used to establish the percentage of motorists that represent through trips (external to external), through-stop trips (external to external, with a stop in the city), and non-through trips (internal to internal, internal to external, and external to internal). The data from this survey was used in the *Regina Regional Transportation Study* to estimate the volume of traffic that might use a Southeast Bypass link.

2.3.2 Regina Regional Planning Study (Reid Crowther, 1996)

The Regina Regional Planning Study was commissioned by MHI in 1993 with the stated purpose of creating a planning tool to guide the development of the region's road network to the year 2013. The study area encompassed the City of Regina; the Regional Municipalities (RMs) of Lumsden, Sherwood, and Edenwold (including the rural municipal community of Emerald Park); the towns of Balgonie, White City, Pilot Butte, and Lumsden; the villages of Edenwold and Grand Coulee; and the hamlet of Richardson.

The report focusses on the development of strategic highway network alternatives and conceptual functional planning of the highway network in the Regina region, and includes the evaluation of several alternative roadway links. A transportation demand model of the study area was used to identify key network issues. The report included a list of key issues to be addressed. The issues related to a potential Southeast Bypass link are as follows:

- *Victoria Avenue / Ring Road* – Traffic growth causing increased delays, particularly at the west intersection. Interchange is not totally free-flow for Highway No. 1 or Highway No. 11
- *Pilot Butte to White City on Highway No. 1* – Traffic growth creating problems for traffic turning onto Highway No. 1. Great Plains Industrial Park trucks have a problem crossing the highway.
- *Victoria Avenue / Fleet Street* - Intersection capacity problems due to confluence of commuter, shopping, and highway traffic

The project Steering Committee and the project Technical Committee included representatives from MHI, the City of Regina, the RM of Edenwold, and the RM of Sherwood. Three public open houses were held in order to inform the public about the study objectives, obtain input regarding regional traffic issues, present background analysis results and network options, and present the technical recommendations. In addition to the open houses, individual meetings were held with the RM of Sherwood, the town of Pilot Butte, and the town of White City. The report does not contain any documentation from the open houses or stakeholder consultations.

The data used in the study included O-D information, existing average annual daily traffic (AADT) volumes, intersection turning movement counts, and historical collision data. The existing conditions analysis included the development of a trip matrix, roadway and intersection level of service results, and a review of accident factors and priority accident sites. The existing 24 hour external-to-external trip estimates that are relevant to a Southeast Bypass connection are as follows:

- Highway No. 1 West to Highway No. 1 East (both directions) – 1,500 vehicles per day
- Highway No. 1 East to Highway No. 6 South (both directions) – 159 vehicles per day
- Highway No. 6 South to Highway No. 1 East (both directions) – 113 vehicles per day

The TModel2 transportation modelling software was used to create a computer traffic model for the study area. Historical population, employment, and highway traffic growth rates were used in conjunction with growth estimates from known development plans to generate a traffic forecast. The regional network model was used to test roadway improvement alternatives based on the forecast traffic volumes.

Three regional road network concepts were evaluated:

1. *Improve Existing Alignment* – Includes interchanges at Highway No. 46, Highway No. 48, Great Plaines Industrial Drive, Gravel Pit Road, Tower Road, Prince of Wales Drive, Fleet Street, and a third level on the existing Ring Road interchange.

2. *Inner Southeast Bypass Alignment* – A new Southeast Bypass with the east terminal at Gravel Pit Road

3. *Outer Southeast Bypass Alignment* – a new Southeast Bypass with the east terminal at Highway No. 48

The following evaluation criteria were used:

- Environmental impacts
- Socio-economic impacts
- Geotechnical impacts
- Roadway design criteria
- General impacts (access visibility, dangerous goods route considerations, and local transportation strategies).

Option 2, the Inner Southeast Bypass Alignment, was selected as the preferred regional road network plan (Figure 2). The recommended option for the east terminal of the Southeast Bypass was Gravel Pit Road. The recommended west terminal was a connection immediately east of the existing Albert Street interchange, where Highway No. 1 becomes Ring Road.

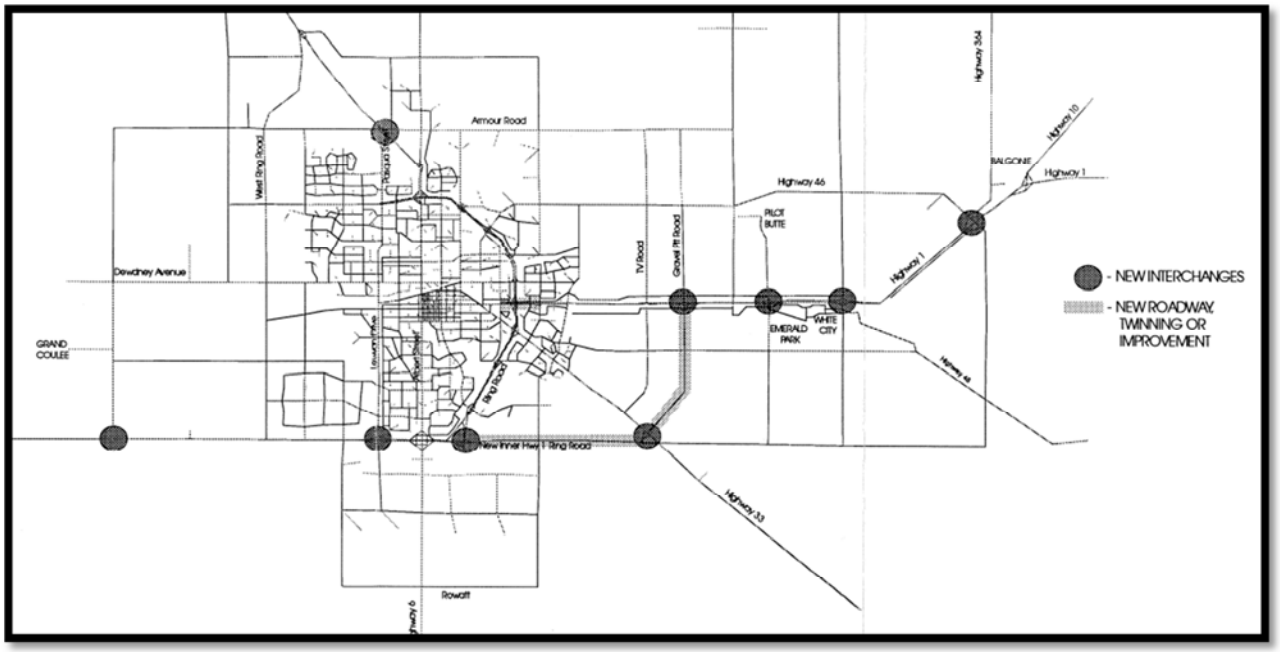
The reasons for this recommendation are as follows:

- Moderate initial capital cost
- Adjacent land is mainly agricultural
- Consistent with transportation strategies of adjacent municipalities
- Provides dangerous goods route
- Road construction can be staged
- Construction will have minimal impact on current traffic streams.

Items of note:

- The evaluation of alternatives in this study did not include the option of locating the east terminal of the Southeast Bypass at Tower Road
- The study did include a comparison of afternoon peak hour traffic volumes on the Southeast Bypass for the following scenarios: east terminal at Gravel Pit Road (~400 vehicles per hour) and east terminal at Tower Road (~1,600 vehicles per hour). This report assumed that a Southeast Bypass alignment with the east terminal at Tower Road would be heavily used by City traffic.
- This report suggests that Tower Road become an arterial roadway, with the possibility of an interchange at the Highway No. 1 & Tower Road intersection. There is a brief discussion of a Northeast Bypass alignment that could connect to this arterial, or to the Southeast Bypass at Gravel Pit road. The report did not provide any analysis of this link.

Figure 2 – Preferred Regional Road Network Plan - 1996

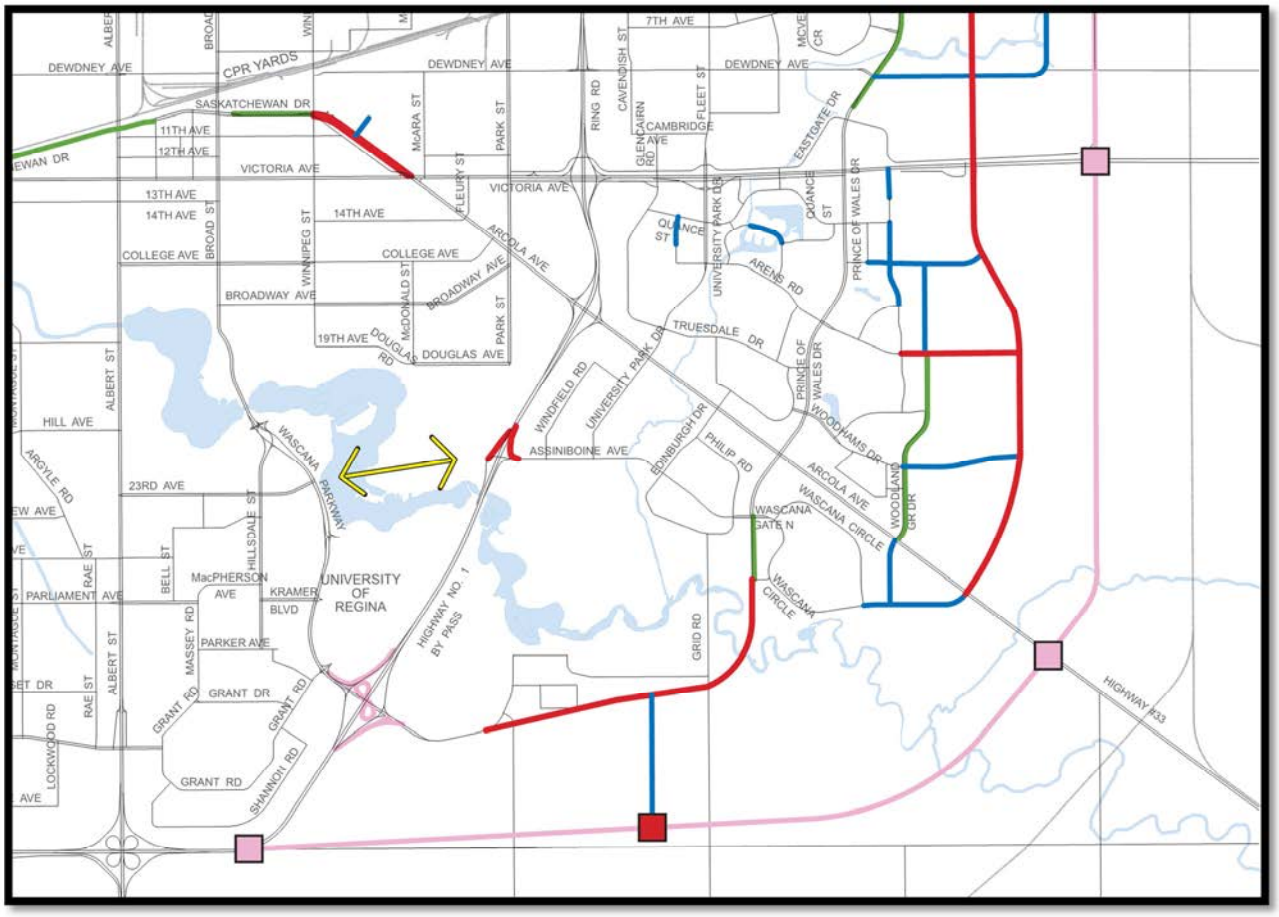


2.3.3 Regina Road Network Plan Review (Trialpha, 2001)

A City of Regina study was undertaken to address long term urban transportation requirements for both 235,000 population and 300,000 population levels. One specific study task was to respond to MHI on the proposed location of the Southeast Bypass. At that point in time, the preferred location was Gravel Pit Road. The City of Regina study recommended Tower Road as the preferred east terminal for the Southeast Bypass. Some of the rationale at the time for choosing Tower Road included proximity for use by east Regina residents and the physical barrier the railway provided that would limit future development of the City eastward at this location.

The recommended road network plan was approved by City Council in 2001 and recommendations were divided into those that could be approved by the City and those identified as the responsibility of "another jurisdiction". As such, the plan identified a new location for the southeast bypass (Figure 3) but the alignment did not have any status within the Ministry.

Figure 3 – Regina Road Network Plan – Southeast Bypass Alignment



2.3.4 Highway No. 1 and Tower Road Traffic Operations Review (Trialpha, 2001)

This review was commissioned by MHI in September 2000. The purpose of the study was twofold:

1. To establish how traffic signals would operate at the Highway No. 1 & Tower Road intersection if Tower Road were to become the Southeast Bypass

2. To identify a functional layout for the intersection should signals be implemented

At the time that this study was undertaken, MHI was in the process of considering a review of the Southeast Bypass location based on the recommendations made in the *Regina Road Network Plan Review*. This review, which was conducted for the City of Regina, recommended Tower Road as the location of the Southeast Bypass.

The study involved a review of traffic operations for existing and forecast conditions. A ten year (2010) traffic forecast was developed based on existing traffic volumes, known development plans, and projections from the City of Regina EMME/2 traffic model. A sixteen year (2016) forecast was also developed using the EMME/2 model assuming full development in the area, and the operation of Tower Road as the Southeast Bypass.

2.3.5 Highway No. 1 / Tower Road Interchange Study (Stantec, 2002)

The purpose of this study was to develop a functional interchange design for the Highway No. 1 and Tower Road intersection. The study indicates that this interchange will form a key element of the future southeast and northeast bypasses around the eastern portion of the City of Regina. At the time that this study was conducted, MHI was considering Tower Road as an option for the east terminal of the Southeast Bypass.

The study includes a review of existing and future traffic volumes at this location. The 15 year (2017) traffic forecast that was developed for the intersection assumed that the southeast and northeast bypass legs were operational. This forecast also assumed that Highway No. 1 traffic would grow at just over 1% per year. Bypass traffic volumes were estimated based on the existing 1993 O-D data.

Future (2017) southeast and northeast bypass traffic volumes were estimated at 10,800 and 11,300 vehicles per day respectively. Of the 10,800 vehicles per day on the Southeast Bypass, only 1,630 (15.1%) were assumed to be through trips. It was assumed that 660 of these through trips would be trucks attempting to bypass the City of Regina.

Several interchange options were examined, and three were selected for detailed study. One of the key factors considered in the analysis was the desire to serve highway-to-highway traffic. Emphasis was also placed on the desire to limit the impact to existing development, in particular to the television station in the northeast quadrant, and the campground in the northwest quadrant.

The recommended interchange design is a partial cloverleaf/partial rotary hybrid. Primary importance is placed on the Highway No. 1 traffic, which is served by a high speed flyover (westbound to southbound) and a high speed ramp (northbound to eastbound). Secondary importance is placed on the connections between the northeast bypass and Highway No. 1 east, which are served through a loop (southbound to eastbound) and a high speed ramp (westbound to northbound). Some of the movements to/from the City receive lower priority, such as the northbound to westbound movement which requires a left turn at an at-grade intersection. This is a complex design with five bridge structures.

This option was selected for the following reasons:

- Best traffic service consistent with local and highway needs
- Safe and unimpeded movement of highway traffic
- Accommodation of expressway speeds
- Construction staging opportunities
- Flexibility to adjust layout to meet future needs
- Most economical alternate
- Postponement of relocating Tourist Information Site
- Minimal disruption to the television station.
- Minor encroachment of commercial campground site
- Reasonable access to all adjacent properties
- Harmony with natural topography and existing features

2.3.6 West Terminal Traffic Operation Study (Trialpha, 2002)

The purpose of this study was to review two options for the west terminal of the Southeast Bypass:

1. Providing a new interchange on Highway No. 1 – a new piece of infrastructure between the existing interchanges at Albert Street and Wascana Parkway. This option places more emphasis on serving highway traffic needs and separating highway and city traffic.

2. Upgrading the existing Wascana Parkway interchange – one location serving both city and highway traffic needs.

The study examines interchange layout options and determines the feasibility of connecting the Southeast Bypass to Highway No. 1 at each location. The study includes an assessment of collision data, traffic volumes, level of service, weaving conditions, and design elements for both options.

Existing (2002) afternoon peak hour traffic volumes were used in the analysis. Ten (2011) and twenty-five year (2026) traffic forecasts were developed using a combination of existing traffic volumes, historical growth rates, development assumptions, and the City of Regina EMME/2 model. The forecast includes

two-way afternoon peak hour volumes on the Southeast Bypass – 325 vehicles per hour in 2011 and 380 vehicles per hour in 2026. These estimates imply limited use of the Southeast Bypass by city traffic.

Option 1, providing a new interchange on Highway No. 1 between Albert Street and Wascana Parkway, was recommended. The following benefits were relevant to the selection of this location:

- Maintains highway system efficiency
- Separates city and highway traffic, and keeps bypass traffic at or outside the city limits
- Minimizes conflict points for Southeast Bypass traffic as they approach the west terminal
- Truck traffic is best accommodated through this option – bypass traffic is kept at grade and does not have to use interchange loops

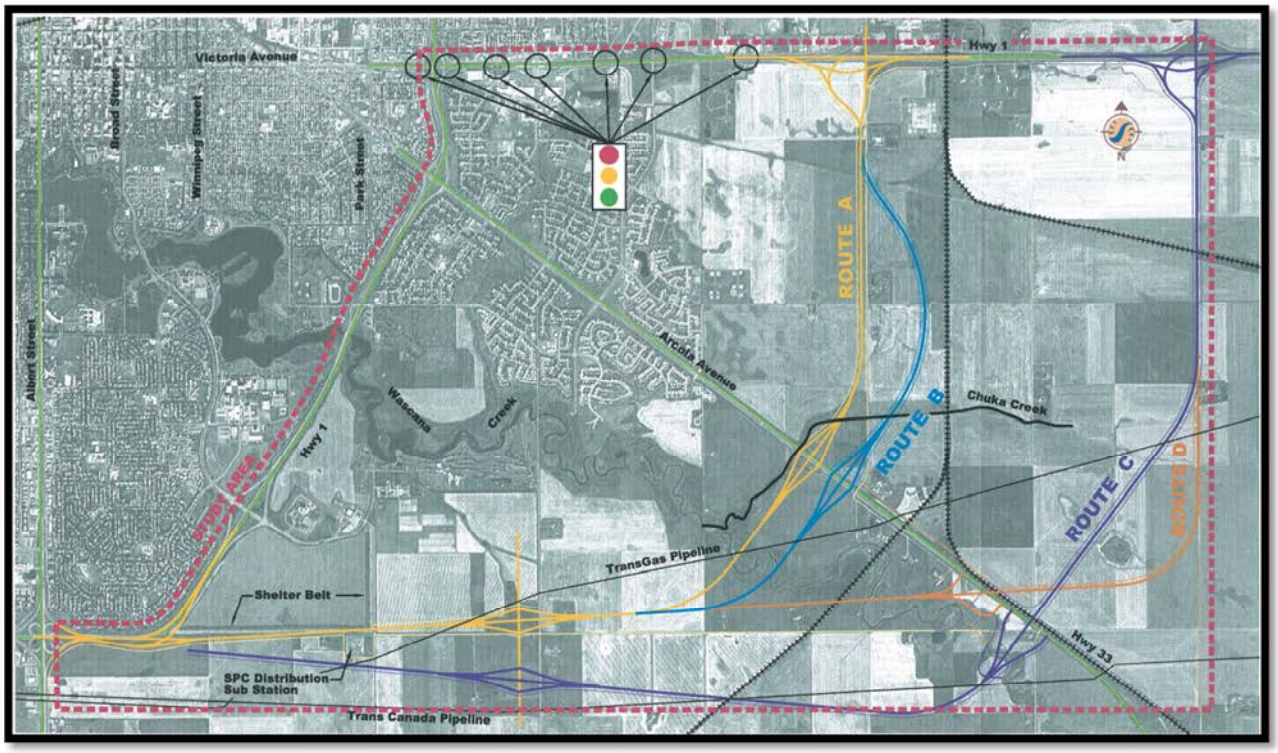
The following issues associated with this option were noted for consideration during the study:

- Available Space – potential impacts to the Whitmore Park neighbourhood, including the possibility of added traffic noise. This was not determined to be a major issue if the interchange is constructed far enough away from the neighbourhood
- Interchange Spacing – interchange spacing in urban areas is usually between 2 and 3 kilometres. There is approximately 3 kilometres between the Albert Street interchange and the Wascana Parkway interchange, so an additional interchange between them would violate the guidelines for minimum desired spacing
- Left Hand Entrance – an interchange at this location will involve a left hand entrance for westbound traffic on the bypass attempting to merge with traffic on the Ring Road. This is a non-standard movement and may cause confusion.
- Weaving – an interchange at this location introduces a number of complex weaving maneuvers over a relatively short distance. Analysis indicated that the weaving could operate at an acceptable level of service under forecast conditions.

2.3.7 Southeast Regina Bypass Functional Study (Stantec, 2004)

The purpose of this study was to carry out a roadway location investigation for the Southeast Bypass alignment. Based on previous studies two bypass corridors were selected for examination and evaluation: an inner corridor with the east terminal at Tower Road and an outer corridor with the east terminal at Gravel Pit Road. Two potential routes were identified in each of these corridors, as illustrated in Figure 4. All options have the west terminal located immediately east of the Albert Street interchange. The study involved a high level of public and stakeholder consultation, including one open house.

Figure 4 – Route Options – Southeast Bypass Functional Study (2004)



The corridor options were examined for serviceability for both highway users and community users. Major considerations also include traffic flow, safety, access, future development plans, physical constraints, costs, and stakeholder/public acceptance.

The report included the following statements about the future functions of the Southeast Bypass:

- To function in the short term as a high-speed suburban/rural divided highway (expressway)
- To function in the long term as a freeway, moving traffic safely with uninterrupted flow
- To provide motorists (particularly truckers) with a choice of either entering the urban developed area with reduced speeds and multiple accesses, or to bypass the urban area on a high speed, controlled access facility.
- To alleviate some of the present congestion on Victoria Avenue, Ring Road, and associated intersections by transferring a portion of the traffic onto a bypass facility
- Improve safety and convenience while reducing vehicle emissions and noise within developed areas

Existing and forecast traffic volumes were used in the evaluation. Highway No. 1 traffic was estimated to grow between 1% and 2% per year. Truck traffic was estimated to grow by 2% per year. The evaluation used the same assumptions for bypass traffic as previous studies, namely the percentage of through traffic (14%) developed from the 1993 O-D data.

The inner route is shown to have a forecast 2026 traffic volume of 4,500 vehicles per day. The outer route 2026 traffic volume is forecast to be 3,500 vehicles per day. These volumes are relatively low, and there is not much difference between them. Previous studies estimated more city traffic on the bypass if the east terminal is located at Tower Road. For example, the 2002 Highway No. 1 /Tower Road Interchange Study shows an estimate of 10,800 vehicles per day on the Southeast Bypass.

The 1996 regional study includes some discussion of the potential uptake of the inner route by city traffic – approximately 4 times as many vehicles will use the bypass if the east terminal is at Tower Road as opposed to Gravel Pit Road. That report concluded that the Gravel Pit Road location is more consistent with area land-use planning, and recommends that Tower Road become a key arterial roadway. The 2004 functional study cites the benefit of uptake by city traffic as one of the reasons for selecting Tower Road as the preferred east terminal location, but the traffic volumes shown in the report do not reflect this.

The west terminal location was not reconsidered at this time. The report indicates that previous studies have set this location, and they did not reopen the issue. The West Terminal Traffic Operations Study (2002) only considered two options: the approved location and Wascana Parkway. The 1996 regional study did not consider another location for the west terminal.

Items to note about the proposed routes:

- The inner corridor does not require any new rail crossings – the outer corridor requires 3
- Both require creek crossings
- The inner corridor is more flexible in terms of connecting to the northeast bypass
- A noise attenuation study may be required at the west terminal

The routes were evaluated based on the following seven categories:

- Public – highway user, commuter, access, dangerous goods
- Socio-Economic – social impacts, shopping/services, recreational, economic factors, existing businesses
- Environmental – land use (severance), sensitive terrain, shelter belts & native vegetation, sensitive fish & wildlife habitat, heritage and designated parks, noise impacts
- Roadway Design – new route lengths, geometric alignment, interchange manoeuverability, railroad crossings, right of way, utilities
- Geotechnical – physiography, topographic features, geomorphology & stratigraphy, hydrogeology
- Costs – capital, staging opportunities, road user
- General – link to the northeast bypass, National Highway Program goals
- Stakeholders – public input/acceptance, RM of Edenwold, RM of Sherwood, City of Regina, Cowessess TLE, Regina Chamber of Commerce

An evaluation was performed using these categories. The key considerations were appraised on a qualitative rating system (good – better – best). Rating values and weighting factors were applied to the categories, and the results were tabulated. The results of the evaluation process indicate that Route A possesses the highest ranking based on the evaluation criteria. A summary of the results are shown in Table 2. Detailed results can be found in Appendix A.

Table 2 – Southeast Regina Bypass Functional Study (2004) Route Evaluation Results

	Inner Corridor (Tower Road)		Outer Corridor (Gravel Pit Road)	
	Route A	**Route B**	**Route C**	**Route D**
Total Evaluation Credits	208	181	176	154
Evaluation Credits / $Million Spent	5.33	4.42	3.39	2.91

The following are some key items to note regarding the evaluation results:

- The outer routes scored higher for highway use, and the inner routes scored higher for commuter/city use. These scores effectively balanced
- Socio-Economic factors heavily favour the inner route
- Not much difference between the routes in the Environmental category
- The Roadway Design category heavily favours the inner routes for the following reasons – shorter, fewer railway crossings, available right-of-way, interchange manoeuverability
- The capital costs are assumed to be much higher for the outer routes due to the added length and additional railway crossings
- The outer routes are slightly favoured in the General category due to compatibility with National Highway Program goals. Note that all routes got the same score for the link to the northeast bypass, though the outer routes appear to have fewer options for this link.
- Stakeholders – the City of Regina favoured Route A, while the public, RM of Edenwold, and Cowessess favoured the outer routes

Route A was selected as the recommend route for the Southeast Bypass for the following reasons:

- Shortest route
- Lowest capital costs
- Least costly for staged implementation
- No new railway crossings
- Least land severance and right-of-way requirements
- Inner corridor best serves a broad mix of high volume traffic – i.e. highway, intercity, and intracity

- Least complicated grade separation and interchanges at Arcola Avenue (Highway No. 33)
- Will operate as an ancillary City Emergency Vehicle Route
- The inner corridor is less circuitous in linking up with future northeast quadrant corridor options

The recommended Southeast Bypass route was approved by MHI in November, 2004.

Additional Items of Note:

- The inner corridor (Tower Road) was projected to be outside the 40 year growth ring of the city
- Part of the initial criteria for the Southeast Bypass was to help reduce congestion on Victoria Avenue and Ring Road

2.3.8 Southeast Regina Bypass Detailed Functional Study (Stantec, 2007)

MHI, in cooperation with the RM of Sherwood and the City of Regina, initiated the development of a detailed functional report for the Southeast Bypass based on the alignment that was approved in 2004. The primary objective of the study was to determine land requirements for the new roadway and affiliated interchanges and to address access issues that involved RM roads, Highway No. 33, future city arterials and both existing and anticipated commercial developments.

Roadway Function/ Traffic Conditions:

- Year 2018 average daily bypass traffic volumes are estimated to range between 6,000 and 9,000 vehicles per day
- One of the criteria of the Southeast Bypass is that no at grade access will be provided. Consequently all accesses to adjacent land parcels will be facilitated via service roads or internal development roadways.
- Interchanges will be provided at the east terminal (Tower Road – Figure 5), Highway No. 33, the future Prince of Wales Drive extension, and the west terminal (Figure 6). The need for an interchange at Betteridge road should be considered – possibly a flyover or limited movements.
- The east and west terminal interchange alignments will be set to favour Highway No. 1 traffic

The study includes detailed plans showing the bypass roadway and interchange vertical and horizontal alignment, service roads and property lines. The cost for a four lane divided highway bypass with grade separated interchanges was estimated at $63 million in 2006 dollars.

Figure 5 – Approved Functional Design of East Terminal Interchange

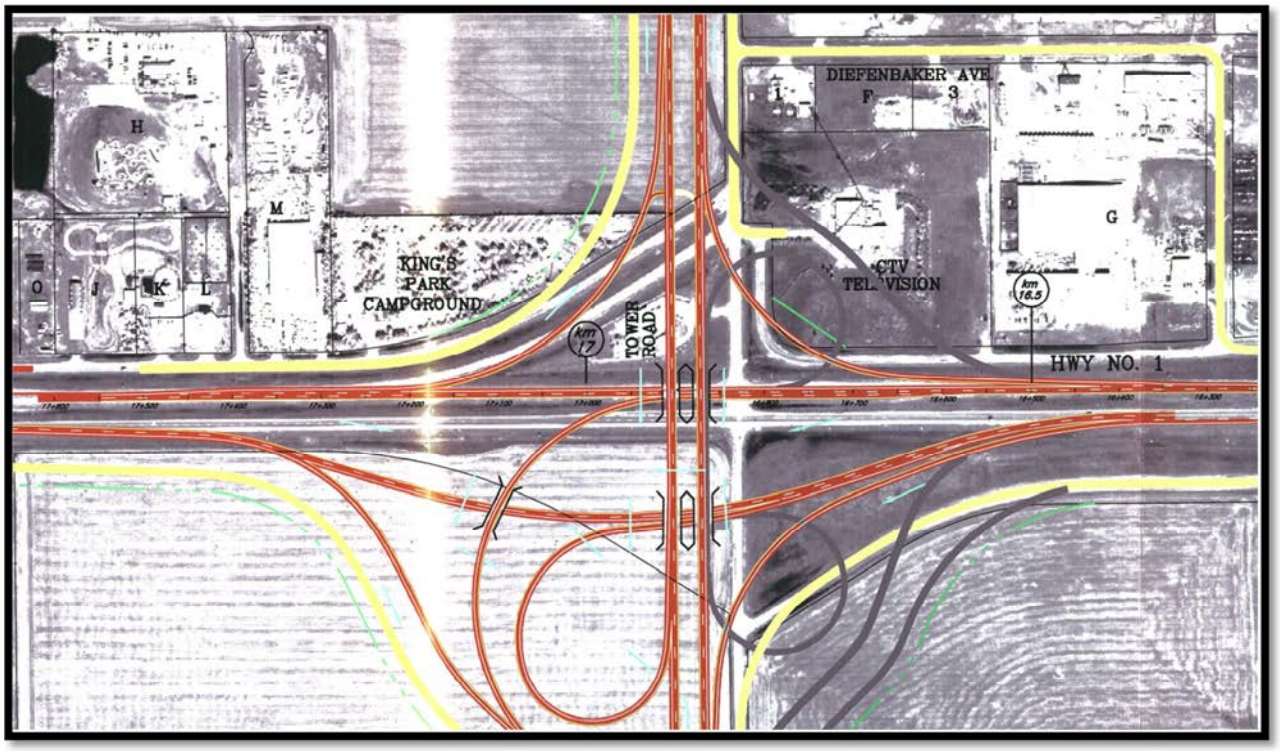
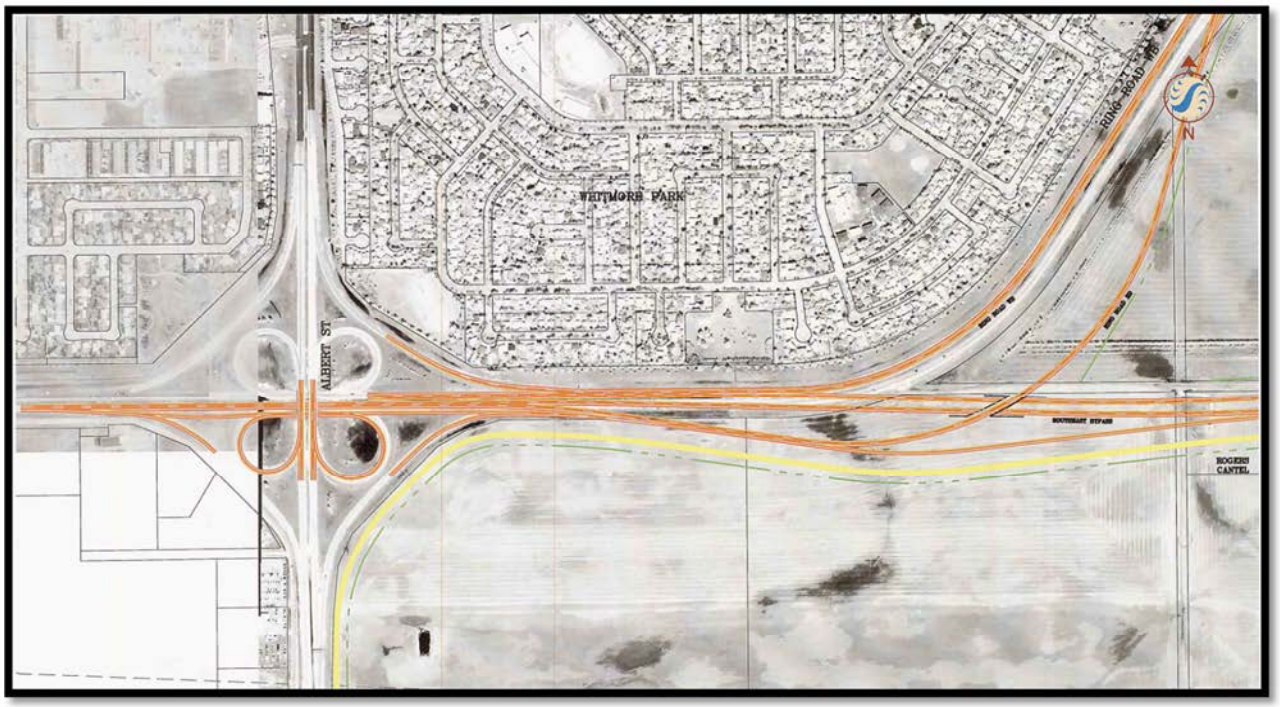


Figure 6 – Approved Functional Design of West Terminal Interchange



2.3.9 Highway No. 1 East Functional Planning Study (AECOM, 2010)

The purpose of the study was to provide an update to the long term functional plan for the Highway No. 1 corridor between Balgonie and Regina. MHI, in partnership with the RM of Edenwold and the towns of Balgonie, White City and Pilot Butte commissioned the review. The study involved the development of a road network plan for the region that includes future interchange locations and layouts, and important connecting roadways. The key activities of the study include:

- Evaluation of existing traffic conditions on the Highway No. 1 East corridor
- Identification of development plans, population growth, and traffic demand that can be reasonably expected to emerge for a 20 year forecast period
- Establishment of interchange locations and staging opportunities, as well as configuration of connector roadways, to address long term operational and safety issues

The study assumed that the Tower Road intersection would be the east terminal of the Southeast Bypass, as this was the approved location at the time. The study focused on the key intersections on Highway No. 1 between Tower Road and Highway No. 10, as listed below:

- Gravel Pit Road
- Pilot Butte Access
- Great Plains Access
- Highway No. 48
- Highway No. 46
- Balgonie Access

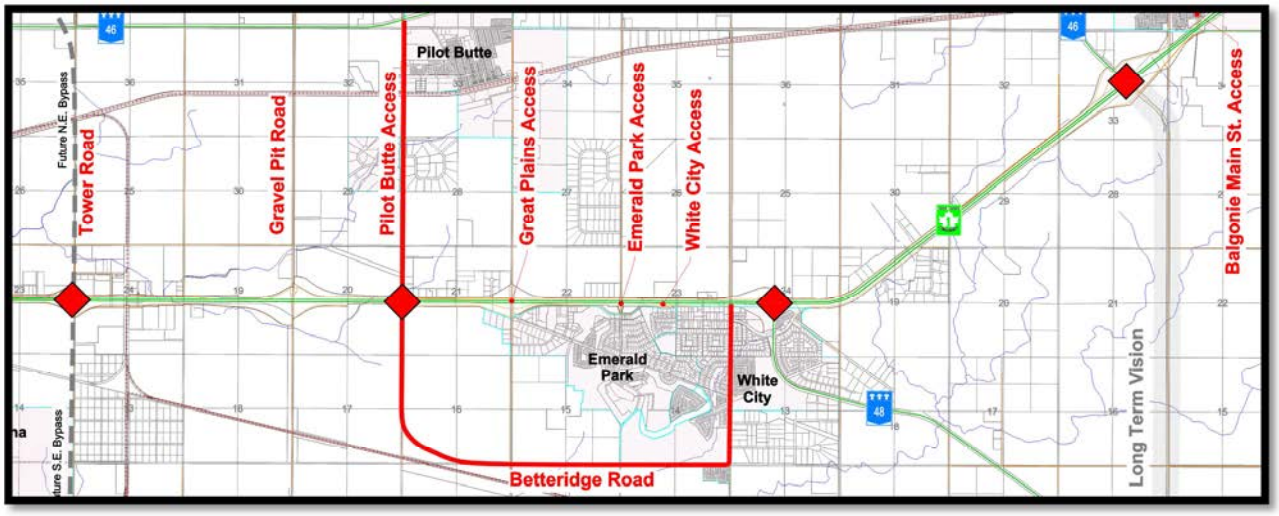
The operational analysis of the study corridor included an inventory of the existing road network, historical collision data, existing and future traffic volumes and existing and forecast level of service. The study also included an extensive stakeholder consultation component which involved:

- Study partner participation on the Steering Committee
- Three public Open Houses
- Community Workshop
- Individual meetings with municipalities and developers

Comments from the stakeholder consultation program were documented and included in the report. There were some comments concerning the Southeast Bypass generally in regards to the east terminal being moved from Tower Road to a location further east.

The recommended long term plan for interchange locations is shown in Figure 7. The plan includes interchanges at Pilot Butte Access, Highway No. 48, and Highway No. 46. Note that the plan also includes a very long term (50+ years) strategy to construct a bypass leading from the Highway No. 46 intersection south and then west around Regina.

Figure 7 – Highway No. 1 East Functional Road Network Plan



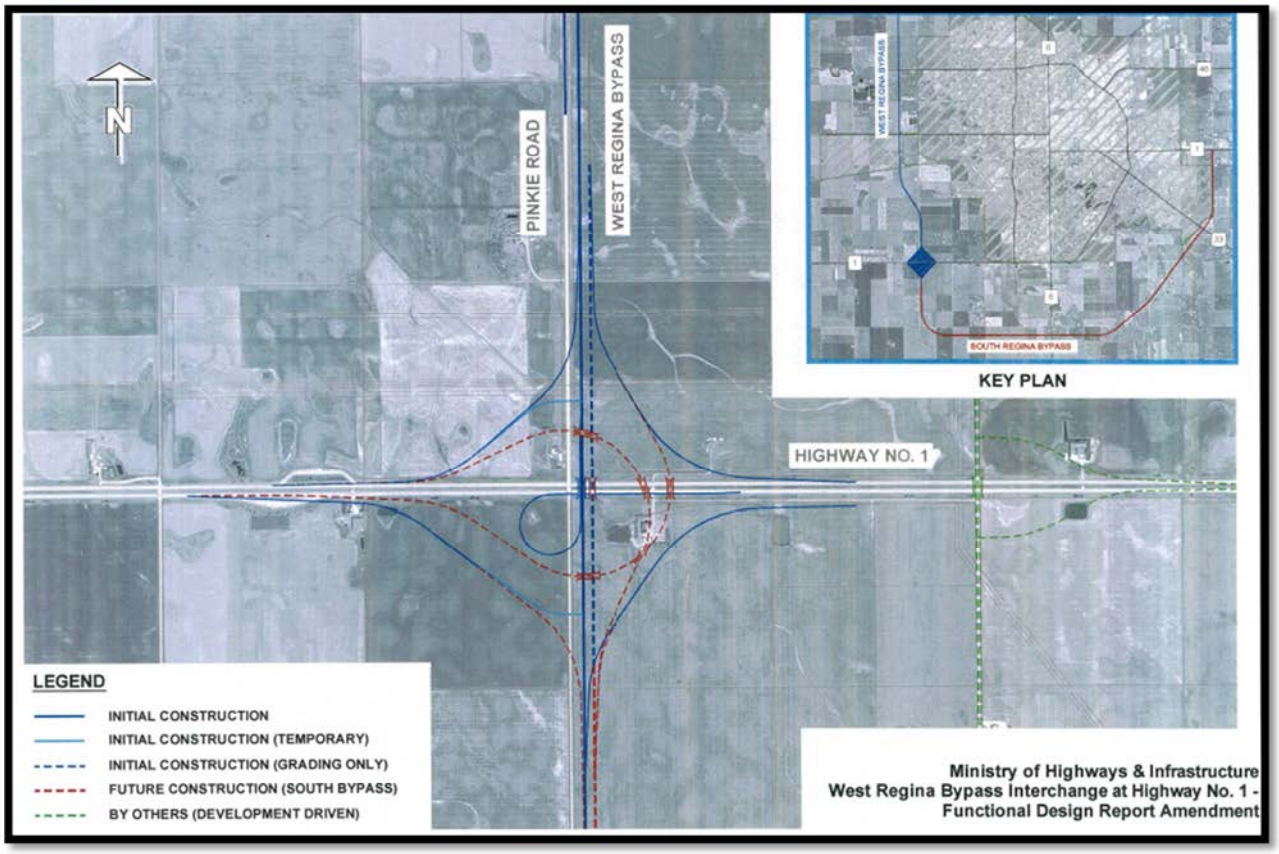
2.3.10 West Regina Bypass Interchange Report (AECOM, 2011)

Past planning studies had indicated that the West Regina Bypass (WRB) would be constructed after the Southeast Bypass. The design and construction of the WRB was accelerated by the development of the Global Transportation Hub, a large intermodal facility located immediately west of Regina. The preliminary stage of the WRB, linking Highway No. 1 to Dewdney Avenue, was constructed in 2010.

The first phase of the WRB includes an at-grade intersection at Highway No. 1. A service interchange is being constructed at this intersection, with the completion target set for fall of 2013. The *West Regina Bypass Interchange Report* is an addendum to the WRB design report, and provides options for staging the planned service interchange into a systems interchange that would become the west terminal to the Southeast Bypass. The recommended systems interchange option is illustrated in Figure 8.

This addendum was requested by MHI in order to provide an option for linking the Southeast Bypass into the WRB. This would make use of infrastructure already being constructed for the WRB, and would create a partial ring bypass system around Regina, requiring only a Northeast Bypass segment to complete the loop.

Figure 8 – Alternate Option for West Terminal – System Interchange



2.4 Previous Public Consultation Results

The *Southeast Regina Bypass Functional Study* (2004) included a large public consultation component. The primary objective of the public consultation was to learn of the concerns of the major stakeholders and if possible incorporate these concerns in the route selection process. One Open House was held on June 24, 2003 and formal presentations were made to the RM of Sherwood, RM of Edenwold, City of Regina, Cowessess First Nation and Regina Chamber of Commerce. The Gravel Pit Road location was preferred by public Open House respondents, the RM of Edenwold and Cowessess First Nation. The City of Regina preferred the Tower Road location. The RM of Sherwood and Regina Chamber of commerce did not formally indicate a preferred route. The key public consultation results are shown in Table 3 and Table 4.

The *Southeast Regina Bypass Detailed Functional Study* (2007) did not include an open house. Appendix B contains a list of firms, agencies, organizations and individuals that were involved in the study consultations.

Table 3 – Southeast Bypass Study Open House (2003) – Preferred Route Options

Route	Number of Respondents	Percentage of Total Respondents
Route A	21	18%
Route B	15	13%
Route C	46	39%
Route D	20	17%
Other	15	13%
Total	**117**	**100%**

Table 4 – Southeast Bypass Study (2003) – Stakeholder Positions

Group / Association	Preferred Route	Second Choice	Primary Concerns
Public Open House (117 Written Responses)	C	A	► Improvement of traffic flow on Victoria Avenue ► Removal of heavy trucks on Victoria Avenue/Ring Road ► Motorist safety
R.M. of Edenwold No. 158	C or D	C or D	► Regina's current rate of growth (easterly) ► Service to suburban development ► Alleviate potential future traffic problems
R.M of Sherwood No. 159	No Response Received		► Access to farm implement dealers ► Keep trucks off service roads ► Effect on North Tower Road
City of Regina	A	B	► Follow Regina road network plan ► Victoria Avenue congestion ► Truck traffic
Cowessess First Nation TLE Board	D	C	► Access to Reserve lands ► Time frame for construction ► Effect on adjacent properties.
Regina Chamber of Commerce	No Response Received		► City growth in SE sector ► Time frame for implementation ► Link to NE quadrant

The *Highway No. 1 East Functional Planning Study* had an extensive stakeholder and public consultation component. The study involved the development of a road network plan for Highway No. 1 between Tower Road and Highway No. 10 that includes future interchange locations and layouts, and important connecting roadways. Although the study did not involve the selection of a route for the Southeast Bypass, many comments were received throughout the course of the study pertaining to the approved east terminal location. Most of the comments received about the Southeast Bypass indicated that the east terminal (Tower Road) was too close to Regina, and should be moved out to Gravel Pit Road, or beyond.

3.0 CONDITIONS ASSESMENT

The Southeast Bypass alignment was selected based in part on projections of future conditions (population, traffic volumes, development plans, etc.). An investigation into current conditions can help to determine if these projections are still valid. If existing conditions are significantly different from the assumed growth trends, this may change the outcome of the route evaluation process.

The following report sections provide a general assessment of how some of the key conditions have changed since the start of the route selection process. The majority of this assessment is based on existing information, and is not intended to be used as part of a new evaluation process. Instead, this information was used to determine if there have been any material changes to the regional road network that may impact the original decision to select the approved Southeast Bypass alignment.

In addition to the key conditions update, this section includes comments on the geometric constraints associated with the approved alignment, and an update to the stakeholder consultation program. Some of the decisions that were made in the original process were based on design constraints and stakeholder input. It is important to document if/how geometric constraints and stakeholder needs have changed since the alignment was approved.

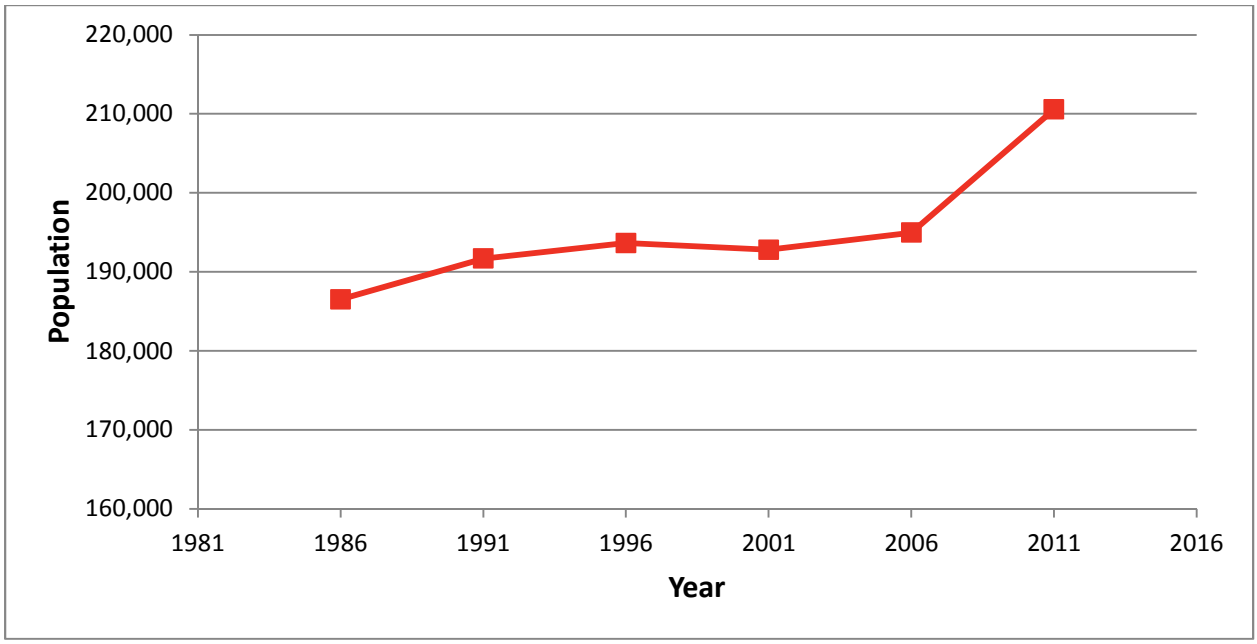
3.1 Population Growth

Table 5 presents the population of the Regina Census Metropolitan Area (CMA) as determined by the Statistics Canada Census. The population growth trend is illustrated in Figure 9.

Table 5 – Population Data – Regina Census Metropolitan Area

Regina Census Metropolitan Area (CMA)	1986	1991	1996	2001	2006	2011
Census Population	186,521	191,692	193,654	192,800	194,971	210,556
Population Growth	-	5,171	1,962	-854	2,171	15,585
Percent Change in Population	-	2.8%	1.0%	-0.4%	1.1%	8.0%

Figure 9 – Regional Population Growth – Regina Census Metropolitan Area



The Regina Census Metropolitan Area includes the following population centres:

- Regina
- Edenwold No. 158
- White City
- Pilot Butte
- Lumsden No. 189
- Lumsden
- Balgonie
- Regina Beach
- Sherwood No. 159
- Grand Coulee
- Pense
- Buena Vista
- Pense No. 160
- Edenwold
- Disley
- Belle Plaine
- Lumsden Beach

During the years that the Southeast Bypass route was being determined, population growth in the region was fairly stagnant. Between the 1986 and 1991 census years, the population of the Regina CMA increased by an average of just over 1,000 persons per year. A similar growth rate was assumed in the Regina Regional Planning Study.

Between the 1991 and 2006 census years, the population of the Regina CMA remained relatively constant. That 15 year period saw an increase of 3,279 persons for an average of only 219 persons per year. It was during this time period that Southeast Bypass route was evaluated and approved. Although growth in the region was assumed, these assumptions were influenced by the historically slow growth patterns at the time.

The population of the City of Regina and the surrounding area has increased significantly over the past several years. Between the 2006 and 2011 census years, the population of the Regina CMA grew by 15,585 persons, which amounts to over 3,000 persons per year. If these recent trends continue, the population of the study area will quickly surpass the long term growth projections used in the existing regional planning documents.

One of the key growth areas in the region is the collection of bedroom communities along Highway No. 1 to the east of Regina. Table 6 below summarizes the population growth in these communities between 2006 and 2011.

Table 6 – Population Growth East of Regina

Census Subdivision (CSD) Name	Population (Statistics Canada Census)			
	2006	2011	Increase	% Change
White City	1,113	1,894	781	70.2
RM of Edenwold	3,606	4,167	561	15.6
Balgonie	1,384	1,625	241	17.4
Pilot Butte	1,872	1,848	-24	-1.3
Total	**7,975**	**9,534**	**1,559**	**19.5**

Population growth alone is not enough to indicate that the approved alignment will not meet the current road network needs in the study area. However, this recent surge in population can impact area development, traffic volumes, and traffic patterns. Impacts to development plans and traffic are investigated in the following report sections.

3.2 Development Plans

Coinciding with the recent growth in population, a significant amount of development has occurred in and around the City of Regina over the past few years. Some of the significant development areas within the City limits include the Global Transportation Hub (GTH), and recent residential and commercial development in the east, northwest, and southwest. A significant amount of residential development has also occurred in the bedroom communities east of Regina.

The following development areas are of particular importance to the Southeast Bypass:

- *Commercial development along the Victoria Avenue East Corridor* – a significant amount of commercial development has occurred along Victoria Avenue East over the past decade. Traffic generated by this development has added to the highway and commuter traffic using Victoria Avenue East, resulting in high traffic volumes and delays along the corridor.

- *Residential development in east Regina* – The timeline for planned development in Regina's east end is being accelerated due to increasing demand. This is pushing the city boundary toward the approved Southeast Bypass alignment.
- *Residential development in the bedroom communities east of Regina* – residential growth in Pilot Butte, White City, Balgonie, and the RM of Edenwold is contributing to the high traffic volumes on Highway No. 1 East and Victoria Avenue East.
- *Global Transportation Hub* – The Global Transportation Hub (GTH) is a new intermodal facility being developed on the west side of Regina. The operation of the GTH will involve a high volume of truck traffic. Under current conditions, trucks coming to/from the east have to travel through Regina on Ring Road to reach the GTH in the west, and it is anticipated that these trucks would be a primary user of the future Southeast Bypass. It is important to note that the GTH was not in development at the time that the Southeast Bypass alignment was set.

Figure 10 illustrates the potential long term growth areas for Regina as shown in the 2011 City of Regina Development Plan. Of particular significance is the residential development abutting the Southeast Bypass alignment in the east, and crossing beyond the alignment in the south. This scenario is considered a very long term plan, but many of the growth areas indicated in this plan are already under development.

The City of Regina 235,000 population plan is shown in Figure 11. Much of this development is in place or in progress, including the West Regina Bypass which is shown as a new highway to the west of the City. This roadway did not exist when the Southeast Bypass alignment was determined – previous planning documents indicated that the Southeast Bypass would be constructed first.

The 235,000 population plan has almost been realized in terms of residential growth. Some key roadways, including the Southeast Bypass, are still required.

Figure 12 illustrates the residential development plans for the southeast sector of Regina, including the approved Southeast Bypass location. The residential development indicated in this plan is well underway. The 2004 *Southeast Regina Bypass Functional Planning Study* assumed that the inner route (the approved alignment) was outside the 40 year growth boundary of the City. Development is quickly approaching this boundary already.

Figure 10 – Long Term Growth Areas for the City of Regina

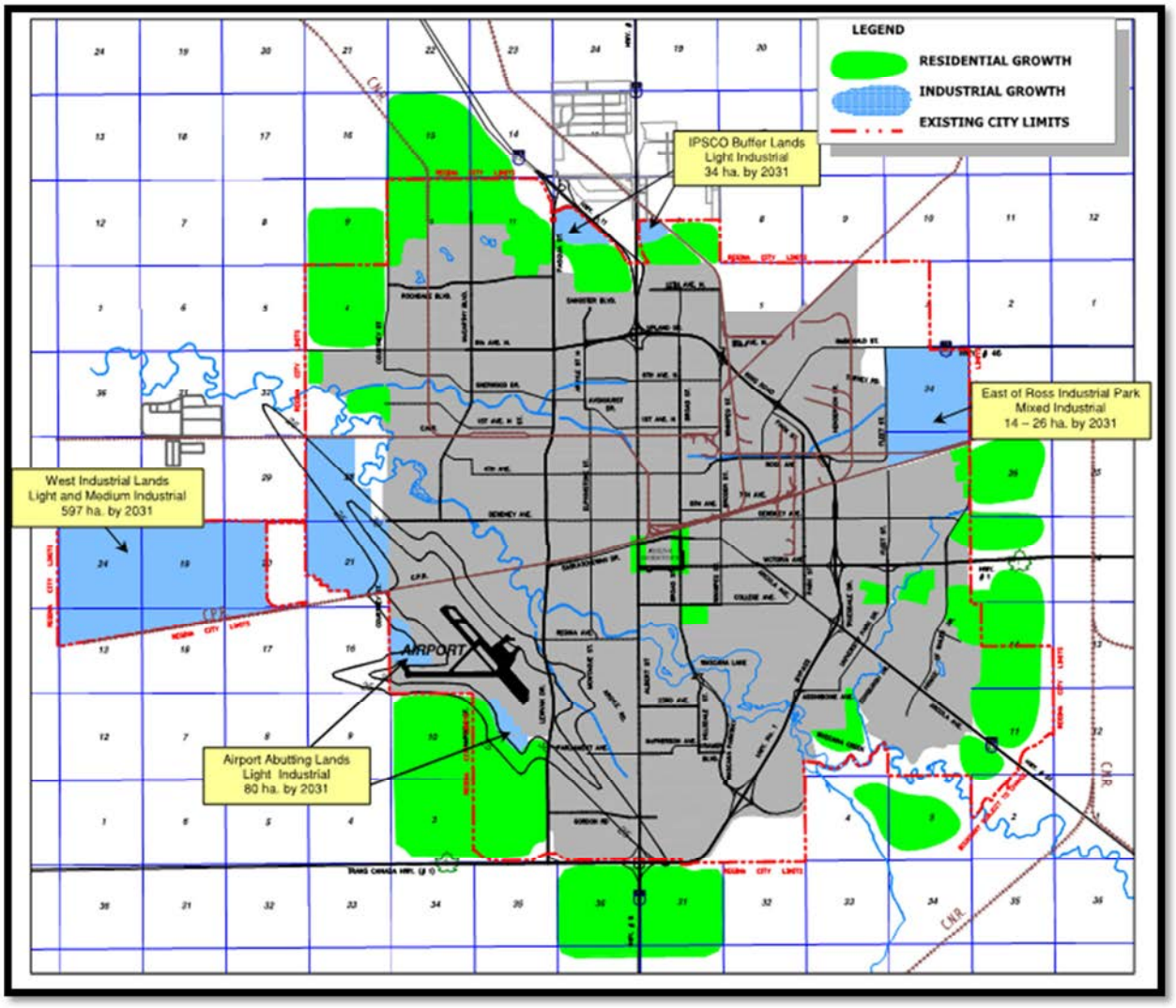


Image taken from *Regina Development Plan (2011)*

Figure 11 – City of Regina 235K Population Plan

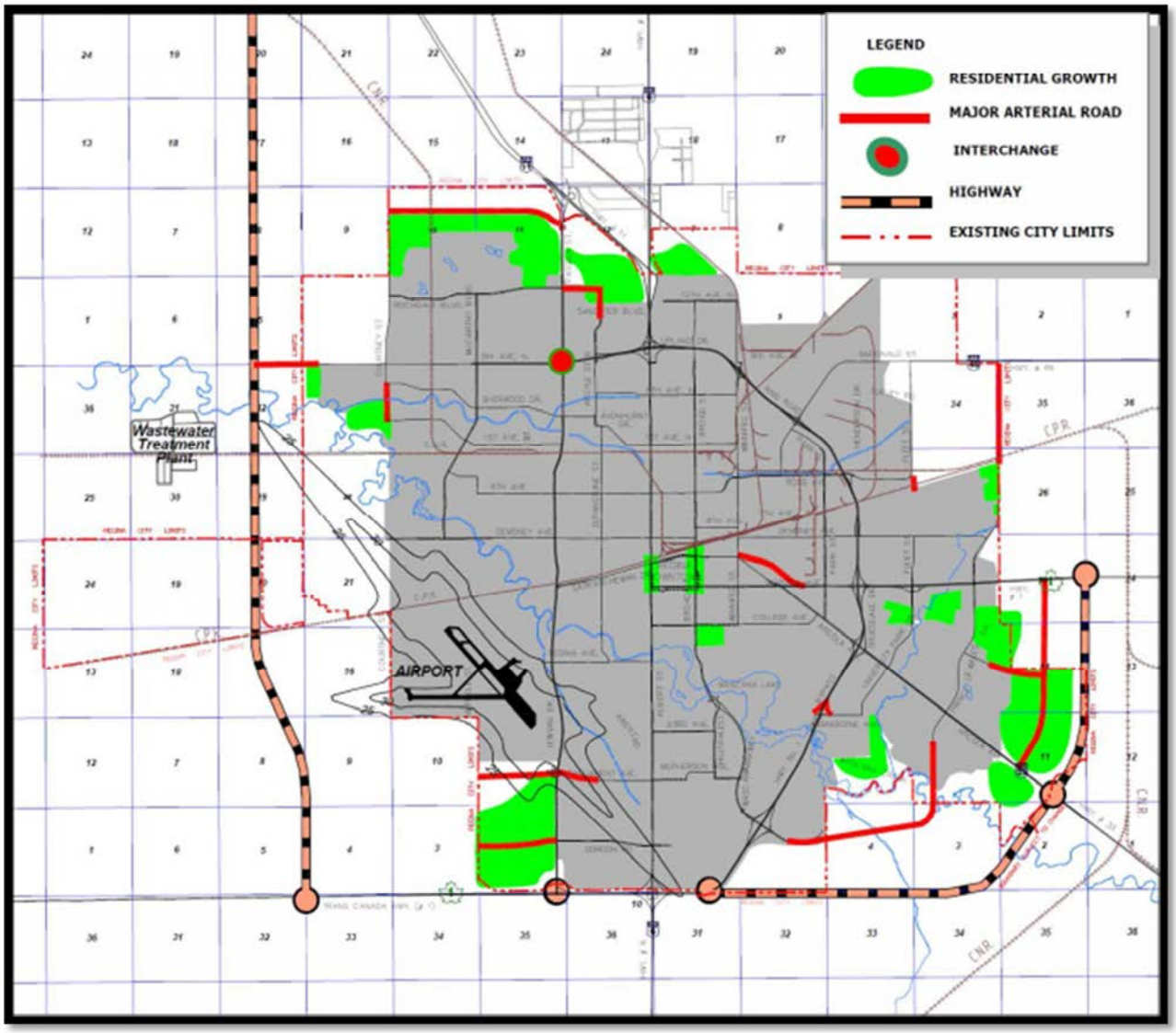


Image taken from *Regina Development Plan (2011)*

Figure 12 – Residential Development Plans for the Southeast Sector of Regina

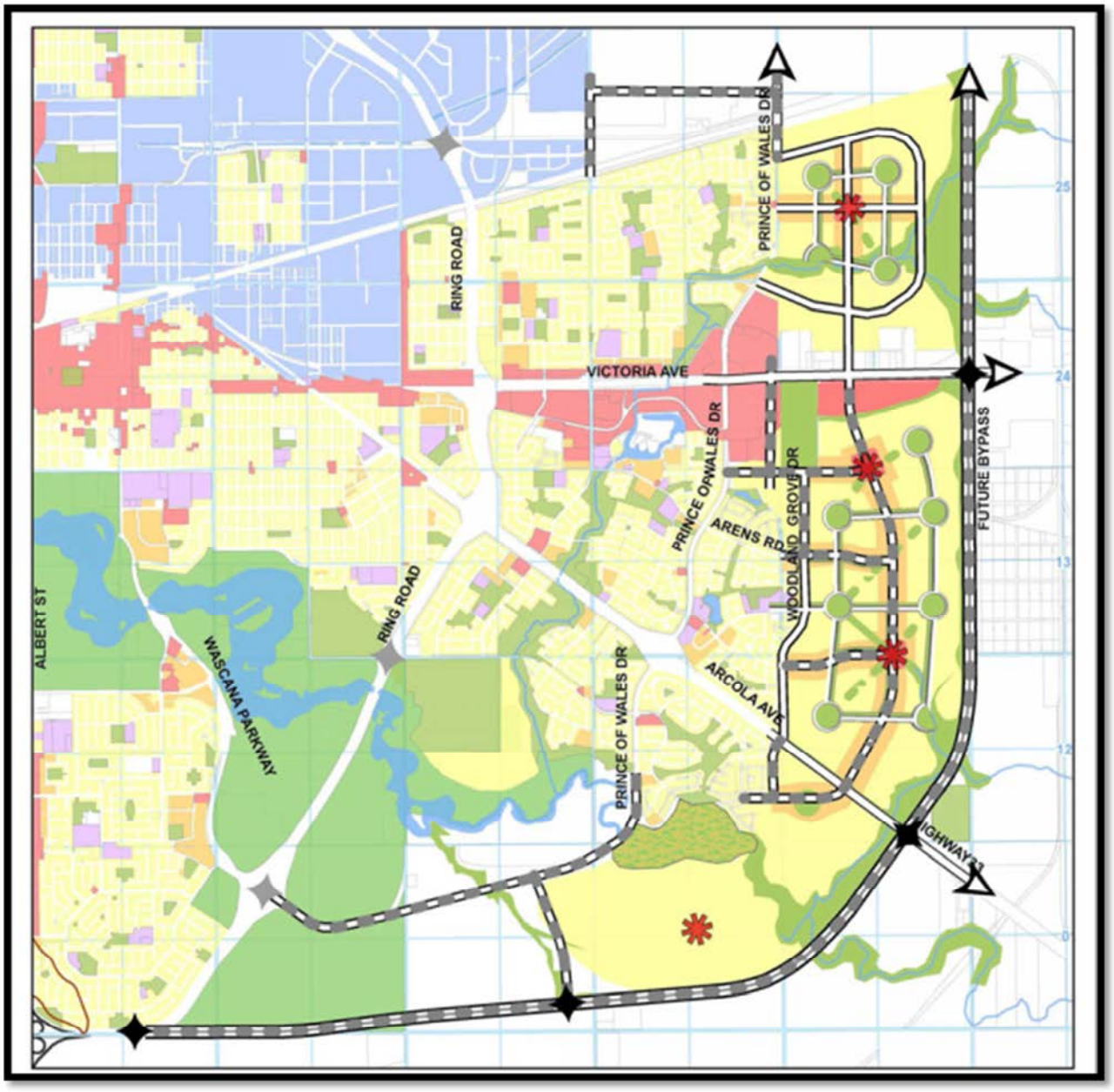
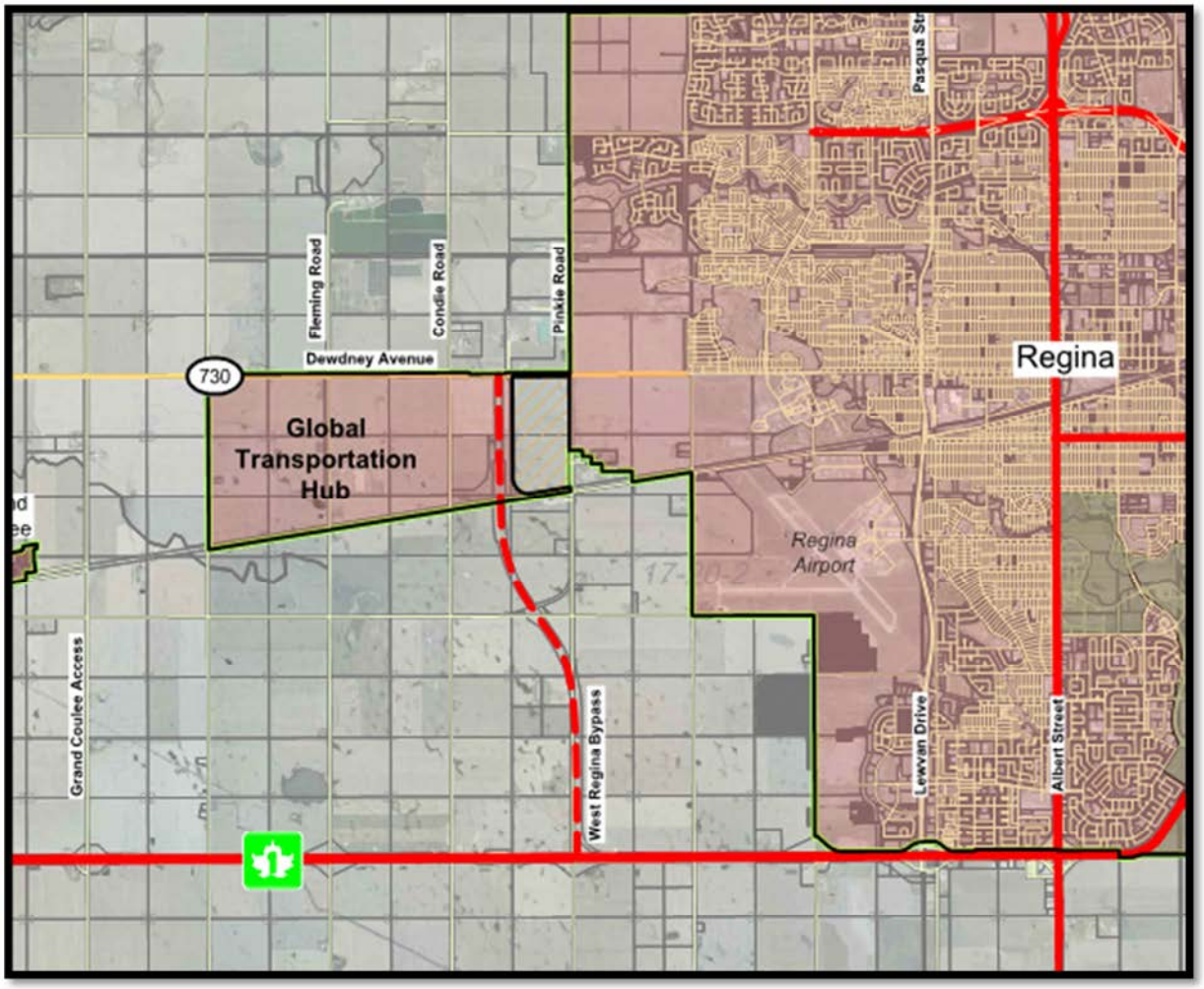


Image taken from *Regina Development Plan (2011)*

Figure 13 presents the location of the Global Transportation Hub. This facility will introduce high volumes of truck traffic to the regional road network, creating high demand for a bypass around the southeast sector of Regina. Note that an interchange is currently being constructed at the Highway No. 1 & West Regina Bypass intersection to accommodate truck traffic.

Figure 13 – Global Transportation Hub



Area development was considered during the selection of the approved Southeast Bypass alignment. However, the significant growth in the region over the past few years has led to an increased rate of development. This is important when considering how close the Southeast Bypass alignment is to the City boundary. The proximity of the bypass to the City limits will lead to an increase in City traffic on the bypass. Consideration must be given to whether or not the approved alignment will still meet the primary objective of serving high speed highway-to-highway traffic.

The development of the Global Transportation Hub will add additional pressures to the road network. This development will generate a significant amount of truck traffic, and many of these trucks will need to

bypass the City. This truck traffic must be taken into consideration when evaluating the potential performance of the Southeast Bypass.

Rapid development in the bedroom communities east of Regina (Pilot Butte, White City, Balgonie, RM of Edenwold) is also contributing to changes in regional traffic patterns. Many of the people that live in these communities work in Regina, and there is a significant amount of commuter traffic using Highway No. 1 East to access Regina in the peak morning and afternoon hours.

3.3 Traffic Volumes

There have been significant increases in regional traffic volumes over the past 20 years. Since the regional planning process started in 1993, there has been a 55% increase in daily traffic volumes on Highway No. 1 immediately east of Tower Road, and a 37% increase in daily traffic volumes on Highway No. 1 immediately west of Lewvan Drive. Table 7 demonstrates the growth in average annual daily traffic volumes (AADT) between 1993 and 2011.

Table 7 – Highway No. 1 Traffic Growth: 1993 - 2011

	1993 AADT	2011 AADT	Increase in AADT	% Increase in AADT
Highway No. 1 West of Lewvan Drive	8,570	11,700	3,130	37%
Highway No. 1 East of Tower Road	14,880	23,020	8,140	55%

Initial estimates used in previous planning studies assumed relatively low growth rates on Highway No. 1 – just over 1 percent per year. As seen in Table 8, this estimate was fairly accurate over the first 14 years of the process, until the detailed functional design was completed and approved in 2007.

Table 8 – Highway No. 1 Traffic Growth: 1993 - 2007

	1993 AADT	2007 AADT	Increase in AADT	% Increase in AADT	Annual Increase in AADT	Annual % Increase in AADT
Highway No. 1 West of Lewvan Drive	8,570	9,240	670	8%	48	0.56%
Highway No. 1 East of Tower Road	14,880	18,440	3,560	24%	254	1.71%

Since that time, regional traffic volumes have increased dramatically. Table 9 presents how the traffic volumes have changed on Highway No. 1 at the east and west limits of Regina between 2007 and 2011. The increase in traffic over this time period is over 6 percent per year.

Table 9 – Highway No. 1 Traffic Growth: 2007 - 2011

	2007 AADT	2011 AADT	Increase in AADT	% Increase in AADT	Annual Increase in AADT	Annual % Increase in AADT
Highway No. 1 West of Lewvan Drive	9,240	11,700	2,460	27%	615	6.66%
Highway No. 1 East of Tower Road	18,440	23,020	4,580	25%	1,145	6.21%

This traffic growth on Highway No. 1 is a combination of background growth on the provincial and national highway system, growth in City of Regina traffic volumes, and growth in commuter traffic to and from the bedroom communities around Regina. As indicated in the *Highway No. 1 East Functional Planning Study*, the majority of the growth in traffic on Highway No. 1 east of Tower Road is due to growth in the communities east of Regina. It should be noted that no matter where the east terminal of the Southeast Bypass is constructed, high volumes of commuter traffic will still travel into the city on a daily basis.

The Global Transportation Hub being developed west of Regina is also contributing to regional traffic growth. The primary access point for the GTH is via the West Regina Bypass, which intersects with Highway No. 1 approximately 3 miles west of Regina. A week long traffic count conducted by MHI in March of 2012 revealed the following information about existing traffic on the WRB immediately north of Highway No. 1:

- Average Daily Traffic Volume (both directions) – 1,792 vehicles per day
- Average Daily Truck Volume (both directions) – 339 trucks per day
- Total number of trucks per week – 2,367

A portion of this traffic originates from the east, and this traffic would presumably use a Southeast Bypass route to access the GTH without having to pass through Regina. At the moment, this represents a small increase to traffic on Highway No. 1 east of Regina – there are currently over 2,000 trucks per day travelling on Highway No. 1 east of Tower Road. However, this only represents the first phase of the Global Transportation Hub operations. At the time that this report was prepared a comprehensive estimate of future traffic volumes generated by the GTH was not available, but GTH related traffic is expected to increase steadily over the next 10 to 20 years.

The traffic volumes on the regional road network have been increasing significantly over the past five years due to residential growth in the region, and truck traffic is projected to grow steadily due to the development of the Global Transportation Hub. This increase in traffic highlights the need for a Southeast Bypass around Regina, but does not necessarily indicate that the approved route will not meet the demand.

In terms of the east terminal, anywhere outside of the City's development boundary will split a portion of the highway traffic around the city. However, much of the traffic will still be bound for the City, regardless of the location of the bypass. It is assumed that the closer the bypass is to the City, the more City traffic will use it. Moving the bypass further from Regina will result in comparatively lower traffic volumes. A highway bypass is a very expensive piece of infrastructure, and to provide it for low volumes of traffic would not be cost effective. These issues were taken into consideration during the initial route evaluation in 2004.

The west terminal of the Southeast Bypass presents a new opportunity. The development of the Global Transportation Hub has introduced new infrastructure to the region, along with new traffic volumes and patterns. There will be a significant amount of truck traffic that will be attempting to bypass the City in order to access the West Regina Bypass. Tying the Southeast Bypass into the West Regina Bypass may not have made sense at the time that the Southeast Bypass alignment was approved, but now it seems to be a logical and useful connection.

3.4 Traffic Operations

Under existing conditions, east/west traffic attempting to bypass the City of Regina must travel through the City on Ring Road and Victoria Avenue East. This contributes to traffic congestion on Victoria Avenue East as the bypass traffic mixes with local commuter and commercial traffic.

One of the key intersections along the current highway alignment is the Ring Road and Victoria Avenue East interchange, as shown in Figure 14. Traffic operations were reviewed at the west ramps of the interchange to help determine the existing need for a Southeast Bypass.

The intersection of Victoria Avenue East and the west ramps for the Ring Road interchange is controlled by traffic signals. Victoria Avenue East traffic flows east/west. The north leg of the intersection is the southbound exit ramp from Ring Road – traffic can only travel southbound on this leg, and must turn left or right onto Victoria Avenue. The south leg of the intersection is the southbound entrance ramp for Ring Road – traffic enters this leg from Victoria Avenue, and must proceed south to join Ring Road.

The key movements at this intersection are the westbound left turn, the southbound left turn, and the eastbound through movement. The westbound left turn represents the westbound traffic on Victoria Avenue that is turning left to head south on Ring Road, following the existing Highway No. 1 alignment. The southbound left turn represents traffic on Ring Road that is attempting to turn eastbound onto Victoria Avenue East. The eastbound through movement represents traffic that is leaving downtown Regina to access residences and shopping areas in east Regina, or to continue on to Highway No. 1 East.

These three movements are in conflict, which causes delays during the peak hours of traffic. The movements can only operate one at a time, and the traffic signals apportion green time to each based on the traffic volumes. The existing afternoon peak hour traffic volumes and Levels of Service (LOS) are shown in Figure 15.

Figure 14 – Ring Road and Victoria Avenue East: West Ramps

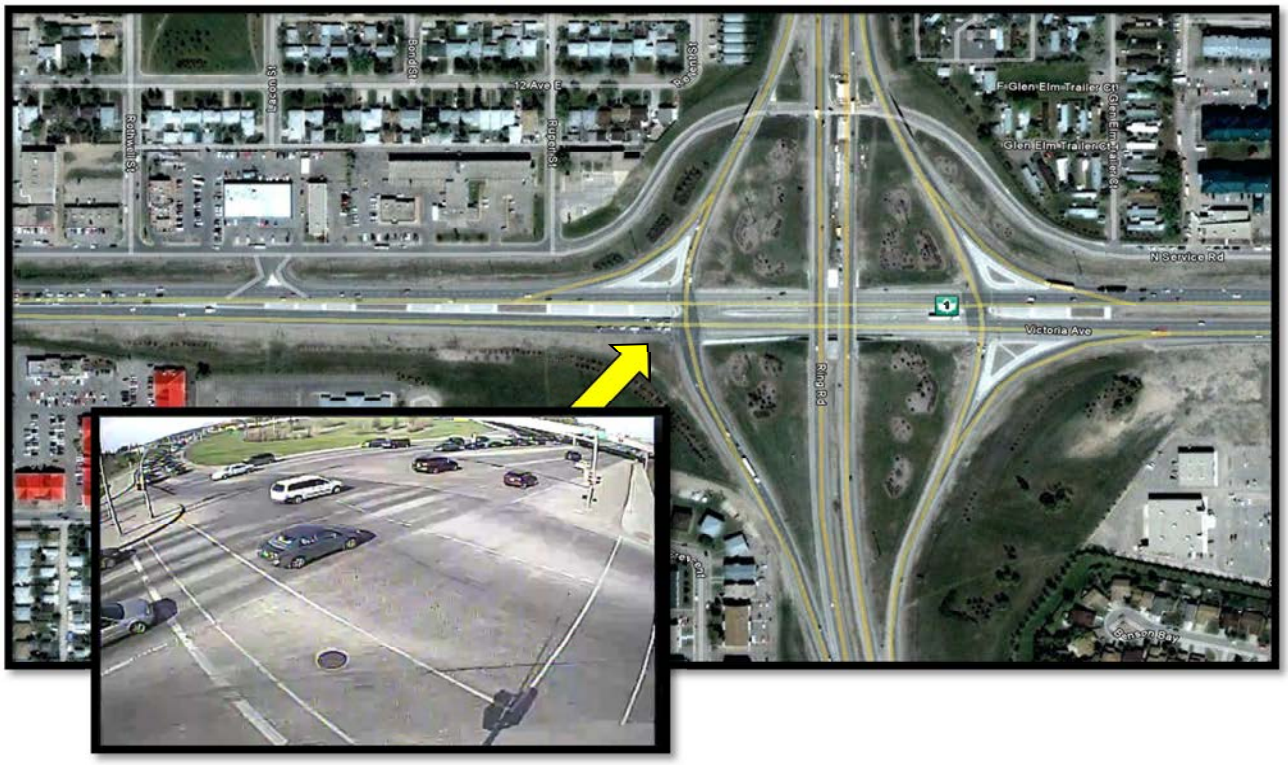
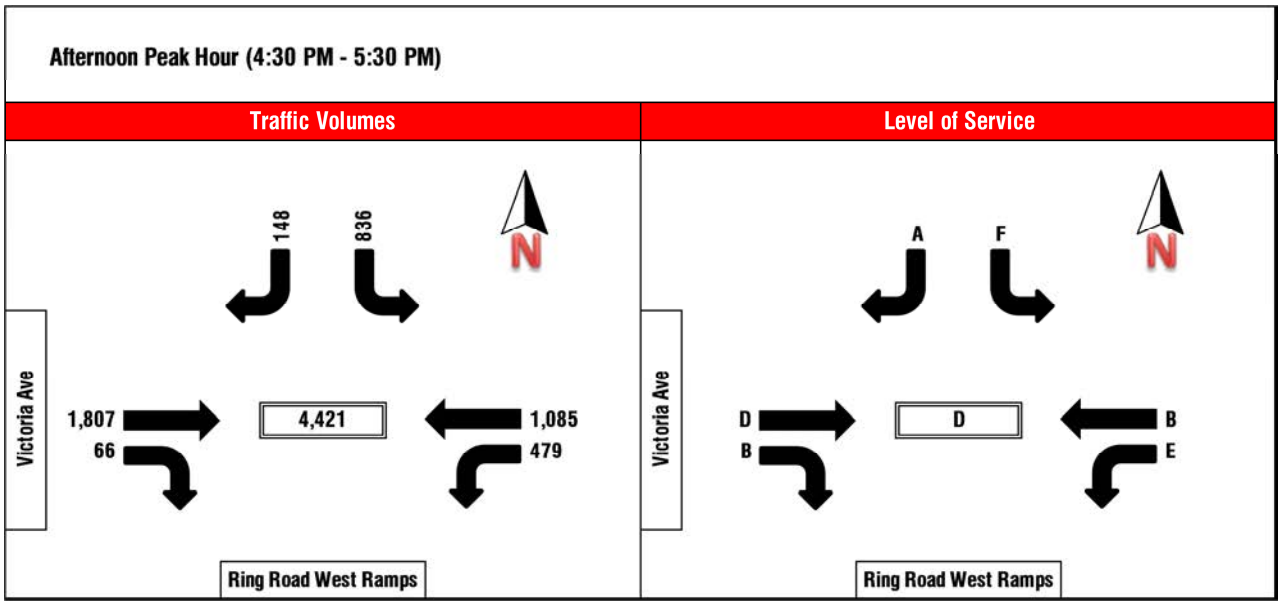


Figure 15 - Analysis Results: Ring Road & Victoria Avenue East



The data for this analysis was collected on May 15, 2012, using a Miovision camera system. The LOS calculations for this analysis were performed using Synchro Version 8, an industry standard traffic micro simulation software application. The LOS for a movement is based on the delay per vehicle experienced

by the traffic attempting to make the movement. The LOS is represented by a letter grade, ranging from A to F. An A grade represents a free-flow condition, while F represents a failure, or gridlock condition. A grade of D is generally considered the lowest acceptable LOS, though an E may be acceptable for certain movements (usually left turns) when time for that movement is sacrificed to serve a more important movement.

Note that the intersection is currently at a level of service D in the afternoon peak hour, and several of the critical movements are operating at or near a failure condition. The southbound left is operating at LOS F. Traffic has been observed backing up on this ramp almost to the point of backing onto Ring Road. The westbound left turn, the traffic attempting to follow the existing alignment of Highway No. 1, is operating at LOS E. Analysis indicates that a traffic volume increase of 10% will likely cause a failure in this movement.

Note that this analysis is independent of adjacent intersections, and only speaks to the operation of this intersection as an isolated location. Still, it is clear that this intersection is reaching its limit in terms of the traffic volumes that it can efficiently process.

A Southeast Bypass would divert some of this traffic. It is assumed that the further out the bypass is from the City limits, the fewer vehicles will use it. If the bypass is too far outside of Regina, it will have limited impact on this intersection. One of the benefits of having the bypass closer to Regina is that it may divert some of the intercity traffic from this intersection as well. This was considered in the initial determination of the Southeast Bypass route.

3.5 Significant Changes to the Regional Road Network

There have been a number of changes to the regional road network since the Southeast Bypass alignment was approved in 2004, but two of the most significant changes have been the development of the West Regina Bypass and the Highway No. 1 East road network plan.

West Regina Bypass

The West Regina Bypass alignment was included in the 1996 *Regina Regional Highway Planning Study*. At the time, and for many years following, it was assumed that the Southeast Bypass would be required first. The development of the Global Transportation Hub has accelerated the timeline for the West Regina Bypass.

The first phase of the bypass is in place – an upgraded alignment along Pinkie Road that links Highway No. 1 to Dewdney Avenue. An interchange at the Highway No. 1 intersection is currently under construction, with a target completion date of fall 2013. The West Regina Bypass will eventually link Highway No. 1 with Highway No. 11, forming a true bypass link around the west side of Regina.

With the development of this bypass link, there comes a valuable opportunity that did not exist at the time the Southeast Bypass alignment was determined. The interchange being constructed to provide access

from Highway No. 1 onto the WRB can be upgraded to act as a connection between the WRB and the Southeast Bypass. Not only would this provide a logical connection between highway bypass segments, but it would pull bypass traffic entirely off of City roadways, and would eliminate the need to construct a complex and unconventional interchange on Ring Road.

Highway No. 1 East

The *Highway No. 1 East Functional Planning Study* reviewed the key access points along Highway No. 1 between Tower Road and Highway No. 10. This stretch of Highway No. 1 includes two highway-to-highway intersections (Highway No. 48 and Highway No. 46) and several important community access points. Traffic generated by the growth of the bedroom communities east of Regina were creating issues that required a new transportation plan for the corridor.

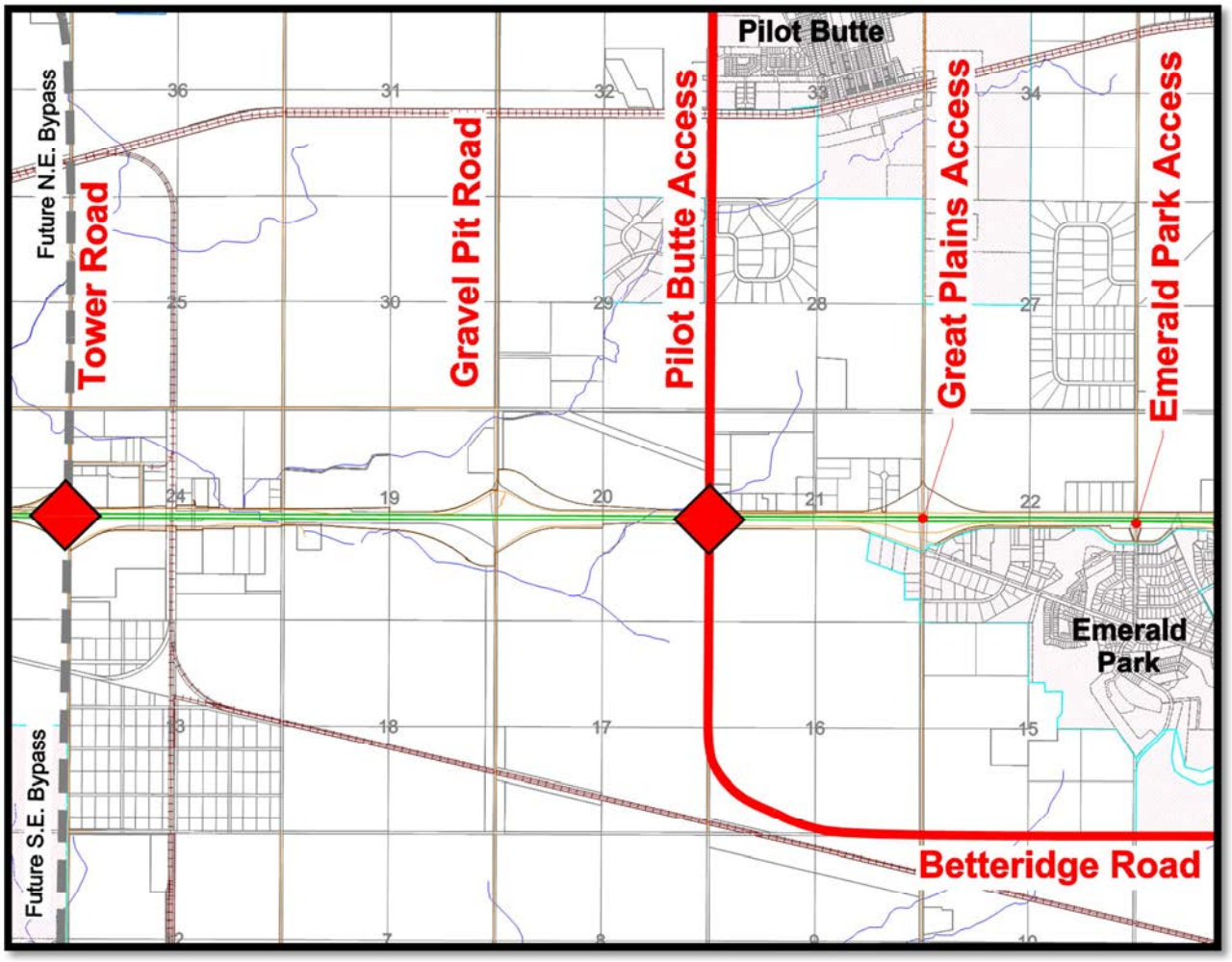
This planning study assumed that the east terminal of the Southeast Bypass would be located at Tower Road, as per the approved plan. With this in mind, a road network plan was developed to preserve free flow on Highway No. 1, while maintaining safe access for the communities in the area. The key to the plan is the location of the interchanges and associated roadways. Interchanges are planned along Highway No. 1 at the following intersections east of Tower Road: Pilot Butte Access, Highway No. 48, and Highway No. 46.

The process for determining these interchange locations involved a large stakeholder and public consultation component that resulted in agreement between the area communities. The plan was received and approved by MHI in 2010. Figure 16 identifies the three mile spacing between the east terminal of the Southeast Bypass (Tower Road) and the first interchange on the Highway No. 1 East corridor at the Pilot Butte Access. It should be noted that if the east terminal of the Southeast Bypass is moved further east, it could disrupt the existing plan for the Highway No. 1 East corridor, as a minimum distance of two miles should be maintained between interchange locations for operational efficiency and safety.

3.6 Geometric Review

A high level geometric review was conducted focusing on the proposed interchange design configurations at the east and west terminals. Maintaining an acceptable level of operation and meeting the expectations of the drivers is key to having a safe, efficient roadway. When drivers are overloaded with unfamiliar situations or design components, or experience increased conflicts with other vehicles as a result of high traffic volumes, the risk of collisions increases. As well, drivers expect a level of consistency in the network, so what is proposed at the terminals to this roadway should be consistent with adjacent roadway components, or better yet provide a higher level of service throughout.

Figure 16 – Southeast Bypass and Highway No. 1 East



With respect to driver expectancy, one of the key issues at either terminal will be the prioritization of roadways, between the Bypass and the potentially higher volume roads it will merge with. Those unfamiliar with the area may not expect to have to exit from their roadway in order to remain on the Trans-Canada Highway. The presence of any left-hand exits or entrances may also affect driver expectancy, but could potentially be designed as more of a merging of equal priority roadways to reduce this risk of confusion if there is enough area to do so.

West Terminal

As mentioned, a major change to the road network in this area is the development of the Global Transportation Hub, which will increase the number of trucks travelling on this route. The proposed west terminal located east of Highway No. 6 would result in higher traffic volumes at the existing and future interchanges between the GTH and the west terminal. Existing interchanges along Highway No. 1 near this location include the recently constructed interchange at Lewvan Drive and the interchange at Highway No. 6. Construction of a service interchange at the West Regina Bypass and Highway No. 1 intersection is currently underway.

The increase in truck traffic would impact the acceleration, deceleration and merging movements at all of these interchanges. Of particular concern is the weaving that will take place in the short weaving zones at the south loops of the Highway No. 6 interchange, and in the key merge areas between Ring Road and the South Bypass.

Due to the age and design of the Highway No. 6 and Highway No. 1 cloverleaf interchange, it is likely that it would be affected to a greater degree by this volume increase and mix of traffic. The proposed design includes some mitigation strategies, including construction of a collector-distributer (C-D) road and the introduction of safety barriers to address the constraints under the bridge after the proposed modifications; however this configuration may still be sensitive to increases in traffic flows and truck percentages.

Geometrically the key areas of concern appear to be:

- The speed differentials that currently exist between eastbound traffic on the different legs of the loop ramps at Highway No. 6 (possibly reduced but not eliminated by the C-D road improvements)
- The short weave distance for westbound movements between the merge of the Bypass and Ring Road, and the adjacent Highway No. 6 interchange. The *Transportation Association of Canada Geometric Design Guide for Canadian Roads (Section 2.1.7.3)* suggests that "for efficient operation on freeways, weaving length between a freeway interchange and an arterial interchange should be in the range of 800 m to 1000 m and between arterial interchanges in the range of 550 m to 700 m." Based on the proposed design, there is approximately 450 m of weaving distance available for this movement.
- Any reduction in the spacing of the loop ramps south of Highway No. 1 resulting from moving the C-D road south will require a reduction in the entrance or exit radii of the two affected loop ramps in the south, which falls in the highest travelling speed section of these ramps. This would somewhat reduce the safe operating speeds on these two loop ramps.
- The short distance on the Highway No. 1 eastbound exit ramp between the divergence of traffic destined for either Albert Street northbound or Highway No. 6 southbound. The eastbound entrance ramps from the Lewvan Drive and Highway No. 1 interchange may affect how far west this ramp could be realigned to increase this distance, and would need to be looked at in more detail.

Contextually, this configuration would match the adjacent interchanges east and west of this terminal. Spacing is minimal between the Highway No 6 interchange and this terminal, so this would be an area of increased decision-making as outlined previously.

East Terminal

Aside from increases in traffic volumes and the recent improvements to increase capacity of Victoria Avenue East, there haven't been any large infrastructure changes in the area around the east terminal that would affect the design.

Contextually, any interchange at this location would initially be a significantly higher level of service than adjacent intersection treatments. To the west, there are a number of signalized interchanges between this location and the interchange at Ring Road. To the east, most existing intersections are at-grade with Highway No. 1, with the closest proposed interchange being located at the Pilot Butte Access.

The lack of certain movements or difficulty in accommodating all movements could be seen as a key factor in the success and acceptance of the proposed design. The ability of the proposed design to integrate with a future northeast bypass is also a key consideration in the design. Alternative designs may be more suitable and allow for increased movements to and from the City if they didn't need to accommodate this growth at this location. However, the flexibility to allow for this Northeast Bypass is a key benefit of the proposed design.

With regards to geometrics and driver expectancy which are tied together, it may seem out of place for westbound or eastbound traffic passing by Regina to be required to take a single lane exit ramp to remain on Highway No. 1. In addition, the westbound through traffic is required to take a left hand exit to do so. A possible solution would be to design this movement such that it is a two lane flyover ramp consistent with similar design features as Highway No. 1 throughout, and maintain a two lane exit into Regina on Victoria Avenue east. Clearly there would be an additional expense in road and bridge costs to create this consistency in the design, which would need to be weighed against the benefits.

3.7 Stakeholder Consultation

Steering Committee

The project was guided by a Steering Committee made up of representatives from the province and the impacted municipalities in the area. The Steering Committee was tasked with selecting a consultant to perform the study, and to ensure that the work was done according to the Terms of Reference. A Steering Committee meeting was held prior to the initiation of the study, and another meeting was held on September 5, 2012 to review the final recommendations.

The Steering Committee Members are listed below:

- Miranda Carlberg, Ministry of Highways and Infrastructure – Systems Planning and Management
- Brent Miller, Ministry of Highways and Infrastructure – Southern Region
- Ralph Leibel, Ministry of Government Relations
- Michael Fougere, City of Regina
- Kevin Eberle, RM of Sherwood
- Reinhold Sauer, RM of Edenwold
- Sid Bowles, Town of Pilot Butte
- Bruce Evans, Town of White City
- Tim Sterzer, Town of Balgonie

Technical Project Committee

A Technical Project Committee was formed to help provide input into the study, and to review the results of the conditions assessment. The Technical Project Committee met on April 12, 2012 to initiate the project, and again on June 28, 2012 to review the draft recommendations.

The Technical Review Committee members are listed below:

- Harold Retzlaff, Ministry of Highways and Infrastructure – Systems Planning and Management
- Viranga Tennakoon, Ministry of Highways and Infrastructure – Systems Planning and Management
- Penny Semczyshyn, Ministry of Highways and Infrastructure – Southern Region
- Kelly Wyatt, City of Regina
- Rod Benroth, RM of Sherwood
- Reinhold Sauer, RM of Edenwold
- Sid Bowles, Town of Pilot Butte
- Howard Slack, Town of White City
- Carson Leib, Town of Balgonie

Stakeholder Meetings

During the months of May and June of 2012, representatives from MMM Group Limited met with representatives from the following stakeholder groups:

- City of Regina
- RM or Sherwood
- RM of Edenwold
- Town of Pilot Butte
- Town of White City
- Town of Balgonie
- MHI Systems Planning Branch
- MHI Southern Region

The purpose of this consultation program was to determine the current feeling about the approved Southeast Bypass alignment, particularly with regards to the east and west terminal locations. The original decision was made with the consideration of specific stakeholder viewpoints, as recorded in the *Southeast Regina Bypass Functional Study*. If the stakeholder perspectives have changed since that time, it could impact the decision to reopen an investigation into the alignment of the Southeast Bypass.

The general outcomes of the stakeholder consultations are as follows:

- West Terminal
  - There is a desire to move the existing alignment and connect directly into the West Regina Bypass
  - There are fewer impacts to stakeholders on the west end compared to the east end
- East Terminal
  - There is a general desire to move the alignment further east, but there is no consensus on what location presents a better option for the east terminal
  - It was difficult to get a clear indication as to why the alignment should be moved or where it should it be moved to
  - It was consistently felt that the alignment infringed on the urban development area
  - There was a desire to provide better access to/from Regina from east terminal interchange

Final Steering Committee Meeting

A final Steering Committee meeting was held on September 5th, 2012, during which representatives from MMM Group presented the study results and final recommendations. Steering Committee members were given the opportunity to comment on the recommendations and indicate whether they felt that the consultant had met the Terms of Reference for the study.

Representatives from the RM of Sherwood were not able to attend the final Steering Committee meeting. A supplemental meeting was held on September 20th, 2012 to give representatives from the RM of Sherwood the opportunity to hear the same presentation given at the final Steering Committee meeting, and provide comments.

The consultant's recommendations (as shown in Section 5 of this report) were accepted by the Steering Committee. It was agreed that the consultant followed the Terms of Reference and completed the review to the satisfaction of the Steering Committee members.

The following additional comments were provided by the Steering Committee:

- Moving the east terminal of the Southeast Bypass out to Highway No. 46 would provide a true highway bypass for the area, but it is understood that the cost of this facility is prohibitive
- Constructing the Southeast Bypass with an east terminal at Tower Road can work, provided that it is integrated with the plan for the Highway No. 1 East corridor between Tower Road and Balgonie
- There is still a need to provide safe access to Highway No. 1 for all of the communities east of Regina – the interchanges planned at Pilot Butte Access, Highway No. 48, and Highway No. 46 are critical
- If the Southeast Bypass/Highway No. 1 East corridor is protected properly (i.e. limited access provided at interchanges) it will function safely and efficiently for years to come

- There are major concerns from the steering committee members if the recommended changes to the Southeast Bypass alignment delays the plans to design and construct the interchanges along the Highway No. 1 East corridor
- It was noted that if the east terminal of the Southeast Bypass remains at the approved Tower Road location, the work on the Highway No. 1 East corridor can proceed independent of the plans for the Bypass
- The Tower Road interchange should be designed for free-flow operation – this can be addressed through a Value Engineering analysis, as proposed in the study recommendations

4.0 PERFORMANCE EVALUATION

The conditions assessment revealed that there have been many changes in the region since the Southeast Bypass alignment was approved in 2004. Some of these changes will have a greater impact on the Southeast Bypass than others.

Area population and traffic volumes have increased more rapidly in recent years than anticipated. While these changes put increased pressure on the road network and accelerate the need for a new bypass, they do not necessarily represent a material change that would indicate the bypass will not function appropriately in its current location.

City development is encroaching on the approved Southeast Bypass route. However, this route has been known for some time, and it was accepted that development would occur up to the roadway. The railway tracks still represent a barrier to City growth, even if the Bypass was moved further east.

The following material changes have been identified which may influence the decision to maintain the current Southeast Bypass alignment, or evaluate other options:

- *Global Transportation Hub* – the development of the GTH will lead to an increase in heavy truck traffic that needs a safe and efficient route around the City of Regina.
- *West Regina Bypass* – phase one of the West Regina Bypass is already operational, and an interchange at the Highway No. 1 and West Regina Bypass intersection is currently under construction. There is an opportunity to link this infrastructure to the Southeast Bypass alignment.
- *Highway No. 1 East Functional Plan* – an interchange location and staging plan has been developed for Highway No. 1 east of Regina. This plan was established with the assumption that the east terminal of the Southeast Bypass would be at Tower Road. A change to the east terminal location could negatively impact this plan.

A performance evaluation of the approved Southeast Bypass alignment was undertaken with these changes in mind. Alternate options for the Southeast Bypass terminals were included in the evaluation for comparative purposes.

4.1 Performance Evaluation Criteria

Table 10 presents the criteria that were developed for the performance evaluation. These criteria were established to help determine if the approved Southeast Bypass alignment can still meet the needs of the regional road network, given the changes that have occurred since the alignment was developed, and the geometric design issues that have been identified. Note that the performance evaluations contained in this report do not represent a full evaluation of options. They are meant to help establish the level of confidence in the potential performance of the approved alignment.

Table 10 – Description of Evaluation Criteria

Consideration	Description of Need
System interchanges at bypass terminals	Provide free-flow directional ramps for primary movements. Local access typically not provided
Connectivity to other Bypasses / Network Planning	Consider the planning of other bypasses and the connection to those bypasses
Accommodation of City traffic from Bypass	Establish how City traffic will be accommodated at key interchanges along the bypass
Impact to other existing and planned interchanges	Keep a minimum separation of 3.2 km (2 mi) between interchanges
Development impacts along alignment	Impact caused by the alignment on existing or proposed land uses, with a focus on residential
Traffic operations efficiency	Limit system bottlenecks such as weaving sections, merging sections, etc.
Geometric design	Meeting standard interchange and highway design criteria
Infrastructure required	Limit the need for additional infrastructure or length of infrastructure

Three level rating system:

Good	▲
Adequate	●
Poor	▼

4.2 Performance Evaluation Results

West Terminal Performance

Table 11 contains the results of the performance evaluation for the approved west terminal. Note that there are several deficiencies that will be difficult to mitigate.

Table 12 presents the performance evaluation results for the approved west terminal compared to the results for the west terminal at the West Regina Bypass location. Note that the West Regina Bypass location outperforms the current approved location on Ring Road in most categories.

Table 11 – Performance Evaluation for Approved West Terminal Location

Consideration	Approved Ring Road Tie-in
System interchanges at bypass terminals	●
Connectivity to other Bypasses / Network Planning	▼*
Accommodation of City traffic from Bypass	▼*
Impact to other existing and planned interchanges	●
Development impacts along alignment	▼*
Traffic operations efficiency	▼*
Geometric design	▼*
Infrastructure required	▼

* Either very difficult or not possible to mitigate

Table 12 – Comparison of West Terminal Options

	West Terminal Location	
Consideration	**Approved Ring Road Tie-in**	**West Bypass**
System interchanges at bypass terminals	●	▲
Connectivity to other Bypasses / Network Planning	▼*	▲
Accommodation of City traffic from Bypass	▼*	●
Impact to other existing and planned interchanges	●	●
Development impacts along alignment	▼*	▲
Traffic operations efficiency	▼*	▲
Geometric design	▼*	●
Infrastructure required	▼	●

* Either very difficult or not possible to mitigate

East Terminal Performance

Table 13 contains the results of the performance evaluation for the approved east terminal. The accommodation of City traffic from the Bypass is deemed to be poor, but this can be mitigated through design changes to the interchange. However, it will be difficult to mitigate the development impacts associated with this alignment.

Table 13 – Performance Evaluation for Approved East Terminal Location

Consideration	Approved Tower Road Tie-in
System interchanges at bypass terminals	▲
Connectivity to other Bypasses / Network Planning	▲
Accommodation of City traffic from Bypass	▼
Impact to other existing and planned interchanges	▲
Development impacts along alignment	▼*
Traffic operations efficiency	●
Geometric design	●
Infrastructure required	●

* Either very difficult or not possible to mitigate

Table 14 presents the performance evaluation results for the approved east terminal compared to the results for the east terminal Gravel Pit Road, and the Pilot Butte Access. Note that the Pilot Butte Access does not appear to be an appropriate location for the bypass. The approved Tower Road location and the Gravel Pit Road location are similar in many aspects. As indicated in previous reports, there is a significant cost required to move the bypass beyond the railroad tracks to Gravel Pit Road, though there is little in the way of offsetting benefit. Another negative impact associated with this location that cannot be easily mitigated is the impact to the Highway No. 1 East functional road network plan.

Table 14 – Comparison of East Terminal Options

Consideration	East Terminal Location		
	Approved Tower Road Tie-in	Gravel Pit Road	Pilot Butte Access
System interchanges at bypass terminals	▲	▲	▼*
Connectivity to other Bypasses / Network Planning	▲	▲	▼*
Accommodation of City traffic from Bypass	▼	●	●
Impact to other existing and planned interchanges	▲	▼*	▼
Development impacts along alignment	▼*	▲	▼*
Traffic operations efficiency	●	●	▼*
Geometric design	●	●	▼*
Infrastructure required	●	▼*	▼*

* Either very difficult or not possible to mitigate

5.0 RECOMMENDATIONS

1. It is recommended THAT:

- The west half of the Southeast Regina Bypass alignment (from Highway No. 33 to the curve in Ring Road) extend further to the south around Regina; and,
- The west terminal of the Southeast Regina Bypass be moved 7.5 km west, providing a direct connection to the West Regina Bypass.

Required actions:

- A route location study be undertaken to finalize the recommended alignment
- Conduct public consultation for the new route

2. It is recommended THAT:

- Tower Road remain as the east terminal of the Southeast Regina Bypass. No material changes were identified through the review to suggest altering the location.

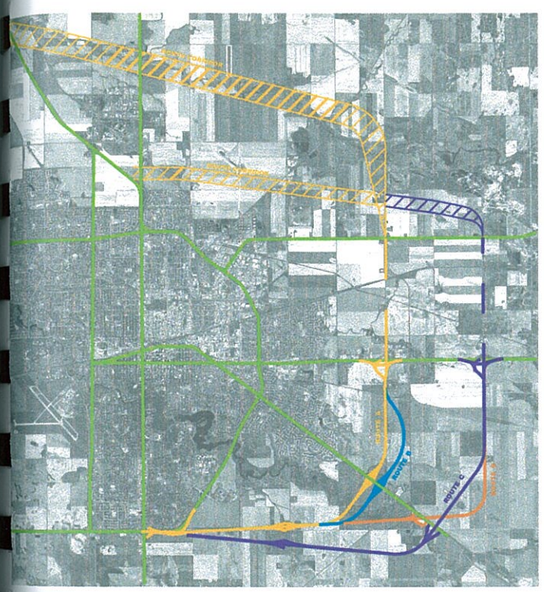
Required actions:

- Conduct a high level assessment of the Northeast Regina Bypass alignment in relation to a Tower Road connection
- Undertake a review of the interchange design at Tower Road, including a Value Engineering analysis. Consider methods to incorporate City traffic at the east terminal interchange
- Take efforts to preserve the work completed on the Highway No. 1 East Functional Planning Study, including the location of other interchanges. The study was endorsed by study partners and approved by the Ministry

MMM Group Ltd.

APPENDIX A – 2004 Functional Plan - Route Evaluation Results

TRANSCANADA HIGHWAY SOUTHEAST BYPASS AT REGINA
CORRIDOR/ROUTE EVALUATION



KEY PLAN

CONSIDERATIONS		ROUTES				
		EXISTING	A	B	C	D
Highway to Highway Rural to City Dangerous Goods Emergency Vehicles Signing Simplicity & Clarity Controlled Highway Access	PUBLIC	-At Grade Signalized Intersections (Congestion) -Reduced Speed Routes -Complex Highway Guide Signing	-Serves Some Intra-City Travel -Highway Trucks Removed From City -Ancillary Emergency Vehicle Route -Broader Range of users Receiving Benefits	-Highway Trucks Removed From City -Ancillary Emergency Vehicle Route	-Highway Trucks Removed From City -Dangerous Goods Well Removed From City -Direct Highway route Signing -Good Inter Provincial Travel	-Highway Trucks Removed From City
Planning & Zoning Impact on Existing Business Future Development Controls Route Right of Way Safety	SOCIAL	-Safety (Truck\Car Conflicts) -No Change to Business Access -Increased Traffic Congestion	-Compatible With Future Planning & Development -Minimizes Property (Right of Way) Requirements -Straight Forward Frontage Road options -Good Visibility of Access to City Centre	-Additional Area Available for City Expansion -Good Visibility of Access to City Centre	-Intra City Use Limited -Large Property Requirement	-Intra City Use Limited -Affects Existing Development
Vehicle Emissions Noise Visual/Aesthetic Harmony Sensitive Land Areas Shelter Belts/ Native Vegetation	ENVIRON-MENTAL	-Vehicle Emissions Most Severe -Noise Levels Most Severe -Lowest Impact On Uncultivated Lands	-Proximity to Chuka Creek -Impacts Uncultivated Lands	-Land Severance -Impacts Uncultivated Lands	-Reduced Impact From Vehicle Emissions and Noise -Land Severance -Impacts Cultivated Lands	-Land Severance -Reduced Impact From Vehicle Emissions and Noise -Impacts Cultivated Lands
Route Lengths Route Alignment Interchange Operation Railway Crossings Drainage Courses Utility Impacts Staging Opportunities	ROADWAY	-Interrupts the Flow of Highway Traffic	-Shortest Route -No New Railway Crossings -Simple Interchange at Highway No. 33 -Least Impact	-Impact on Chuka Creek Minimized -No New Railway Crossings -Right Angle Crossing at Highway no. 33	-Three Railway Crossings -Least Impact on Sask Power Facilities -More Complex Interchange at Highway No. 33 and CPR -Several Pipeline Crossings	-Three Railway Crossings -Highway No. 33 Crossing on Skew -More Complex Interchange at Highway No. 33 -Bypass Route Must Cross Over Highway No. 33 and CPR
Community Construction Land Acquisition	COSTS	-Rehabilitation and Upgrading $15.0 Million	STAGE 1 $21.0 Million ULTIMATE STAGE $39.0 Million	STAGE 1 $22.0 Million ULTIMATE STAGE $41.0 Million	STAGE 1 $30.0 Million ULTIMATE STAGE $52.0 Million	STAGE 1 $30.0 Million ULTIMATE STAGE $53.0 Million

[FIG 15]
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Saskatchewan Highways and Transportation

Client/Project
SASKATCHEWAN HIGHWAYS AND TRANSPORTATION

Figure No.
15

Title
REGINA SOUTHEAST BYPASS

REGINA SOUTHEAST BYPASS
CORRIDOR/ROUTE EVALUATION

Criteria	Inner Corridor (Tower Rd)		Outer Corridor (Gravel Pit Road)		Weighting
	Route A	Route B	Route C	Route D	
Public					
Highway user	♦♦	♦	♦♦♦	♦♦	
Commuter	♦♦♦	♦♦♦	♦♦	♦♦	3♦
Access	♦♦♦	♦♦♦	♦♦	♦♦	
Dangerous goods	♦	♦	♦♦♦	♦♦♦	
	9x3=27	8x3=24	10x3=30	9x3=27	
Socio-Economic					
Social impacts	♦	♦♦	♦♦♦	♦♦♦	
Shopping/services	♦♦	♦♦	♦	♦	
Recreational	♦♦	♦♦	♦♦	♦♦	3♦
Economic factors	♦♦♦	♦♦♦	♦	♦	
Existing Businesses	♦♦♦	♦♦♦	♦	♦	
	11x3=33	12x3=36	8x3=24	8x3=24	
Environmental					
Land Use (severance)	♦♦	♦♦	♦	♦	
Sensitive terrain	♦	♦	♦	♦	
Shelter belts & native vegetation	♦	♦	♦♦	♦	
Sensitive fish & wildlife habitat	♦♦♦	♦♦♦	♦♦♦	♦♦♦	2♦
Heritage & designated parks	♦♦	♦♦	♦♦	♦♦	
Noise impacts	♦♦	♦♦	♦♦♦	♦♦	
	11x2=22	11x2=22	12x2=24	10x2=20	
Roadway Design					
New Route Lengths	♦♦♦	♦♦	♦	♦	
Geometric alignment	♦♦	♦	♦	♦	
Interchange maneouverability	♦♦	♦♦	♦	♦	4♦
Railroad crossings	♦♦♦	♦♦♦			
Right-of-way	♦♦♦	♦♦		♦	
Utilities	♦	♦	♦♦	♦	
	14x4=56	11x4=44	5X4=20	5X4=20	
Geotechnical					
Physiography					
Topographic features	COMMON TO ALL ALTERNATES				3♦
Geomorphology & stratigraphy					
Hydrogeology					
Costs					
Capital	♦♦♦($39M)	♦♦♦($41M)	♦($52M)	♦($53M)	
Staging opportunities	♦♦	♦♦	♦♦	♦♦	5♦
Roaduser	♦♦	♦♦	♦♦	♦♦	
	7x5=35	7x5=35	5x5=25	5x5=25	
General					
Link to the Northeast Bypass	♦♦♦	♦♦♦	♦♦♦	♦♦♦	3♦
National Highway Program goals	♦♦	♦♦	♦♦♦	♦♦♦	
	5x3=15	5x3=15	6x3=18	6x3=18	
Stakeholders					
Public input/acceptance	♦		♦♦♦		
R.M. of Edenwold			♦♦♦	♦	
R.M. of Sherwood	No response				5♦
City of Regina	♦♦♦	♦			
Cowessess TLE			♦	♦♦♦	
Regina Chamber	No response				
	4x5=20	1x5=5	7x5=35	4x5=20	
TOTAL EVALUATION CREDITS	208	181	176	154	
EVALUATION CR/$MILLION SPENT	5.33	4.42	3.39	2.91	

LEGEND
Best ♦♦♦
Better ♦♦
Good ♦
Poor

Figure No. 16

APPENDIX B – 2007 Detailed Functional Plan – List of Stakeholders

HIGHWAY NO. 1 SOUTHEAST REGINA BYPASS
DETAILED FUNCTIONAL STUDY

CONSULTATIONS

The following is a list of firms, agencies, organizations, and individuals that were involved in the study consultations:

- Saskatchewan highways and Transportation:

  Terry Bloome
  Jon Wyatt
  Terri Arendt
  Jeffrey Holland
  Sukhy Kent
  Harold Retzlaff
  Miranda Carlberg

- Rural Municipalities
  - RM of Sherwood #159

    Administrators:
    Debbie Kusler
    Colleen Christopherson
    Tina Douglas

    Reeves:
    Jack Drew
    Linda Boxall

    Councilors:

    Paul Fournier, Jack Wilke, Wally Johnson, Roy Klym, Rod Brown, James Farley, Kevin Eberle, Doug Harle

  - RM of Edenwold #158

    Administrators:
    Donna Strudwick
    Sherry Wagman

    Reeve:
    Ron Dielschneider

    Councilors:
    Betty Capnerhurst, Mitch Huber, Dan Thibault, Dwayne Radmacher, Reinhold Sauer, Grant Fahulman

- City of Regina

Mayor:	Pat Fiacco
City Manager:	Bob Linner
Engineering:	Harlan Ritchie, Dorian Wandzura, Allan Duff, Joe Hladky, Kelly Wyatt, Monique Kealey
Urban Planning:	Garry Quiring

Community Services:	Peggy Clark
Fire Chief:	Jack Lichtenwald
Transit:	Don Hnetka
Councilors:	Fred Clipsham, Michael Fougere, Bill Gray, Rob Deglau

- Regina Chamber of Commerce
- Utilities

SaskEnergy:	Richard Brandvold
TransGas:	Kon Stolz
SaskTel/FO:	Chris Bolhken, Rob Humphrey
SaskPower:	Jim Harris, Tim Eckel, Bob Cooper, Barry Lee, Jason Doell
Water/Storm Sewer:	City of Regina

- Sask Environment: Fred Beek
- Wascana Creek Conservation and Development Authority:
  Rod Heise
  Martin Bechard
  Erwin Bettel
  Jacques Poissant
  David Sloan
- Wascana Centre Authority:
  Ken Dockham
  Van Isman
- Landowners: (Excluding Open House Contacts)

Robert Zinkhan	SE 23-17-19-2 (Tim Zinkhan, Son, contacted)
Agriculture/Agri-Food Canada	S½ 4-17-19-2 (Ryan Muscoby contacted on behalf of Roy Ferguson)
Gordon Gardiner	SW 2-17-19-2 (Mrs. Gardiner contacted)
Peter Whitmore	N½ 31-16-19-2
Garnet Cedar	SW 3-17-19-2 (Parcel "A")

- Sub-Consultants:

Drainage:	Water Resource Consultants Ltd. - Ray Pentland, P.Eng.
Geotechnical:	Ground Engineering Ltd. - Tim Adelman, P.Eng.
Noise Attenuation:	Patching Associates Accoustical Engineering Ltd. - Richard Patching, P.Eng., Neil Morozumi, P.Eng.